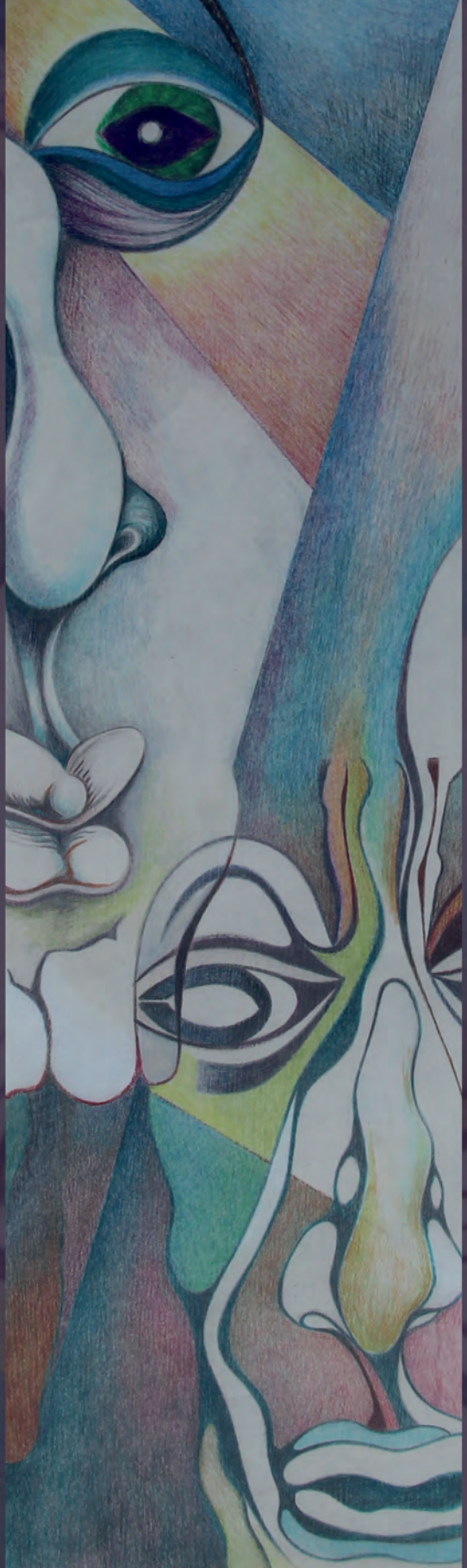

Pathways to violence in schizophrenia

Josanne van Dongen

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The role of antisocial personality, substance misuse, delusions, and delusional distress

Josanne van Dongen

Illustrations by: Marianne van Dongen
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Verschillende wegen naar geweld in schizofrenie
De rol van antisociale persoonlijkheid, middelen misbruik, wanen en waanstress

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Prof.dr. H.J.C. van Marle

Overige leden

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The best and most beautiful things in the world cannot be seen
or even touched. They must be felt with the heart.

Helen Keller

Voor mijn lieve mama

Contents

Chapter 1

General introduction

No single variable explains violence in schizophrenia; rather, violent behavior occurs within a social-ecological system, involving a *whole person* with a particular life history and state health or disease, interacting with a particular social surround.

Swanson et al. (2006)

General introduction

There is a long held general belief in society that persons with a major mental disorder are dangerous. The media play an important role in the maintenance of this belief by highlighting cases of violent acts by mentally disordered individuals. Though, during the seventies, this belief became more and more criticized. Studies on the relation between severe mental illness and (violent) criminal offending found no relation between the two. In an extensive research on violent crime by 'mentally abnormal offenders' in Germany, Häfner and Böker (1973) concluded that "if we define the dangerousness of the mentally abnormal as the probability of their committing a violent crime, then our findings show that this does not exceed the dangerousness of the legally responsible adult population as a whole" (p. 284). From The Baxstrom Studies (Cocozza & Steadman, 1974), we learned that psychiatry failed in the prediction of dangerousness in the mentally ill. Similarly, in the Netherlands, Tuinier (1989) wrote his dissertation on a field study on the relation between psychiatric syndrome and criminality. He also concluded that psychiatric syndromes (except for abuse disorders) have no relation with criminal offending.

This trend of *decriminalization* continued in the nineties. Steadman et al. (1998) conducted the MacArthur Risk Assessment study. This longitudinal study followed up patients discharged from acute inpatient facilities and compared them to individuals from the same neighborhoods The authors concluded that there was no significant difference in the rate of violence posed by the discharged patient group as compared with the community population. Appelbaum, Robbins, and Monahan (2000) further examined this data and studied the link between delusional beliefs and violent behavior. They also concluded that there was no association between delusions and violent behavior, nor between delusions and recidivism rates. Similarly, in a meta-analysis conducted by Bonta, Law, and Hanson (1998) it became clear that there was no difference in recidivism of violence between mentally disordered offenders or non-disordered offenders. All this showed evidence that there was no relation between major mental disorder and (violent) crime. It was thought that higher rates of criminal behavior by persons with a major

mental illness resulted from *criminalization of mental illness.* That is, crime rates in discharged patients reflect strange behavior associated with the illness and not the underlying antisocial behavior (Teplin, 1984).

At the same time as decriminalization occurred, some important studies were published showing an association between psychosis and violent behavior. For example, Taylor and Gunn (1984) investigated a large prison sample, and found that the prevalence of major mental disorders in prison was high. That is, 9% of a sample of 1241 men showed symptoms of a major mental disorder. Most of them were psychotic, with schizophrenia as the most frequent diagnosed disorder (see Box 1 for diagnostic criteria). One year later, Taylor (1985) wrote her often cited work: "Motives for offending violent psychotic men." In this paper she concluded that an important motive for offending in psychotic offenders are positive symptoms (e.g. delusions and hallucinations) that drive them to violent. In the following years, data from the MacArthur risk assessment study (see Monahan et al., 2001), where the conclusions of Steadman and colleagues (1998) and Appelbaum and colleagues (2000) were based on, were reexamined. As a result, Robbins, Monahan, and Silver (2003) and Teasdale, Silver, and Monahan (2006) found that when taking gender into account, there is an association between psychotic symptoms and violent behavior. That is, men are more likely to behave violently when they experience threat delusions. In contrast, females more often adopt a *tend-and-befriend* coping strategy and therefore are less likely to behave violently when experiencing threat delusions (Teasdale et al., 2006).

Recent reviews have shown that there is a small, but significant relation between psychosis and (violent) criminal behavior (e.g. Douglas, Guy, & Hart, 2009; Fazel, Gulati, Linsell, Geddes, & Grann, 2009; Taylor, 2008). The meta-analysis conducted by Douglas et al. (2009) provided strong support that psychosis and violence are associated to one another, but with a small overall effect size that varies considerably across the studies. Psychosis was reliably associated with a 49%-68% increased likelihood of violence. What the authors also showed was that the inconsistent results of earlier research (see previous paragraph) may be explained by a selection bias. That is, a relation between psychosis

may be found in one population (e.g. prison sample), but not in another (e.g. discharged patients).

The relation between schizophrenia and violent crime is stronger than that between schizophrenia and non-violent crimes (e.g. Belfrage, 1998; Côté & Hodgins, 1992; Lindqvist & Allebeck, 1990), including increased risk of homicide (see Large, Smith, & Nielssen, 2009 for a systematic review and meta-analysis). Odds ratio's for homicide in schizophrenia range between 5.85 and 18.38 depending on gender and comorbid substance use and dependence diagnoses (Eronen, Tiihonen, Hakola, 1996; Schanda et al., 2004). The pooled proportion of homicide by persons with schizophrenia is found to be 6.5% (Large et al., 2009).

In the Netherlands, the incidence of homicide by persons with a psychotic illness is found to be 0.05 per 100.000 citizens. And the prevalence is found to be 12.6%, which is comparable to the figures found in other countries (see Liem &Vinkers, 2012).

One of the reasons why studies on the relation between psychosis and violence are found to be inconsistent, are confounding factors that influence the results. For instance, comorbid factors in persons with psychosis, such as personality problems and/or substance use may influence the relation between psychosis and violent behavior. On the basis of these comorbid factors, one can define different types of offenders. Currently, we speak of different subtypes of offenders with schizophrenia. These subtypes, and the role of specific comorbid psychopathological factors, are discussed in more detail in subsequent paragraphs.

First, I would like to illustrate the role of comorbidity and the existence of distinct types of offenders, by introducing some cases of persons with a psychotic disorder who have committed a violent crime. These cases illustrate the heterogeneity of offenders with psychosis, because they differ in background, symptomatology and comorbidity, which result in different pathways to violent offending.

BOX 1. DSM-IV-TR criteria for schizophrenia

Diagnostic and Statistical Manual of Mental Disorders IV (DSM-IV-TR) diagnostic criteria for schizophrenia.

A. Characteristic symptoms: Two (or more) of the following. Each present for a significant portion of time during a 1-month period (or less if successfully treated):

- Delusions
- Hallucinations
- Disorganized speech
- Disorganized or catatonic behavior
- Negative symptoms

B. Social/occupational dysfunction: For a significant portion of the time, since the onset of the disturbance, one or more major areas of functioning such as work, interpersonal relations, or self-care are markedly below the level achieved prior to onset (or when the onset is in childhood or adolescence, failure to achieve expected level of interpersonal, academic, or occupational achievement.

C. Duration: Continuous signs of the disturbance persist for at least 6 months, including at least 1 month of symptoms that meet Criteria A.

D. Schizoaffective and Mood disorder are excluded.

E. Substance/general medical conditions are excluded.

F. Relationship to a pervasive developmental disorder: Additional diagnosis of schizophrenia is only made if prominent delusions or hallucinations are present for at least one month.

(APA, 2000)

BOX 2.

Roland, a 42 years old man had killed his mother, skinned her, and walked the streets. This was not his first crime, Roland was known by the criminal justice system for years. He had not finished secondary school and had started making trouble since then. In an expert report to the court by psychologists and psychiatrists it became clear that he suffered from religious delusions. He said that he had received commands from God via satellites. He had to sacrifice what he loved most, his mother.

BOX 3.

In 1998, Willem, a 37 years old man without a criminal record worked on an oil platforma and murdered his colleague with an ax. Willem had been in an acute psychotic episode and was convinced that his new colleague was the guy who had raped his sister. In addition, this new colleague seemed to keep a close eye on everything that Willem did. As a result, Willem felt threatened and distressed, and the two frequently had an argument. Then, during night, Willem suddenly committed this very serious crime. After observation in a forensic clinic, Willem was sentenced with a TBS order.

Roland (see BOX 2) has been known by the criminal justice system for years, and has been in and out of psychiatric services. In one psychotic episode he commits as terrible crime (killing his mother) motivated by his delusions. In contrast, Willem (see BOX 3) does not have a criminal record. He has a job, is married, and despite of his illness he seemed to function very well. Then, motivated by the distress caused by his delusional idea that the rapist of his sister is following his every step, Willem murdered his colleague. Gregor (see BOX 4) is an example of an offender with psychosis who also has a comorbid diagnosis of antisocial personality disorder. Gregor uses multiple types of substances and had started to use them at a young age. His offenses seem to be motivated by selfishness and without any concern for the consequences of his acts or empathy for his victims. Therefore, his violent acts seem to be motivated by his antisocial personality and do not seem to be caused by psychotic symptoms. It is important to acknowledge the heterogeneity of offenders with schizophrenia and the fact that the motive for committing a violent act is different for each subtype.

BOX 4.

Gregor, a 45 years old man came into contact with the justice system at age 14. He is known by psychiatric institutions for years and since the age of 22 years he is diagnosed with schizophrenia. From early age on he was in a lot of trouble, used alcohol, cannabis, and sometimes amphetamines, and began stealing at age 13. He committed multiple (violent) robberies. As he said, this was just for partying and for his own gain. In TBS, he was diagnosed with both schizophrenia and antisocial personality disorder.

Aggression and violent behavior

In studying aggressive and violent behavior in schizophrenia, we need a clear definition of the concepts of aggression and violent behavior. The fact that studies in this field use different definitions of these constructs is pointed out in the review by Douglas and colleagues (2009): "There is no simple way to define or measure violence."(p. 4). Additionally, the terms 'aggression' and 'violence' are often used interchangeable. In this dissertation, we will use the definition proposed by Moyer (1976): *Aggression* is "overt behavior involving intent to inflict noxious stimulation or to behave destructively toward another organism" (Moyer, 1976, p. 2). And, regarding aggression towards inanimate objects: "Destructive behavior against inanimate objects is only considered if frustration or aversive stimulation is involved" (p. 3). *Violence* refers to aggressive behavior among humans, thereby excluding aggressive behavior in animals or against objects (Volavka, 2002).

There are several ways to operationalize and measure aggressive behavior (see Suris et al., 2004 for a review). Some studies operationalize aggression by official criminal records (e.g. Steadman et al., 1998; Tiihonen, Isohanni, Räsänen, Koiranen, & Moring, 1997). Others use self-report questionnaires (e.g. Aggression Questionnaire; Buss & Perry, 1992; Reactive and Proactive Aggression Questionnaire; Raine et al., 2006), or observation scales (e.g. Social Dysfunction and Aggression Scale; Wistedt et al., 1990; Staff Observation Aggression Scale Revised; Nijman et al., 1999). Laboratory measures that are often used include the Hot Sauce Paradigm (Lieberman, Solomon, Greenberg, & McGregor, 1999) and the Point Subtraction Aggression Paradigm (Cherek, 1992). All of these have their advantages and limitations. The advantage of criminal records is that the acts are officially recorded. But, it is likely that these figures are an underestimation of (violent) offending and aggressive behavior, therefore self-reports can be usefull, although their validity and reliability has to be warranted (Thornberry & Krohn, 2003). Using self-reports, one can include a wider range of problem behaviors that are not registered in police records, such as aggressive behavior that has not been officially recorded. Using experimentally induced aggression is in favor when one wants to make causal inferences, which cannot be

accomplished using self-reports. However, as with self-report measures, experimental tasks have to be valid and reliable to be sure that one measures the construct that is under study, which is aggressive behavior.

Related to the problem of operationalization, it is important to consider diverse concepts used to define aggression and violence. These different concepts reflect several types of aggression based on diverse motivations. By taking these into account one can hopefully better understand the etiology of aggressive behavior. Different types of aggression can be distinguished on the basis of aggression form (e.g. verbal, social or physical) and function (e.g. impulsive or predatory) (Vitaro, Brendgen, & Barker, 2006). For example, some studies only focus on physical aggression in humans, including beating. Other studies use more broad definitions of aggression by including also verbal and social aggression such as making threats to another person, or social exclusion.

Aggressive and violent behavior can be categorized as either reactive (impulsive) or proactive (premeditated) aggression on the basis of their function (Cornell et al., 1996; Dodge & Coie, 1987; Miller & Lynam, 2006). *Reactive aggression* is characterized by negative affect including hostility, and often is a response to provocation (Dodge & Coie, 1987). Reactive aggression is assumed to result from social-information processing difficulties. An example would be that one incorrectly interprets intent of others as hostile. Reactive aggression is found to be associated with early temperamental difficulties, such as inattentiveness and reactivity, anxiety and later feelings of depression (Vitaro et al., 2002). Therefore it is suggested to be involved in difficulties in information-processing capabilities and emotion regulation. In line with this, reactive aggression is found to be associated to schizotypal symptoms as unusual perceptual experiences and delusional beliefs (Raine et al., 2006) and schizophrenia in adulthood (Vitiello et al., 1990). Also, reactive aggression is found to be associated with impulsivity and trait anxiety (Raine et al., 2006). *Proactive aggression* is characterized by goal directed behavior that is most often planned, cold-blooded and is more in line with the acquisition of imitative aggressive acts by role models. Researchers explain proactive aggression using the 'social learning theory' (Bandura, 1973), in that it is assumed to be acquired by the observation of role

models. Proactive aggression is found to be associated with psychopathic personality traits (Cornell et al., 2006). For instance, persons with higher scores on the Psychopathy Checklist-Revised (Hare, 1991), are more likely to show proactive aggression than persons who have low scores on the PCL-R. Also, proactive aggression, but not reactive aggression predicts later delinquency and disruptive behavioral problems (Vitaro, Brendgen, & Tremblay, 2002; Vitaro, Gendreau, Tremblay, & Oligny, 1998), and is associated with a negative childhood environment (Raine et al., 2006).

Referring to the introductory cases, one can imagine that the homicide in the case of Willem can be viewed as a reactive violent act. Willem felt threatened, which is regarded as a provocative situation. In contrast, the robberies of Gregor can be viewed as acts of goal oriented predatory violence. Gregor just wanted to get money to party and did not think about the negative consequences for his victims. Because of the different external correlates of these two different types of aggressive behavior, we also made this distinction in our research.

Schizophrenia and aggressive behavior

One explanation for previous inconsistent results with respect to violence in psychosis may be the presence of confounding factors associated with violence, such as gender, age, low social economical status, and comorbidity of substance use and/or antisocial personality (Douglas et al., 2009). Besides these confounders, there are other moderating factors such as methodological diversity. Namely, Appelbaum et al (2000) using data from the McArthur risk assessment study, did not found an association between psychosis and violence in discharged patients. But studies using inpatients samples did show a relation (e.g. Cheung, Schweitzer, Crowley, & Tuckwell, 1997; Nolan et al., 2005). Inpatient violent behavior is found in high rates in psychiatric wards (see Daffern & Howells, 2002 for a review). Although (severe) physical violence may be scarce (e.g. Nijman, Bowers, Oud, & Jansen, 2005), staff members working with involuntary admitted patients experience a substantial amount of aggression. Results regarding violence in schizophrenia in inpatient samples may differ from results obtained from community based samples. For although

demographic factors, and comorbid factors such as antisocial personality and substance use may are related to violence posed by persons with schizophrenia in the community, the role of these factors in inpatient setting may be less important (Steinert, 2002).

In this dissertation we will focus mainly on psychotic symptoms and the comorbid factors antisocial personality and substance use. Regarding positive symptoms, research have shown that patients with psychosis and a violent past have more positive symptoms than patients without a violent past (Frésan et al., 2005). And, the more positive symptoms a patient has, the more likely it is that he will show aggressive behavior (Steinert, Wolfle, & Gebhardt, 2000). Studies found that when controlling for confounders such as antisocial personality characteristics and substance use, there is still a significant relation between psychosis and violence (Brennan, Mednick, & Hodgins, 2000; Swanson et al., 2006).

Underlying antisocial personality traits may partly explain a higher risk of showing aggression and violent behavior among individuals with schizophrenia. Different studies found that antisocial personality and psychopathic traits are more common in persons with schizophrenia than in persons from the general population (Moran & Hodgins, 2004; Mueser et al., 2006; Nolan, Volavka, Mohr, & Czobor, 1999; Tengström, Grann, Langström, & Kullgren, 2000). For example, Nolan and colleagues (1999) found that persons with schizophrenia and a history of violence more often had a comorbid psychopathic personality. None of the persons with schizophrenia without a history of violence scored above the cut-off score for psychopathic personality.

Persons with schizophrenia also tend to have comorbid substance use problems, which further increase the risk of violent behavior (Erkiran, Özünalan, Evren, Aytaclar, Kirisci, & Tarter, 2006; Putkonen, Kotilainen, Joyal, & Tiihonen, 2004; Swanson, Holzer, Ganju, & Tsutomu Jono, 1990; Tiihonen, Isohanni, Räsänen, Koiranen, & Moring, 1997). However, this comorbidity of substance use is often explained by the presence of antisocial personality characteristics. Tengström et al. (2004) found that when taking psychopathic personality into account, the comorbidity of substance use disorders does not add to the prediction of risk for offending. Presence of early conduct problems seems

to be associated with comorbid substance use in schizophrenia (Mueser et al., 1997; Swartz et al., 2006). Thus, some persons with schizophrenia may have a triple diagnosis which makes them even more disabled, and therefore more prone to exhibit violent and criminal behavior (Putkonen et al., 2004).

In the current thesis, we will investigate these different comorbid factors in pathways to violence in schizophrenia, because to our knowledge, no study has previously investigated the unique role of positive psychotic symptoms in relation to other comorbid factors such as antisocial and psychopathic traits and substance use.

Subtyping offenders with schizophrenia

On the basis of the aforementioned comorbid factors, one can subtype offenders in schizophrenia. Subtyping adds to the understanding of different pathways into violent behavior in those individuals, which in turn can lead to more effective treatment interventions. Looking back at the different offender cases illustrated in Box 2 to 4 in Chapter 1 of this dissertation, it follows that although all three are offenders with schizophrenia, they can be subtyped on the basis of their comorbid characteristics such as presence of antisocial personality.

The recognition of subtyping is based on the work of both Pamela Taylor (e.g. Humphreys, Johnstone, MacMillan, & Taylor, 1992; Jones, Van den Bree, Ferriter, & Taylor, 2009; Taylor, 1998; Taylor & Hodgins, 1994), and Sheilagh Hodgins (e.g. Hodgins, 1995; Hodgins, Côté, Toupin, 1995; Tengström, Hodgins, Kullgren, 2001) in their research on violent offenders with 'pure' psychosis and those with psychosis and comorbid antisocial personality. In earlier work of Taylor (i.e. Humphreys et al., 1992) it was shown that in a sample of patients who were admitted to a psychiatric hospital for the first time, there were some patients who showed dangerous behavior before any sign of psychotic illness. Though, the majority of the patients who were admitted showed dangerous behavior that was related to their psychotic illness. Most common was dangerous behavior associated with having delusions of being poisoned.

Hodgins (1995) labeled these different types of offenders *early starters* and *late starters.* Early starters begin their delinquent behavior at a young age *before* the onset of the psychiatric disorder. Their delinquent behavior is attributed to a pre-morbid antisocial personality. The late starters on the other hand, begin their delinquent behavior *after* the onset of the psychiatric disorder. Their criminal behavior is attributed to perceptual and cognitive symptoms of the disorder (Hodgins, 1995).

These findings are confirmed by a recent review that summarizes research on early and late starters. Bo, Abu-akel, Kongerslev, Haahr, and Simonsen (2011) concluded that there seem to be at least two trajectories in schizophrenia that lead to violence. First, there is a trajectory characterized by antisocial behavior prior to the onset of the psychotic illness. In this type, antisocial and psychopathic traits primarily explain aggression and violent behavior in persons with schizophrenia. The second trajectory of violence in schizophrenia is primarily explained by positive psychotic symptoms (e.g. delusions and hallucinations) of the schizophrenia disorder.

Recently, Hodgins (2008; 2009) suggested that there may be a third offender type within the typology. These are men in their late thirties with a schizophrenia disorder who *suddenly* commit a *very serious* crime. They commit this first offense after the onset of their disorder, and may be so called *first offenders*. Hodgins hypothesized that their offending may be associated with higher levels of so called Deficient Affective Experiences (DAE; Moran & Hodgins, 2004). These symptoms include shallow affect, callousness, lack of remorse, and failure to accept responsibility for own actions. First offenders usually obtain a higher level of academic and social functioning because, as compared with early starters, they are less likely to have a history of disruptive behavior, and are less likely to have had a negative childhood environment. This group contrasts with the late starters, in that the late starters continue a criminal career, often with a variety of less serious offenses, whereas first offenders commit a single very serious offence.

Referring to the introductory cases, and looking in to them more closely, Gregor (Box 4) can be regarded as an early starter. Diagnosed with a premorbid antisocial personality disorder and higher rates of psychopathic personality traits he is repetitively

involved in (violent) criminal acts. Despite his treatment with antipsychotic medication, his violence risk is still high. That is, although his positive symptoms may have been reduced by successful treatment, his latent antisocial personality becomes more apparent and therefore the risk is still increased. Roland (Box 2) can be regarded as a late starter. His criminal career did not start until the onset of his schizophrenia disorder, and subsequently he was repeatedly involved in criminal behavior of which his last act was the very extreme killing of his mother. Willem (Box 3) is illustrative of a first offender. He was in his late thirties when he suddenly committed a very serious offense (homicide) motivated by the distress and anger that he felt accompanying his delusion that his colleague was the rapist of his sister. At the moment, Willem is treated with antipsychotics to reduce his positive symptoms and with benzodiazepines to reduce his distress. His violence risk is now considerably reduced.

On the basis of the literature reviewed above, it is concluded that the relation between violence and schizophrenia is not yet clearly understood. Although there is evidence of subtypes within offenders with schizophrenia, more knowledge is needed on specific factors associated with the pathways to violence in schizophrenia.

The role of persecutory delusions and delusional distress

With respect to positive symptoms, delusions (not hallucinations) seem to account for most of the (violent) offending in persons with a psychotic disorder (Taylor, 1985; Taylor et al., 1998; Swanson et al., 1996). It was thought that particular symptoms, known as *threat/control-override symptoms* are associated with violent behavior in persons with psychosis (Link, Monahan, Stueve, & Cullen, 1999; Link & Stueve, 1994; Link, Stueve, & Phelan, 1998). It is assumed that these symptoms will lead to violence if they cause a person to perceive others as harmful (e.g. threat delusions) or when these symptoms intrude in such a way as to override internal controls (e.g. influence delusions). However, in contrast to what was thought previously, studies found that especially the threat delusions (not the control-override delusions) are associated with violent behavior (Björkly, 2002; Stompe, Ortwein-Swoboda, & Schanda, 2004; Teasdale et al., 2006). More

specifically, persecutory delusions seem to be most strongly related to violence (see Björkly, 2002 for a review). Persons with persecutory delusions have the conviction that others will cause them psychological, physical or social harm (Freeman and Garety, 2000). The person feels that this harm will be inflicted currently or in the future. In addition, the person feels that the harm is intentional.

The link between persecutory delusions and aggressive behavior is not yet clearly understood. Some authors suggest that violent behavior could be explained by a so called *acting upon delusions* or *symptom consistent violence* (Buchanan et al., 1993; Junginger et al., 1998; Wessely et al., 1993). Freeman and colleagues (2007) showed that patients adopt safety behaviors to cope with their persecutory delusions and that patients adopt more safety behavior when feeling distressed. And although aggression is a less common safety behavior (Freeman et al., 2007), presence of delusional distress resulting from persecutory delusions may explain why people act upon their delusion with violent behavior (see Björkly, 2002). Delusional distress is defined as negative affect and stress associated with the delusional beliefs. Delusional distress is one of the factors likely to cause the person to act upon his persecutory delusions (Buchanan et al, 1993).

Considering the introductory cases, Willem (Box 3) is an example of an offender who had persecutory ideas. He thought that his new colleague was the rapist of his sister, and was know keeping a close eye on him. This idea caused him so much distress that for Willem there was no other way to protect himself and his sister then to kill his colleague.

Aims and outline of this thesis

The main aim of this thesis is to further elucidate the relation between schizophrenia and aggressive and violent behavior. That is, despite many studies on this topic, we still do not know the specific relation between the two, and therefore in the current thesis, pathways to violence in schizophrenia are studied. **Chapter 1** gives a review of the literature on violence in schizophrenia. After this, the empirical work is divided in two parts. Part One will concentrate on subtyping offenders with schizophrenia, and aims to explain which factors predict whether one becomes an early starter, late starter or first offender as

compared with a non-offender with schizophrenia. In **Chapter 2** we examine the new formulated third type of offenders with schizophrenia; the first offenders**.** This chapter aims to specify this type within the early/late start typology by contrasting early starters, late starter, and first offenders on a variety of variables (e.g. psychopathology and offense characteristics). In **Chapter 3** we test the hypotheses on the etiology of the early and late starters formulated in the literature. In this theory it is hypothesized that the criminal offending of early starters is initiated by a premorbid antisocial personality, and that the offending of late starters and first offenders will be explained by the presence of psychotic symptoms (e.g. delusions and hallucinations). To study this, we compared the offender groups with two contrast groups; offenders without a major mental disorder, and non-offenders with schizophrenia. In **Chapter 4** we aim to reveal which etiological factors predict whether, compared to a non-offender, a person with schizophrenia becomes an early starter, late starter, or first offender.

Part Two of this thesis focuses on the role of persecutory delusions and delusional distress in violence by persons with schizophrenia. Secondly, the unique contribution of persecutory ideations, substance use, and psychopathic traits in predicting inpatient aggression will be examined. In **Chapter 5**, the Dutch version of the Persecutory Ideation Questionnaire (PIQ; McKay, Langdon, & Coltheart, 2006), an assessment instrument that specifically measures persecutory ideations will be validated in a non-clinical and clinical sample. In **Chapter 6,** using a quasi experimental design in a patient sample, we examine the unique contribution of persecutory ideations in the prediction of inpatient aggression next to psychopathic traits and substance use. In the study described in **Chapter 7** we investigate the relation between persecutory ideations and several types of aggressive behavior in a non-clinical sample. Additionally, the role of ideational distress in this relation will be studied. In the last study, described in **Chapter 8,** the mediating role of delusional distress in the relation between persecutory ideations and inpatient aggressive behavior on the ward will be examined. In the General discussion (**Chapter 9**), the main conclusions are summarized. In addition, limitations of the studies are described, and implications for practice and directions for future research are provided.

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Part One

Subtyping offenders with schizophrenia

While the individual man is an insoluble puzzle, in the aggregate he becomes a mathematical certainty. You can, for example never foretell what any man will do, but you can say with precision what an average number will be up to.

A. Conan Doyle

Chapter 2

First offenders with psychosis:

Justification of a third type within the early/late start offender typology

Josanne D. M. van Dongen

Nicole M. L. Buck

Hjalmar J. C. van Marle

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Abstract

Within the early/late start typology of offenders with schizophrenia, a third type, first offenders, has been proposed. The aim of this study was to examine the justification of this first offender type. Retrospective file study consisted of 97 early starters, 100 late starters, and 26 first offenders. Variables in different domains were scored. There were significant differences between the groups within the domains life functioning, abuse and family-related problems, psychiatric functioning, substance misuse, antisocial personality and offense characteristics. Most differences were between the early starters and first offenders. The existence of the first offender type is justified by the present findings. These findings underscore the importance of offender subtyping for better offender treatment interventions.

Introduction

Recent meta-analyses revealed a small but significant relationship between having a psychotic disorder, and criminal behavior (Douglas, Guy, & Hart, 2009; Taylor, 2008). According to the early and late start offender typology (Hodgins, 1995), there are two types of offenders among persons with a major mental disorder. The first group is the early starter; persons in this group begin their delinquent behavior at a young age *before* the onset of the psychiatric disorder. Their delinquent behavior is attributed to a pre-morbid antisocial personality. The late starters on the other hand, begin their delinquent behavior *after* the onset of the psychiatric disorder. Their criminal behavior is attributed to perceptual and cognitive symptoms of the disorder (Hodgins, 1995; Pedersen, Rasmussen, Elsass, & Hougaard, 2010).

Recently, Hodgins (2008) suggested that there may be a Type 3 offender among persons with a major mental disorder. These offenders are men in their late thirties with a schizophrenia disorder who *suddenly* commit a *very serious* offense. They commit this first offense after the onset of their disorder, and may be so called *first offenders*. Note that this group follows the late start pathway, but contrasts with the late starters, in that the late starters are more likely to start a criminal career with a variety of less serious offenses. The first offenders suddenly commit a very serious (often fatal) offense without signs of (premorbid) antisocial personality. The main aim of this study was to investigate offender characteristics of this new group within the early start and late start typology in offenders with schizophrenia. Such knowledge on subtypes in these offenders is important for it can help improve their treatment, prevent offending, and reduce recidivism.

Previous studies examining the early start and late start typology found differences between these groups in different domains. With respect to life functioning, early starters more often have poor academic performance; more often only have lower education and are less likely to be employed (Pedersen et al., 2010; Tengström, Hodgins, Kullgren, 2001).

Regarding abuse- and family-related problems, parents of early starters are found to be more often convicted of crimes than parents of late starters (Jones, Van den Bree, Ferriter, & Taylor, 2009; Mathieu & Côté, 2009), and paternal substance misuse is more often found among parents of early starters than among parents of late starters (Laajasalo & Häkkänen, 2005; Mathieu & Côté, 2009; Tengström et al., 2001). Early starters are more likely to be separated from their parents in childhood due to outplacement (Laajasalo & Häkkänen, 2005; Tengström et al., 2001). In addition, since physical and sexual abuse in childhood is found to be related to criminal behavior later in life (Herrenkohl & Russo, 2001; Weiler & Widom, 1996), one would expect that a larger proportion of early starters compared with late starters is abused in their youth. But, this has not been tested within the early/late start typology.

Differences between early starters and late starters regarding psychotic symptomatology have not been studied previously either. But since it is hypothesized by Hodgins, Côté, and Toupin (1995) that the criminal behavior of late starters is more attributable to perceptual and cognitive symptoms of the major mental disorder, one would expect that the early starters and late starters differ with respect to symptomatology. For example, late starters may exhibit more positive symptoms (delusions and hallucinations). Regarding other variables in the domain of psychiatric functioning, previous studies showed that early starters have a younger age at first hospitalization (Tengström et al., 2001), and are more likely to have been institutionalized or hospitalized (Jones et al., 2009; Matieu & Côté, 2009).

With respect to antisocial personality as a premorbid factor for criminal and violent behavior in early starters, previous studies found that early starters are more often diagnosed with an antisocial personality disorder (Goethals, Willigenburg, Buitelaar, & Van Marle, 2008; Matieu & Côté, 2009; Tengström et al., 2001) and although it seems tautological, they are more likely to show disruptive behavior during childhood and/or adolescence. In addition, Tengström and colleagues (2001) found that early starters have a higher total score on the Psychopathy Checklist Revised (Hare, 1991), a measure that scores the level of psychopathic traits.

With respect to substance misuse, previous studies found that early starters are more likely than late starters to have co-morbid substance use disorders as adults and start using substances at a younger age than late starters (Goethals, Buitelaar, & Van Marle, 2008; Jones et al., 2009; Mathieu & Côté, 2009; Pedersen et al., 2010). For instance, Tengström and colleagues (2001) found that early starters had a co-morbid diagnosis of substance use disorder in more than three quarters of the cases, while this was true for nearly half of the late starters. In line with the finding by Tengström et al. (2001), studies on persons with a major mental disorder and co-morbid antisocial personality showed that these patients often have a triple diagnosis with a co-morbid substance use disorder (Mueser et al., 2006; Putkonen, Kotilainen, Joyal, & Tiihonen, 2004).

Regarding offense characteristics, studies found that early starters commit more crimes than late starters (Laajasalo & Häkkänen, 2005; Mathieu & Côté, 2009; Pedersen et al., 2010). In line with this, individuals with schizophrenia and more psychopathic traits (which is thought to be characteristic of early starters) commit more violent offenses than individuals with schizophrenia but fewer psychopathic characteristics (Nolan, Volavka, Mohr, & Czobor, 1999; Tengström et al., 2001; Tengström, Grann, Langström, & Kullgren, 2000; Tegtröm, Hodgins, Grann, & Langström, 2004). In addition, Woodworth and Porter (2002) found that homicides committed by offenders with more psychopathic traits are more often proactive offenses. Therefore, one would expect that early starters will show more proactive offenses than late starters. Furthermore, victims of late starters were more often a family member, whereas victims of early starters were more often strangers (Laajasalo & Häkkänen, 2005). Finally, some studies found that in contrast with late starters, early starters are more often intoxicated at the time of the offense (Goethals et al., 2008; Tengström et al., 2001).

Although first offenders as a third type in the early/late start typology is mentioned in a few articles (Hodgins, 2008; Pedersen et al., 2010), there is no published research in on this typology. But, findings of studies examining homicide offenders are in line with the expected characteristics of this third group. That is, these studies found that

most offenders with a schizophrenia disorder have no history of serious violence or other antisocial behavior (Beaudoin, Hodgins, & Lavoie, 1993; Erb, Hodgins, Freese, Müller-Isberner, & Jöckel, 2006.

Based on the literature (e.g. Hodgins, 2008), it can be hypothesized that first offenders may obtain a higher level of functioning in life because they are thought to be less likely to have a history of disruptive behavior, and are less likely to have had family-related problems in childhood as compared with early starters. Also, it is likely that they have more positive symptoms at the time of the offense that drove them to commit the crime, may be in conjunction with a Deficient Affective Experience (e.g. shallow affect, callousness, lack of remorse, failure to accept responsibility for own actions). They are not likely to have a co-morbid antisocial or psychopathic personality, nor are they likely to use substances before the onset of the schizophrenia disorder. With respect to offense characteristics, they are more likely to have attacked family related victims, may be more likely to have committed a homicide, and may have acted primarily in a reactive aggressive manner.

The main aim of the present study was to test whether the addition of a third type (i.e. first offenders) to the early and late start typology, is justified. Therefore, we compared first offenders, early starters and late starters to each other with respect to social functioning, abuse and family-related problems, psychiatric functioning, substance use, antisocial personality, and offense characteristics. In previous studies, several definitions were used to allocate subjects to the early start and late start offender groups. These are: (1) first offense committed before or after 18 years of age (Goethals et al., 2008; Tengström et al., 2001), (2) whether or not there was co-morbid conduct disorder or antisocial personality disorder (Matieu & Côté, 2009; Pedersen et al., 2010), and (3) whether an offense had been committed before or after the first psychiatric hospital admission (Jones et al., 2009). Jones and colleagues (2009) suggested that the offending of early starters may have caused a delay in treatment of early starters. If this is the case, making a distinction based on first admission may not be correct. In addition, making a distinction based on age may be questionable as well. Indeed, late starters with an age

above 18 years can actually be early starters. Also, because previous studies did not include the onset of the disorder in the definition, early starters could have been late starters.

In the present study we tried to overcome these difficulties with the definition of the early starters and late starters by defining the groups based on whether they committed their first offense before or after the onset of the schizophrenia disorder. The present study is the first to examine *first offenders* in the early/late start offender typology. First offenders are those late starters who have committed their first offense, which is a very serious offense, after age 35 years (Hodgins, 2008). We hypothesized that early starters in our study are similar to those defined in previous studies. In contrast, late starters as defined in previous studies are a combination of what we define to be late starters and first offenders. We hypothesize that first offenders will differ from early starters as well as from late starters on a broad range of variables, and that late starters will be more comparable to early starters.

Methods

Sample

The sample consists of all 223 reports to the court (94.2% male, 5.8% female) of suspects admitted to the Obervation Clinic of the Ministery of Justice (Pieter Baan Center) in Utrecht, The Netherlands. Their mean age was 34.08 (*SD* = 9.01) with a range of 17.95 to 59.49 at the time they were admitted for observation. They had been diagnosed with a schizophrenia spectrum disorder, and were examined in the years 1993 to 2008. The Pieter Baan Center is part of the Netherlands' Institute of Forensic Psychiatry and Psychology. When a person accused of a serious offense is referred to this institute, he or she has to undergo a clinical pretrial assessment for the court and is observed by behavioral experts for seven weeks to determine whether the defendant has a mental disorder and can be held responsible for his or her act (for more information see Van Marle, 2000). These assessments are standardized, multidisciplinary and therefore

extensive and complete in its information. In this sample, 80.7% of the persons were diagnosed with schizophrenia, 6.7% were diagnosed with a schizoaffective disorder, and 12.6% were diagnosed with a delusional disorder. Their ethnical background was based on country of birth of the mother. In the complete sample, 43.1% had a Dutch background. The background of others was Moroccan (10%), Turkish (4.6%), Surinamese (12.7%), Netherlands Antillean (5%), and Cape Verdean (1.2%). In 2.3% their mother was born in another western country, in 6.5% she was from a refugee country and 14.6% had another background.

The persons in the sample were allocated to one of three groups: early starters (ES), late starters (LS), and first offenders (FO) based on the start of the prodromal phase and first offense. Onset of prodromal phase was determined by onset of disturbed behavior (Yung & McGorry, 1996). In reports to the court this was described as the loss of motivation, depressed mood, anhedonia, anger and irritability, attention problems, suspiciousness, social withdrawal, and psychotic-like experiences. First offense was based on first convicted crime stated in the criminal record. ES had committed their first offense before onset of the prodromal phase. LS had committed their first offense after the onset of the prodromal phase. FO were defined as those LS who had never been convicted of a crime before admission to the Observation Clinic, and were older than 35 years of age when they committed their (first) offense. The cutoff of 35 years was based on the proposition that first offenders are in their late thirties when they commit their first offense (Hodgins, 2009). Given their age, it is unlikely that this first offense is the start of a criminal career. Severity of the offense was determined by the fact that referral to the Pieter Baan Center for a first offense often means that this is a very serious offense, otherwise one would not be referred for observation in this clinic. This resulted in 97 ES, 100 LS, and 26 FO. 37 offenders committed their first offense after onset of the disorder but fall outside the 35 years criterium. Theoretically they can become late straters, thus we could not classify this group. Therefore these offenders were excluded from the study.

Procedure

Reports to the court were consulted at the Observation Clinic of the Ministery of Justice in Utrecht. Clinical diagnoses were standardized, using the Diagnostic Statistical Manual, by a multidisciplinary team of psychiatrists and psychologists. In order to qualify for a psychotic classification in our study, patients had to have an Axis I psychotic disorder according to the DSM third or fourth edition (APA, 1980; 1987; 1994). The disorders included were schizophrenia, schizoaffective disorder, and delusional disorder. To control for the fact that observer bias might color the ratings, the variables were scored by graduate-level research assistants before assigning the cases to one of the three groups. Thus raters were blind with respect to group allocation.

Measures

All measures were scored using the clinical assessments and official records in the reports to the court. All variables were dichotomized as *yes* or *no*.

Life functioning

Marital status and employment were dichotomized as being married and employed at time of admission or not. Educational degree obtained before admission to the observational clinic was dichotomized as having finished only primary school or higher levels of education.

Abuse and family-related problems

Sexual abuse and physical abuse were scored using information provided by the participant or by third parties (e.g. social workers). If it was stated that the participant was beaten repeatedly (with objects), kicked or otherwise physically abused, the variable was scored as *yes*. Emotional abuse was scored as *yes* when parents yelled repeatedly at the person when he or she was a child, called the person names, degraded him/her, and/or bullied the child. Parental substance abuse, parental criminal behavior, and the presence

of parents during childhood were scored for both parents separately. Presence of the parents was defined as participant living with both biological parents until age 16. In addition, it was scored whether or not the person was placed outside the home when he was a child. This item was scored only when the person was placed outside the home due to incompetence of the parents.

Psychiatric functioning

Raters scored whether particular symptoms were present (as stated in the file) during the crime, and/or during hospitalization. Symptoms that were scored are hallucinations, delusions of grandeur, influence, reference and persecutory delusions. Also, it was scored whether one was previously hospitalized (in a civil or forensic mental health institution).

Antisocial personality

We scored presence of a diagnosis of APD, antisocial personality traits, and psychopathic personality traits. Disruptive behavior disorders (DBD) were coded as present if the report indicated that the person was diagnosed with a conduct disorder, oppositional-defiant disorder or attention deficit hyperactivity disorder. In addition, age when conduct problems were present was scored as before age 12 years, and between age 12 years and 18 years. Conduct problems were scored when there were problems such as running away, skipping school, or criminal activities.

Substance use

Substance use was scored as yes when substance use disorder or substance dependence was diagnosed. In addition, type of substance was dichotomously scored with *yes* and *no* for alcohol, cannabis, and other/poly substance use. It was also scored whether the persons used substances before the age of 15 years or not and whether the person used substances before the onset of the schizophrenia disorder.

Offense characteristics

Type of index offense was dichotomized as violent and non-violent convictions, whether or not it concerned a homicide offense (murder or manslaughter), and whether or not it was a proactively or reactively motivated offense (see also Dodge & Coie, 1987). The index offense was scored by the rater as reactive when in the file stated that the offense was preceded by some kind of provocation or when stated that the offense was motivated by a particular psychotic symptom (e.g. persecutory delusion). The offense was scored as a proactive offense when the offense was premeditated and without provocation of another person or situation .When the act was a reaction to a provocation, the act was scored as reactive. Note that when the offense was a reaction to a delusion or hallucination (e.g. system consistent violence), the offense was scored as reactive. Intoxication at time of the offense was scored as yes or no. Further, victim relation was scored as family or not, and crime scene was scored as public place or not.

Statistical analyses

Because the main aim of this study is to test differences between the groups on all individual variables, bivariate test statistics (chi-square statistic) were used. Given the stated hypotheses we compared each group to each other, thus we compared the ES with the LS, the ES with the FO and the FO with the LS. In cases where cells had expected counts less than 5 we reported Fisher's exact test *p*-values. All analyses were conducted using a two tailed significance level ($p < .05$).

Results

Only significant results are discussed below. For a summary of the results regarding social functioning and abuse- and family-related problems see Table 1. For a summary of psychiatric functioning, antisocial personality, and substance use see Table 2 and for a summary of offense characteristics see Table 3.

Early starters compared with late starters

Results regarding the comparison between ES and LS show that there are no differences between the two groups concerning social functioning. Results concerning abuse and family-related problems show that ES are significantly more likely to have been physically and emotionally abused. No differences were found in the domain of psychiatric functioning. However, results showed differences between the groups regarding antisocial personality. ES were more likely to have antisocial and psychopathic personality traits, and to have had conduct problems during adolescence. Also, ES were more likely to have a diagnosis of substance misuse. However, no differences between the groups were found in the type of substances misused. With respect to offense characteristics, the only difference between the groups was that in ES it was more likely that the index offense took place in a public place.

Early starters compared with first offenders

When ES were compared to FO, we found that ES were less likely than FO to be employed at the time of observation in the clinic. Also, there was a trend for FO to be more likely to be married. With respect to abuse and family-related problems, no differences emerged between the ES and FO. In addition, no differences were found within the domain of psychiatric functioning. However, major differences emerged when comparing ES and FO in the domain of antisocial personality. ES were more likely to have a diagnosis of APD, and to have antisocial personality traits. Also, ES were more likely to have had a diagnosis of disruptive behavior disorders (DBD) in childhood, and to have had conduct problems during youth and/or adolescence. With respect to substance misuse, ES were more likely to have a diagnosis of substance misuse. FO were more likely to misuse alcohol, while ES were more likely to misuse cannabis and/or other/poly substances. In addition, there was a trend for ES to be more likely to have started their substance use before age 15 years. In the domain of offense characteristics, it was found that FO were more likely to have homicide as their index offense, and it was more likely that this offense was reactive in

nature. In addition, in FO it was more likely that their victim was a family member. In ES it was more likely that their index offense took place in a public place.

First offenders compared with late starters

When FO were compared with LS, it was found that FO were more likely have been employed at the time of admission in the clinic. Also, in FO it was more likely that the father was present during childhood. No differences were found in the domain of psychiatric functioning. Regarding antisocial personality, results showed that FO were less likely to have antisocial personality traits, less likely to have had DBD in childhood and less likely to have had conduct problems during adolescence. With respect to substance misuse, results showed that FO are more likely to misuse alcohol, but less likely to misuse cannabis or other/poly substances. In the domain of offense characteristics, results showed that FO were more likely to have homicide as an index offense, and FO were more likely to have a family member as victim for the index offense.

Table 1. Differences between ES, LS, and FO in social functioning and family-related problems.

	Percentages				ES vs LS		ES vs FO		LS vs FO	
	ES	LS	FO	Total	Value†	*p*	Value†	*p*	Value†	*p*
Social Functioning										
Married	7.2	10.0	19.2	9.9	0.48	.614	3.36	.067	1.68	.195
Employed	4.1	5.0	23.1	6.7	Fisher	1.00	Fisher	.006	8.46	.004
Lower education	33.0	41.0	50.0	38.6	1.36	.244	2.56	.110	0.68	.409
Abuse and Family-related problems										
Sexual abuse	5.2	8.0	11.5	7.2	0.62	.432	Fisher	.365	Fisher	.696
Physical abuse	30.9	18.0	11.5	22.9	4.47	.035	Fisher	.500	Fisher	.562
Emotional abuse	43.3	28.0	26.9	34.5	5.03	.025	2.29	.130	0.01	.913
Father substance	23.7	15.0	19.2	19.3	2.40	.121	0.23	.628	0.28	.599
Mother substance	4.1	8.0	7.7	6.3	Fisher	.373	Fisher	.606	Fisher	1.00
Father criminal	12.4	8.0	3.8	9.4	1.03	.310	Fisher	.297	Fisher	.684
Mother criminal	0.0	2.0	3.8	1.3	Fisher	.498	Fisher	.211	Fisher	.503
Father presence	62.9	54.0	80.0	61.0	1.60	.206	2.95	.086	6.14	.014
Mother presence	88.7	88.0	92.3	88.8	0.02	.885	Fisher	.734	Fisher	.733
Placed out home	32.6	26.0	19.2	28.1	1.04	.309	1.75	.185	0.51	.475

† Df = 1

Table 2. Differences between ES, LS, and FO in psychiatric functioning, antisocial personality, and substance use.

	Percentages				ES vs LS		ES vs FO		LS vs FO	
	ES	LS	FO	Total	Value†	*p*	Value†	*p*	Value†	*p*
Psychiatric functioning										
Hallucinations	63.9	72.0	65.4	67.7	1.48	.224	0.02	1.00	0.44	.509
Grandiose delusions	37.1	40.0	30.8	37.7	0.17	.677	0.36	.549	0.75	.388
Influence delusions	22.7	22.0	15.4	21.5	0.01	.909	Fisher	.590	Fisher	.591
Reference delusions	36.1	32.0	50.0	35.9	0.37	.545	1.67	.258	2.91	.109
Persecutory delusions	71.1	68.0	84.6	71.3	0.23	.633	Fisher	.212	Fisher	.142
Prior hospitalization	63.9	64.0	53.8	62.8	0.00	1.00	0.88	.348	0.90	.371
Antisocial personality										
APD diagnosis	16.5	9.0	0.0	11.2	2.50	.114	Fisher	.022	Fisher	.202
APD traits	66.0	37.0	0.0	45.3	16.55	<.001	Fisher	<.001	Fisher	<.001
Psychopathy	8.2	1.0	0.0	4.0	Fisher	.017	Fisher	.201	Fisher	1.00
DBD	22.7	15.0	0.0	16.6	1.90	.168	Fisher	.004	Fisher	.039
Conduct youth	41.2	33.0	19.2	35.0	1.43	.231	4.28	.039	1.86	.173
Conduct adolescence	85.6	64.0	38.5	70.4	12.09	.001	24.67	<.001	5.55	.018
Substance misuse										
Substance misuse	60.8	46.0	26.9	50.2	4.35	.037	9.48	.002	3.08	.079
Alcohol	2.1	3.0	19.2	4.5	Fisher	1.00	Fisher	.005	Fisher	.009
Cannabis	20.6	15.0	3.8	16.1	1.06	.302	Fisher	.044	Fisher	.189
Other/Poly substance	38.1	28.0	3.8	29.6	2.29	.130	Fisher	<.001	Fisher	.008
Substance < 15 years	24.7	27.0	7.7	23.8	0.13	.718	Fisher	.064	Fisher	.039

† Df = 1

Note. APD = antisocial personality disorder; DBD = disruptive behavioural disorder.

Table 3. Differences between ES, LS, and FO in offense characteristics.

	Percentages				ES vs LS		ES vs FO		LS vs FO	
	Early	Late	First	Total	Value †	*p*	Value †	*p*	Value †	*p*
Offensecharacteristics										
Violent offense	90.7	86.0	88.5	88.3	1.07	.302	Fisher	.716	Fisher	1.00
Homicide	50.5	49.0	76.9	52.9	0.05	.832	5.81	.025	6.50	.011
Reactive offense	71.1	77.0	92.3	76.2	0.88	.347	Fisher	.037	Fisher	.101
Proactive offense	19.6	12.0	3.8	14.3	2.14	.144	Fisher	.071	Fisher	.300
Intoxication	16.5	16.0	19.2	16.6	0.01	0.93	0.11	.772	0.16	.768
Family as victim	16.5	25.0	46.2	23.8	2.16	.162	10.26	.001	4.45	.035
Public place	47.4	25.0	26.9	35.0	10.74	.001	3.51	<.001	0.04	.804

† Df = 1

Discussion

The main aim of the present study was to examine whether the addition of a third type (i.e. first offender) to the early/late start offender typology among individuals with schizophrenia is justified. This is the first study which investigates first offenders, and it is the first study to compare the subtypes on a **v**ariety of domains; social functioning, abuse and family-related problems, psychiatric functioning, antisocial personality, substance use, and offense characteristics. Given the results of the present study, the first offender group within the early/late start offender typology is justified. Specifically, although the first offenders did not differ from the early and late start offenders with respect to psychiatric functioning, and abuse and family related problems (except for father presence). The first offenders did differ from both the early and late starters with respect to antisocial personality, social functioning, offense characteristics and substance misuse.

An interesting finding is that first offenders are not characterized by traits of an antisocial personality disorder, psychopathy or DBD *at all*. This is in line with the description of first offenders by Hodgins (1995; 2008), and the hypothesis that early starters are characterized by a premorbid antisocial personality, whereas late starters and first offenders are not. The finding that a lower percentage of late starters scores on antisocial personality as compared to early starters is in line with previous studies (Goethals et al., 2008; Tengström et al., 2001). However, still a substantial percentage of late starters report traits of APD and conduct problems during youth and adolescence. Note that it is the first offender group that has no traits of ASPD, psychopathy, and DBD. Therefore, we suggest that first offenders account for a significant proportion of the differences found between early starters and late starters in previous studies on the early/late start offender typology. We further suggest that antisocial personality traits should not be ignored in late starters.

Hodgins (2008) hypothesizes that first offenders, similar to late starters, commit their offense due to positive symptoms (e.g. delusions and hallucinations) of the schizophrenia disorder, and not due to a premorbid antisocial personality. Contrary to our

hypothesis there were no differences between the three groups regarding psychiatric functioning. However, this result is in line with the findings of Laajasalo and Häkkänen (2005) and suggestions of Moran and Hodgins (2004). The latter suggested that symptom profiles of the psychotic disorder may not differ between persons with schizophrenia alone and those with co-morbid antisocial personality. Although other studies found that early starters were more likely to be hospitalized for psychiatric reasons (Laajasalo & Häkkänen, 2005; Tengström et al., 2001), we could not confirm this in our study.

Although no differences were found between the groups regarding psychiatric functioning, this does not mean that delusions and hallucinations were not responsible for the crime committed in the different groups. It is still possible that these positive symptoms played a role in the crime committed by first offenders and late starters, whereas it did not play a role in the crimes committed by early starters. Note that the present study shows that first offenders are more likely to have committed a homicide as index offense (their first offense) in a reactive manner. This increases the likelihood that they acted on the positive symptoms that they experienced. Future research could investigate whether type of positive symptoms differ between first offenders and late starters, and non-offenders with schizophrenia. If this is so, it is likely that that type of positive symptoms plays a role in the offense

The early starters in our study resemble those defined in previous studies with respect to life functioning, antisocial personality characteristics, and offense characteristics. In line with our hypothesis that early starters are more likely to have a negative childhood environment, we found that early starters were more likely to have had family related problems as compared with late starters and first offenders. The hypothesis that the offending of early starters is likely to be attributable to a (premorbid) antisocial personality is confirmed in the current study, in that the proportion of early starters with APD traits as well as conduct problems during youth and adolescence is high. Although CD is more common in persons who develop schizophrenia later in life, the antisocial behavior in early starters may run parallel to the schizophrenia disorder

(Hodgins et al., 2005). This assumption is confirmed in our study, in that a large proportion of early and late starters have conduct problems, especially during adolescence.

The late starters in the current study resemble the late starters in previous studies (Goethals et al., 2008; Jones et al., 2009; Mathieu & Côté, 2009; Pedersen et al., 2010; Tengström et al., 2001). Though, as mentioned above, the early starters and late starters are not as different from each other as expected, and the late starters resemble early starters more than first offenders in the current study.

With respect to substance misuse, results are in line with our hypothesis, in that early starters and late starters differ only in the *proportion* of substance misuse diagnosis, not in *type* of substance misused. In contrast, first offenders differed from both early starters and late starters on substance *types* misused. First offenders were more likely to misuse alcohol, whereas early starters and late starters were more likely to misuse cannabis and other/poly substances. In addition, first offenders were less likely to start misusing substances before age 15 years. These findings are in line with earlier findings regarding early/late start typology (Goethals et al., 2008; Laajasalo & Häkkänen, 2005). However, in the current study we found these differences between the early starters and first offenders instead of between early starters and late starters. The fact that the proportion of early starters and late starters who started misusing substances before age 15 was more than 3 times higher than in first offenders, can be explained by the co-morbidity of (premorbid) antisocial personality in early starters and late starters, and its co-occurrence of substance misuse (Putkonen et al., 2004).

Group differences with respect to offense characteristics are in line with our hypothesis and previous findings (Laajasalo & Häkkänen, 2005; Woodworth & Porter, 2002). These findings show that early starters are less likely to offend in a reactive manner, are less likely to victimize a family member, and are more likely to commit an offense in a public place. In contrast, first offenders are more likely to commit an offense in a reactive manner, more likely to victimize a family member, and more likely to commit a homicide. Contrary to our expectations, we found no differences between the groups

with respect to intoxication at the time of the offense. Currently, we have no explanation for this specific result.

In sum, the results show that there are differences between early starters, late starters, and first offenders in different domains. So the first offender is justified as a third additional group next to the early starters and late start offenders. That is, although we found no group differences regarding psychiatric functioning, other findings were in line with the early/late start theory. Namely, a large proportion of early starters score on APD, about one third of late starters score on APD traits and many reported conduct problems, whereas none of the first offenders score on traits of APD, psychopathy and DBD. Future studies should examine whether psychiatric functioning plays a role in initiation of the aggressive behavior of late starters and first offenders.

A limitation of the present study is the fact that the data was based on file data of forensic assessments. This means that a lot of information was retrospectively obtained, with the disadvantage that some information may not be precise. For example, the retrospective determination of a prodromal phase in the participants may have been difficult because of the incomplete information in the files. However, it must be noted that these reports to the court are one of the most extensive and complete records with standardized, and multidisciplinary obtained information.

The current study also has important implications. Insight in factors that characterize different subgroups of offenders result in better classification of these groups. Results show that early starters typically have more difficulties in many areas of functioning than late starters and first offenders. Therefore, reducing the risk of criminality and violent behavior by the development of interventions targeted at family-related problems at an early stage would be beneficial. Knowing that one has a history of offending and (premorbid) antisocial personality will lead to a classification of either early starter or late starter. Consequently, treatment targeting the antisocial personality in addition to the treatment of the schizophrenia disorder would be recommended for both early starters and late starters. Thereby reducing the risk of reoffending. Treatment of first

offenders has to focus on reducing the positive psychotic symptoms with antipsychotic medication whether or not in combination with cognitive behavioral therapy.

Future studies should explore this typology further in other samples. For instance, it is suggested that late starters commit multiple crimes; however, their crimes do not have to be very serious. Therefore, this group may be underrepresented in our sample which used file data from an institution where individuals who have committed more serious crimes are examined. Late starters may be more likely to be found in general or forensic psychiatric wards. Further studies may examine whether first offenders differ from civil psychiatric patients with no criminal record. This may increase our knowledge regarding characteristics of patients with schizophrenia who are likely to become violent. Prospective studies examining risk factors are needed to establish the causal relationship between such risk factors and their differential associations with early starters, late starters, and first offenders. In addition, research may focus on the motivation for offending in these offender types. We still do not know whether delusions and/or hallucinations play a role in the aggressive behavior of first offenders and late starters.

To conclude, this study is the first to demonstrate that the addition of a third type (i.e. first offender) in the early/late start typology of offenders with schizophrenia is justified. Knowledge regarding these different offender types enables more accurate research, offender profiling and treatment interventions for offenders with a schizophrenia disorder.

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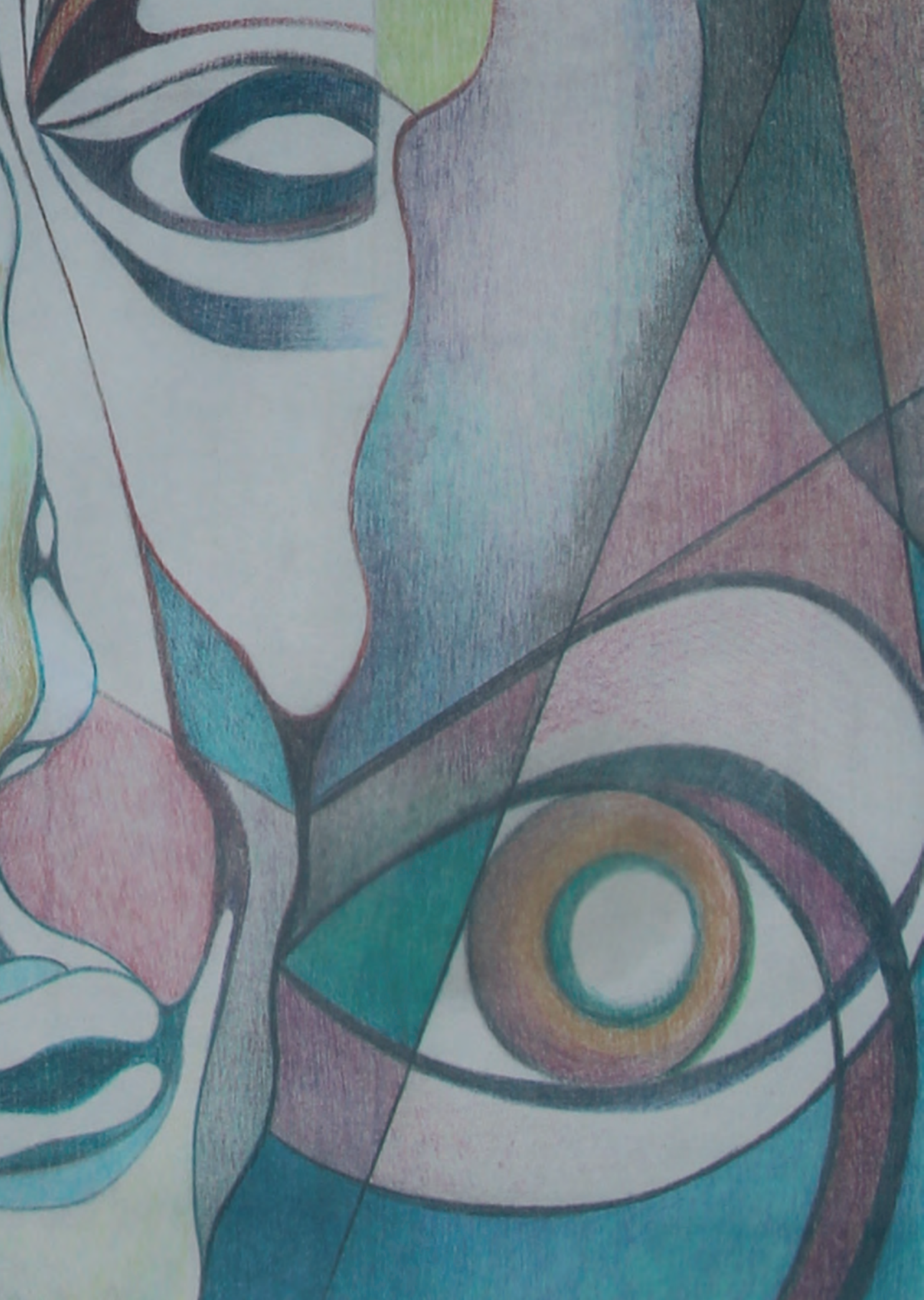

Chapter 3

Antisocial personality and delusions:

Two pathways to offending in schizophrenia

Josanne D. M. van Dongen

Nicole M. L. Buck

Marko Barendregt

Nico M. Van Beveren

Edwin De Beurs

Hjalmar J. C. Van Marle

Submitted for publication

Abstract

Hodgins' offender typology (e.g. 2009) describes three subtypes among individuals with schizophrenia (early starters, late starters, and first offenders) whose criminal behavior is caused by different factors. The typology assumes that early starters resemble life-course-persistent offenders with no schizophrenia in that the criminal behavior of both offender groups is thought to be attributable to antisocial personality characteristics. The criminal behavior of late starters is thought to be attributable to positive psychotic symptoms. This is also likely to be the case in first offenders. The aim of the present retrospective file study was to examine whether early starters (*n* = 97) resemble offenders without schizophrenia (*n* = 115) with respect to antisocial personality, and to see whether late starters (*n* = 100) and first offenders (*n* = 26) are characterized by different types of positive psychotic symptoms than persons with schizophrenia without a criminal history (*n* = 129). The results suggest that the start of criminal behavior of early starters is indeed attributable to premorbid antisocial personality characteristics, and that the offending of late starters and first offenders is likely to be attributable to persecutory delusions and grandiose delusions. Acknowledging these subtypes of offenders with a schizophrenia disorder in risk assessment and treatment might prevent future criminal and violent offending and reduce violence risk.

Introduction

According to Hodgins' offender typology (2008; 2009) there are three types of offenders with schizophrenia; the early starters, the late starters, and the first offenders. Hodgins and colleagues hypothesize that early starters develop antisocial personality characteristics early in life, which may be reflected in a childhood history of conduct problems (Hodgins, 1995; Hodgins & Coté, 1993; Hodgins, Coté, & Toupin, 1995). In that way, early starters may be similar to the *life course persistent* delinquent group defined by Moffitt (1993), except for the fact that they eventually develop a schizophrenia disorder. Late starters, also called *adult starters* (Hodgins, 1995; Kratzer & Hodgins, 1999), usually start offending in adulthood *after* the onset of a major mental disorder (e.g. schizophrenia). Hodgins and colleagues hypothesize that their criminal behavior is attributable to cognitive-and perceptual (positive) symptoms of the disorder (Hodgins, 1995; Hodgins et al., 1995). Once late starters have started their criminal behavior, they will repeatedly engage in criminal behavior and violence toward others (Hodgins, 2009). The third type of offenders with a schizophrenia disorder is the first offenders. They *suddenly* commit a *very serious* offense *after* the onset of their schizophrenia disorder (Hodgins, 2008; Hodgins, 2009; Pedersen, Rasmussen, Elsass, & Hougaard, 2010). The first offender group within this typology was first studied by Van Dongen, Buck, and Van Marle (in press).They suggested that the serious offending of late starters and first offenders may be the result of particular positive symptoms. Although previous studies have shown that there are differences between early starters, late starters and first offenders, so far no study has examined whether early starters resemble offenders with no major mental disorder. Also, no study examined whether late starters and first offenders really differ from non-offenders with schizophrenia regarding their positive symptoms.

Van Dongen and colleagues (in press) found that early starters differed more from first offenders than from late starters, especially regarding antisocial personality (i.e. conduct problems, antisocial personality and substance use). Early starters are more likely than late starters and first offenders to have conduct problems during childhood, and to

have antisocial personality traits in adulthood. Also, early starters had more substance use problems, which started during childhood. Late starters are also more likely than first offenders to have had conduct problems during adolescence, to have antisocial personality traits, and to have started to use substances at an early age. In contrast, none of the first offenders showed antisocial personality characteristics or a disruptive behavioral disorder during childhood. First offenders were less likely to misuse cannabis or other/poly substances, and were less likely to use substances before age 15 years. However, they were more likely to misuse alcohol.

These findings are consistent with the idea that, in contrast to late starters and first offenders, the offending of early starters is initiated by the presence of antisocial personality characteristics. Late starters and first offenders committed a crime after the onset of their psychotic disorder, and it may be hypothesized that their offending (partly) results from psychotic symptoms. However, Van Dongen et al. (in press) found no differences between the three groups regarding positive psychotic symptoms. This seems to be inconsistent with the hypothesis that the offending of late starters and first offenders is attributable to positive psychotic symptoms, whereas that of the early starters is not. Note that positive symptoms may still trigger or maintain criminal behavior among early starters. However, these symptoms did not cause the onset of their criminal career for the early start group started offending before the onset of the psychotic illness. Further, late starters and fist offenders may have other types of positive psychotic symptoms as compared with civil psychiatric patients with a psychotic disorder.

If the early starters indeed hardly differ from offenders with no major mental disorder, and early starters are more likely than late starters and first offenders to have a (premorbid) antisocial personality, this indicates that the criminal career of the early starters is indeed likely to be initiated by premorbid antisocial personality characteristics. If early starters are indeed characterized by a premorbid antisocial personality, then it is also important to treat these personality characteristics in addition to the psychotic symptoms to reduce criminal behavior of early starters.

If the criminal behavior of late starters and first offenders can indeed be attributed to positive psychotic symptoms, a larger proportion of late starters and first offenders compared with non-offenders will have positive symptoms, and/or the type of positive symptoms of state starters and first offenders differs from those of non-offenders. For example, late starters and first offenders may have more persecutory delusions, whereas non-offenders with schizophrenia have more hallucinations.

The main aim of the present study was to test whether the onset of the criminal behavior of early starters is most likely attributable to a premorbid antisocial personality as reflected by antisocial personality characteristics and conduct problems already present in childhood. In addition, we aimed to look at whether the criminal offending of late starters and first offenders is most likely attributable to positive symptoms of the schizophrenia disorder.

To examine whether the onset of criminal behavior of early starters is most likely attributable to a premorbid antisocial personality and less likely attributable to positive symptoms, the early starters were compared with offenders without schizophrenia, but who are characterized by antisocial personality characteristics. Also, the early starters were compared with late starters and first offenders regarding antisocial personality characteristics. We hypothesized that early starters would resemble offenders without schizophrenia with regard to their antisocial personality, but that early starters would show more antisocial personality as compared with late starters and first offenders. In addition, early starters were compared with late starters, first offenders, and non-criminal patients with schizophrenia on positive symptoms. On the basis of previous research we hypothesized that early starters, as compared with late starters and first offenders, are less likely to have positive symptoms, and that they show other types of positive symptoms. However, we hypothesize that they will be more likely to have positive symptoms than non-criminal patients with schizophrenia. To examine whether the criminal offending of late starters and first offenders is more likely to be attributable to positive symptoms of the schizophrenia disorder, they were compared to non-offenders with schizophrenia, and to early starters with respect to positive psychotic symptoms.

Based on previous findings, we hypothesized that late starters and first offenders would differ from non-offenders with schizophrenia on type of delusions, and persecutory delusions in particular. In contrast, late starters and first offenders will not differ from early starters in terms of proportion of persons who have positive symptoms, but the groups may differ in terms of types of positive symptoms.

Method

Participants

The current study is a file based study and consisted of a total of 367 files comprising the following groups: Early starters (*n* = 97), offenders with no major mental disorder (*n* = 115), Late starters (*n* = 100), first offenders (*n* = 26), and a group of schizophrenia patients without a criminal record (*n* = 129). Demographic and diagnostic characteristics are summarized in Table 1.

Files from the early starters, late starters and first offenders were retrieved from the Obervation Clinic of the Ministery of Justice (Pieter Baan Center) in Utrecht, The Netherlands, which is part of the Netherlands Institute of Forensic Psychiatry and Psychology (NIFP). Individuals in the three groups have been diagnosed with a schizophrenia spectrum disorder, and were examined in the years 1993 to 2008. The offender group without schizophrenia (first control group) consisted of court reports of offenders referred for clinical evaluation by the NIFP in Rotterdam and Dordrecht in the years 2005 to 2008. When a person accused of a serious offense is referred to the NIFP, he or she has to undergo a clinical pretrial assessment for the court. When the person is referred to the Pieter Baan Center, he or she will be observed by behavioral experts for seven weeks to determine whether the defendant has a mental disorder and can be held responsible for his or her act (Van Marle, 2000). These pretrial assessments are standardized, and multidisciplinary in most cases, and therefore extensive and complete in their information. The non-offender schizophrenia group (second control group) consisted of files from general psychiatric patients, diagnosed with a schizophrenia

spectrum disorder and had no criminal record. They were admitted to a psychiatric ward of the Erasmus Medical Center, Rotterdam, The Netherlands in the years 2002 to 2008.

Group allocation for the early starters, late starters and first offenders was based on the start of the prodromal phase of their schizophrenia disorder and first offense. Onset of prodromal phase was determined by onset of disturbed behavior, described for example as loss of motivation, anhedonia, anger and irritability, attention problems, social withdrawal, and psychotic-like experiences (see Yung & McGorry, 1996). First offense was based on first convicted crime stated in the criminal record. Early starters had committed their first offense before the onset of the prodromal phase. Late starters and first offenders had committed their first offense after the onset of the prodromal phase. In addition, first offenders had never been convicted of a crime before admission to the Pieter Baan Center, and were older than 35 years of age (see Hodgins, 2009 for characteristics of the first offender group).

Members of the offender group had never been diagnosed with a major mental disorder on Axis I. However, this offender group could have been diagnosed with a substance use or dependence diagnosis on Axis I, and all cases were selected on having Cluster B personality disorder problems. Note that first offenders in the offender group were excluded.

Table 1. Demographic characteristics of the early starters, offenders, late starters, first offenders, and non-offenders.

	Early starters (*n* = 97)	Offenders (*n* = 115)	Late starters (*n* = 126	First offenders (*n* = 26)	Non-offenders (*n* = 129)
Age	31.95 (7.49)	32.75 (11.16)	35.70 (9.73)	43.41 (6.05)	30.05 (0.80)
Male gender	97.9%	87.0%	91.3%	65.4%	76.7%
Ethnicity					
Dutch	40.2%	60.0%	45.2%	73.0%	36.4%
Other Western	3.1%	2.6%	1.6%	3.8%	3.1%
Dutch Antilles	5.2%	9.6%	0.8%	3.8%	0.0%
Morocco	15.5%	2.6%	5.6%	0.0%	10.9%
Turkey	3.1%	3.5%	4.0%	3.8%	4.7%
Surinam	17.5%	8.7%	11.1%	0.0%	20.2%
Cape Verde	0.0%	3.5%	6.3%	3.8%	4.7%
Refugee	4.1%	3.5%	0.8%	0.0%	7.0%
Other	11.3%	6.1%	24.6%	11.4%	13.2%
Psychotic disorder					
Schizophrenia	83.5%	N/A	78.6%	57.7%	92.2 %
Schizo-affect.	3.1%	N/A	9.5%	23.1%	4.7%
Del. disorder	13.4%	N/A	11.9%	19.2%	3.1%

Measures

All measures were scored using the clinical assessments and official records in the reports to the court (early starters, first offenders and offenders), and patient files (non-offenders). Variables were dichotomized as yes or no.

Antisocial personality

Because personality disorder diagnoses often are postponed when there is an Axis I psychiatric disorder, we scored the presence of an antisocial personality when the report mentioned an antisocial personality disorder, antisocial personality traits, or

psychopathic personality traits. Disruptive behavior disorders (DBD) were coded as present if it was indicated that the person was diagnosed with a conduct disorder, oppositional-defiant disorder or attention deficit hyperactivity disorder. In addition, two variables were scored regarding conduct problems before age 12 years, and between 12 and 18 years of age. Conduct problems were scored when there were problems such as running away, skipping school, or criminal activities.

Substance use

If in the file stated that a person had a diagnosis of substance use disorder or substance dependence then the variable was scored as "yes". Type of substances misused was scored for alcohol, cannabis, and other/poly substances use. It was also scored whether the persons used substances before the age of 15 years or not.

Positive symptoms

Visual and auditory hallucinations, grandiose delusions, influence delusions, reference delusions, and persecutory delusions were scored as present or not.

Procedure

Reports to the court were consulted at the Observation Clinic of the Ministery of Justice in Utrecht (early starters, late starters, and first offenders), NIFP in Rotterdam (offenders), and the Department of Psychiatry of the Erasmus Medical Center in Rotterdam (non-offenders). When a schizophrenia spectrum disorder was diagnosed in the early starters, late starters, and first offenders, and non-offenders, the case was included. Clinical diagnoses were standardized, using all five axes of the Diagnostic Statistical Manual. In order to qualify for a psychotic classification in our study, patients had to have an Axis I psychotic disorder according to the Diagnostic and Statistical Manual, third or fourth edition (APA, 1980, 1987, 1994). The disorders included were schizophrenia, schizoaffective disorder, and delusional disorder. The variables in the early

start and first offender group were scored by graduate-level research assistants before group allocation to the early start and first offender group.

Statistical analyses

Chi-square test statistics were used to test differences between the groups on individual variables in the domains of antisocial personality, substance use, and positive symptoms. In cases where cells had expected counts less than 5 we reported Fisher's exact test *p*-values. All analyses were conducted using a significance level of $p < .05$.

Results

Is the offending of early starters associated with a premorbid antisocial personality?

Results for the bivariate analyses comparing early starters with offenders on antisocial personality characteristics and substance use showed (see Table 2), that a larger proportion of early starters had conduct problems in youth and adolescence as compared with offenders. In addition, early starters less often used alcohol as compared with offenders. Further, results showed that the early starters resembled the offenders with respect to APD diagnosis, APD traits, psychopathic traits, DBD, substance misuse and type of substances (other than alcohol).

When comparing early starters with late starters on antisocial personality characteristics and substance use (see table 2), results showed that a higher proportion of early starters had conduct problems in adolescence, antisocial personality traits, psychopathic traits, and a higher proportion used substances more often.

Early starters were also compared with first offenders with respect to antisocial personality and substance use (see Table 2). A higher proportion of early starters had conduct problems in youth and adolescence. Also, early starters were more likely to have a DBD, diagnosis of APD or to have APD traits. In addition, they were also more likely to

use substances, mostly cannabis and other/poly substances. Early starters were less likely to use alcohol when compared with first offenders. We have to note that none of the first offenders had a DBD, had APD traits or were diagnosed with APD.

To test whether positive symptoms play a role in the criminal offending among early starters, we compared the early starters with patients with no criminal records with respect to positive symptoms (see Table 2). Results showed that a higher proportion of early starters had persecutory delusions and grandiose delusions as compared with non-offenders.

Is the offending of late starters and first offenders associated with positive symptoms of the schizophrenia disorder?

Results comparing late starters with non-offenders with schizophrenia showed that a higher proportion of late starters had persecutory delusions and grandiose delusions as compared with non-offenders (see Table 2).

When comparing first offenders with non-offenders with schizophrenia, results showed that in this comparison too, a higher proportion of first offenders had persecutory delusions and grandiose delusions (see Table 2).

All three groups (e.g. early starters, late starters and first offenders) did not differ from each other on positive symptoms (see Table 2).

Table 2. Percentages and results of the univariate tests regarding antisocial personality, substance use, and positive symptoms.

	Percentages					ES vs. OF	ES vs. LS	ES vs. FO	ES vs. SP	LS vs. FO	LS vs. SP	FO vs. SP
	ES	OF	LS	FO	SP	Value[a]	Value[a]	Value[a]	Value[a]	Value[a]	Value[a]	Value[a]
Antisocial personality												
APD diagnosis	16.5	26.1	9.0	0.0	N/A	2.85	2.50	Fisher*	N/A	N/A	N/A	N/A
APD traits	66.0	67.8	37.0	0.0	N/A	.08	16.55***	35.76***	N/A	N/A	N/A	N/A
Psychopathic traits	8.2	3.5	1.0	0.0	N/A	Fisher	Fisher*	Fisher	N/A	N/A	N/A	N/A
DBD disorder	30.9	35.7	15.0	6.3	N/A	0.53	1.90	10.65**	N/A	N/A	N/A	N/A
Conduct youth	41.2	24.3	33.0	19.2	N/A	6.89**	1.43	4.28*	N/A	N/A	N/A	N/A
Conduct adolescence	85.6	62.6	64.0	38.5	N/A	14.12***	12.09***	24.67***	N/A	N/A	N/A	N/A
Substance use												
Substance misuse	60.8	60.0	46.0	26.9	53.5	0.02	4.35*	9.48**	N/A	N/A	N/A	N/A
Alcohol	2.1	19.2	3.0	9.5	5.4	Fisher***	Fisher***	Fisher**	N/A	N/A	N/A	N/A
Cannabis	20.6	11.3	15.0	3.8	22.5	3.47	1.06	Fisher*	N/A	N/A	N/A	N/A
Other/Poly substances	38.1	33.9	28.0	3.8	25.6	0.41	2.29	11.30***	N/A	N/A	N/A	N/A
Substance before 15	24.7	17.4	27.0	7.7	10.0	1.73	0.13	3.58	N/A	N/A	N/A	N/A
Positive symptoms												
Auditory hallucinations	62.9	N/A	68.0	53.8	65.9	N/A	0.57	0.70	0.22	1.82	0.11	1.36
Visual hallucinations	18.6	N/A	30.0	26.9	24.8	N/A	3.50	0.89	1.26	0.09	0.77	0.05
Grandiose delusions	37.1	N/A	40.0	30.8	13.2	N/A	0.17	0.36	17.67***	0.75	21.68***	Fisher*
Influence delusions	22.7	N/A	22.0	15.4	21.7	N/A	0.01	0.66	0.03	0.55	0.01	0.53
Reference delusions	36.1	N/A	32.0	50.0	33.3	N/A	0.37	1.67	0.19	2.91	0.05	2.61
Persecutory delusions	71.1	N/A	68.0	84.6	50.4	N/A	0.23	1.94	9.87**	2.79	7.18**	10.30***

[a] *df* = 1 * $p < .05$ ** $p < .01$ *** $p \leq .001$

Discussion

This is the first study that investigated the differences between early starters, late starters, and first offenders in comparison with two control groups; a group of offenders without a major mental disorder, and a group of general psychiatric patients without an offense history. The main aim of the present study was to examine whether early starters indeed resemble offenders without a major mental disorder with respect to antisocial personality characteristics, thereby suggesting that the start of their offending is most likely attributable to a premorbid antisocial personality. And whether a larger proportion of late starters and first offenders as compared to non-offenders with schizophrenia report positive symptoms, as well as whether late starters and first offenders have other types of delusions as compared to non-offenders. This would suggest that the offending of late starters and first offenders is attributable to positive symptoms of the schizophrenia disorder.

The results showed that early starters did resemble offenders with no major mental disorder, except for the fact that early starters were more likely to have had conduct problems during adolescence, and that offenders were more likely to use only alcohol as a substance. When comparing early starters with late starters and first offenders with respect to antisocial personality and substance use, more differences between the groups appeared. That is, early starters were more likely to have conduct problems during adolescence, to have APD traits, to have an APD diagnosis, and to use different types of substances (e.g. cannabis, other/poly). Early starters largely resemble offenders with no major mental disorder with respect to antisocial personality and substance use, and differ from late starters and first offenders on those factors. These findings suggest that the criminal career of early starters may (similar to the criminal career of offenders without mental disorder) be initiated by antisocial personality characteristics. To test whether positive symptoms play a role in their criminal behavior as well, we compared early starters with all other groups (i.e. patients without criminal

record, late starters and first offenders). With respect to positive symptoms, we found that although early starters did not differ significantly from late starters and first offenders with respect to delusions and hallucination, early starters did differ from patients without criminal record. Therefore, we conclude that delusions resulting from the psychotic disorder play a role in the criminal behavior of the early starter, possibly by maintaining their criminal behavior.

We also examined whether the offending of late starters and first offenders was most likely attributable to positive symptoms of the schizophrenia disorder by comparing these groups with patients without criminal record. We found that only the proportion of persecutory delusions and grandiose delusions differed between late starters and non-offenders, and between first offenders and non-offenders We did not find significant differences in positive symptoms between the three offender groups. Consequently, we conclude that the offending among late starters and first offenders is most likely attributable to delusions (i.e. grandiose and persecutory delusions) resulting from the schizophrenia disorder.

Thus, our hypotheses are in line with Hodgins early/late start offender typology. Not in line however, are the findings that the early starters are more likely than offenders to have conduct problems during childhood and adolescence. But, this finding is consistent with the notion that conduct problems seem to be a precursor of schizophrenia (e.g. Ferdinand & Verhulst, 1995; Kim-Cohen, 2005). However, the present study indicates that the conduct problems are more likely to be comorbid than only a precursor to the schizophrenia disorder, because the characteristics were not only present during the prodromal phase of schizophrenia disorder but also thereafter. In addition, the results showed that there are differences in the proportion of persons with conduct problems across the schizophrenia offender groups (e.g. early starters, late starter, and first offenders), thereby showing that conduct problems are related, yet distinct from the development of schizophrenia.

The results also showed that early starters were more likely than offenders to misuse other/poly substances, and cannabis. Possibly, early starters have vulnerability for

developing both antisocial personality and a psychotic disorder. In early starters, conduct problems may lead to the misuse of cannabis at an early age, thereby increasing the risk of developing a psychotic disorder in those who already have this vulnerability (see Arseneault et al., 2002; Fergusson, Poulton, Smith & Boden, 2006; Henquet, Murray, Linszen, & Van Os, 2005).

There are three limitations of this study. First, one can not rule out the possibility that persons in the patient group without criminal record will not become offenders in the future. Similarly, it cannot be ruled out that first offenders will become late starters when they engage in offending again. Second, in this study we used file data from two different sources. File data for the offender groups (early starters, late starters, first offenders, and offenders) are based on data of forensic assessments. File data for the non-offenders is based on standard file reports. These reports contain the most important information of the patient, but are not as extensive as the forensic assessments. Subsequently, differences in the source of information may have led to an underscore of information in the non-offender group as compared with the three offender groups. For instance, information regarding specific types of hallucinations and delusions may be underreported in the non-offender group. A third limitation is that the study is bases on retrospective obtained information using reports and files. As a result, information on participants may not have been complete or not very elaborative. For example, information regarding prodromal signs in patients with a psychotic disorder is not always fully described in all files. In addition, to make valid statements on the etiology of the criminal behavior of early starters, late starters, and first offenders it is necessary to conduct prospective longitudinal studies and experimental research to investigate which factors are causative for becoming either type of offender.

This study also has several implications. Because early starters, late starters and first offenders differ, acknowledging subtypes of offenders with schizophrenia can improve the accuracy in risk assessment. Further, treatment may also be more effective when taking subtypes into account. Among early starters treatment should not only be

directed at the reduction of psychotic symptoms, but should also be directed at antisocial personality characteristics.

Risk assessment in persons with a schizophrenia disorder who committed crimes after the onset of the disorder might focus more on individual types of symptoms such as persecutory delusions and grandiose delusions. In this way, psychotic driven criminality may be prevented and an effort can be made in reducing the symptom consistent fatal offenses often targeted at family members. Further research can investigate which persons with persecutory delusions will commit a crime or becomes violent. Better insight into variables that might mediate the relation between these delusions and violent behavior might be useful in reducing violence risk.

In conclusion, this study showed that it is likely that premorbid antisocial personality characteristics initiate the offending of early starters. Delusions may maintain offending in early starters. The offending of late starters and first offenders may stem from particular delusions (i.e. persecutory delusions and grandiose delusions).

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Chapter 4

Unraveling offending in schizophrenia:
Explanatory factors in subgroups of offenders

Josanne D. M. Van Dongen
Nicole M. L. Buck
Hjalmar J. C. Van Marle

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Abstract

Previous studies using birth cohorts have shown that persons with schizophrenia are at higher risk of becoming an offender. Some authors point to the importance of subtyping those offenders with a psychotic disorder in early starters, late starters, and first offenders. The aim of the present retrospective file study was to examine which etiological factors predict who is likely to become an early starters (*n* = 97), late starter (*n* = 100), or first offender (*n* = 26) compared to non-offender with schizohrenia (*n* = 129). Using multinomial logistic regression, we found that the risk of becoming categorized as either an early starter or a late starter is higher in those who have had a negative childhood environment, finished merely lower education, and misused substances (especially at an early age). The risk of becoming categorized as a first offender is increased when one has persecutory delusions and/or grandiose delusions. The risk is reduced when the person uses cannabis, poly substances, or when one uses substances other than alcohol or cannabis, such as amphetamines. Knowledge on the different etiological factors resulting in different offender types has implications for intervention strategies for these offenders.

Introduction

Although some studies conclude that major mental disorder (including schizophrenia) can be a protective risk factor for violence (e.g. Harris, Rice, & Quincy, 1993), previous studies have shown that persons with schizophrenia are at higher risk of criminal offending (e.g. Arsenault, Moffit, Caspi, Taylor, & Silva, 2000; Brennan, Mednick, & Hodgins, 2000). Also, recent meta-analyses have shown that psychosis is a significant risk factor for violent offending (Douglas, Guy, & Hart, 2009; Fazel, Gulati, Linsell, & Geddes, 2009; Fazel & Yu, 2011). Some authors point to the importance of subtyping offenders with a psychotic disorder (Jones, Ferriter, Van den Bree, Taylor, 2009; Hodgins, 2008). In that way, risk assessment and interventions will become more effective. One such typology is the early/late start offender typology described by Hodgins (1995; 2008). Early starters develop antisocial personality characteristics early in life, which may be reflected in a childhood history of conduct problems (Hodgins, 1995; Hodgins & Coté, 1993; Hodgins, Coté, & Toupin, 1995), and consequently they develop a criminal career. Thus, early starters may be similar to the "life course persistent" delinquent group defined by Moffitt (1993), except for the fact that they eventually develop a schizophrenia disorder. Late starters, also called "adult starters" (Hodgins, 1995; Kratzer & Hodgins, 1999), usually start offending in adulthood *after* the onset of a major mental disorder (e.g. schizophrenia). Hodgins and colleagues hypothesize that their criminal behavior is attributable to cognitive-and perceptual (positive) symptoms of the disorder (Hodgins, 1995; Hodgins et al., 1995). Once late starters have started their criminal behavior, they will repeatedly engage in criminal behavior and violence toward others (Hodgins, 2009). The third type of offenders with a schizophrenia disorder is the first offender group. They *suddenly* commit a *very serious* offense *after* the onset of their schizophrenia disorder (Hodgins, 2008; Hodgins, 2009; Pedersen, Rasmussen, Elsass, & Hougaard, 2010).

A recent study investigating all three subtypes within this offender typology at the same time and found that early starters are characterized by more antisocial personality characteristics which often were already present in childhood, and more often

use cannabis and poly substances than late starters and first offenders. Late starters are found to have less antisocial personality characteristics than early starters, but more in comparison with first offenders. First offenders are not likely to have antisocial personality characteristics, although they do have conduct problems in adolescence (probably as precursor to the schizophrenia disorder). (Van Dongen, Buck, & Van Marle, in press). Further, early starters are characterized by a negative childhood environment, financial and work related problems and substance abuse problems already present during adolescence (Mathieu & Côté, 2009; Tengström, Hodgins, & Kullgren, 2001). Late starters are more likely to use substances than first offenders. First offenders are less likely to use cannabis and poly substance, but are more likely to use alcohol as compared with early starters. Interestingly, the three groups do not seem to differ in their level of positive symptomatology although the type of delusions associated with the particular subgroup may differ (Van Dongen et al., in press).

Previous studies (e.g. Goethals, Buitelaar, & Van Marle, 2008; Jones et al., 2009; Mathieu & Côté, 2009; Pedersen et al., 2010; Tengström et al., 2001) have investigated several factors (e.g. demographic characteristics, antisocial personality, negative childhood, and substance misuse) associated with the early start and late start offender subtypes. However, it is still unclear which person with a schizophrenia disorder will become an offender, nor can we predict what type of offender the person is most likely to become (i.e. early starter, late starter or first offender). In the present study, our main aim was to investigate who becomes an early starter, late starter or first offender compared with non-offenders with schizophrenia. In the current study we focused on etiological factors including life functioning, abuse- and family related problems, substance use and positive symptoms of schizophrenia, which are associated with delinquent behavior. We did not investigate antisocial personality characteristics (e.g. conduct problems and antisocial personality), because of the risk for a tautological conclusion that those with more antisocial traits have a higher risk of becoming an offender. Given the literature on the offender typology we hypothesized that the risk of becoming an early starter is increased when the life history includes problems associated with life functioning,

negative childhood factors such as abuse, and problems with starting the use of substances at an early age. In contrast, we hypothesize that specific symptoms, such as persecutory delusions and/or grandiose delusions, are predictive of becoming a late starter or first offender.

Method

Subjects

The current study is a file based study and consisted of a total of 352 files comprising the following groups: Early starters (ES; *n* = 97), late starters (LS; *n* = 100), first offenders (FO; *n* = 26), and a group of schizophrenia patients without a criminal record (SP; *n* = 129). Demographic and diagnostic characteristics are summarized in Table 1.

Files from the ES, LS, and FO groups were retrieved from the Obervation Clinic of the Ministery of Justice (Pieter Baan Center) in Utrecht, The Netherlands, which is part of the Netherlands Institute of Forensic Psychiatry and Psychology (NIFP). Individuals in the three groups have been diagnosed with a schizophrenia spectrum disorder, and were examined in the years 1993 to 2008. When a person accused of a serious offense is referred to the NIFP, he or she has to undergo a clinical pretrial assessment for the court. When the person is referred to the Pieter Baan Center, he or she will be observed by behavioral experts for seven weeks to determine whether the defendant has a mental disorder and can be held responsible for his or her act (Van Marle, 2000). These pretrial assessments are standardized, multidisciplinary in most cases, and therefore extensive and complete in their information. The SP group consisted of files from general psychiatric patients, diagnosed with a schizophrenia spectrum disorder and had no criminal record. They were admitted to a psychiatric ward of the Erasmus Medical Center, Rotterdam, The Netherlands in the years 2002 to 2008.

Group allocation for the ES, LS, and FO group was based on the start of the prodromal phase of their schizophrenia disorder and first offense. Onset of prodromal phase was determined by onset of disturbed behavior, described for example as loss of

motivation, anhedonia, anger and irritability, attention problems, and social withdrawal (see Yung and McGorry, 1996 for an overview of prodromal characteristics). First offense was based on first convicted crime stated in the criminal record. ES had committed their first offense before the onset of the prodromal phase. LS and FO had committed their first offense after the onset of the prodromal phase. In addition, FO never had been convicted of a crime before admission to the Pieter Baan Center and had an age equal to or above 35 years.

Table 1. Demographic characteristics for the ES, LS, FO, and SP group.

	Early starters (*n* = 97)	Offenders (*n* = 115)	Late starters (*n* = 126)	First offenders (*n* = 26)	Non-offenders (*n* = 129)
Age	31.95 (7.49)	32.75 (11.16)	35.70 (9.73)	43.41 (6.05)	30.05 (0.80)
Male gender	97.9%	87.0%	91.3%	65.4%	76.7%
Ethnicity					
Dutch	40.2%	60.0%	45.2%	73.0%	36.4%
Other Western	3.1%	2.6%	1.6%	3.8%	3.1%
Dutch Antilles	5.2%	9.6%	0.8%	3.8%	0.0%
Morocco	15.5%	2.6%	5.6%	0.0%	10.9%
Turkey	3.1%	3.5%	4.0%	3.8%	4.7%
Surinam	17.5%	8.7%	11.1%	0.0%	20.2%
Cape Verde	0.0%	3.5%	6.3%	3.8%	4.7%
Refugee	4.1%	3.5%	0.8%	0.0%	7.0%
Other	11.3%	6.1%	24.6%	11.4%	13.2%
Psychotic disorder					
Schizophrenia	83.5%	N/A	78.6%	57.7%	92.2 %
Schizo-affect.	3.1%	N/A	9.5%	23.1%	4.7%
Del. disorder	13.4%	N/A	11.9%	19.2%	3.1%

Note. ES = early starter, LS = late starter, FO = first offender, and SP = schizophrenia patient.

Measures

All measures were scored using the clinical assessments and official records in the reports to the court (ES, LS, and FO), and patient files (SP group). Variables were dichotomized as yes or no.

Life functioning

Marital status and employment were dichotomized as being married and employed at time of admission or not. Educational degree obtained before admission to the observational clinic was dichotomized as having finished only primary school or higher levels of education.

Abuse and family-related problems

Sexual abuse, physical abuse and emotional neglect were scored using information given by the participant himself or by third parties, for example social workers. If the participant was beaten repeatedly (with objects), kicked or otherwise physically abused, the variable was scored as “yes”. Emotional neglect was scored as “yes” when the report included comments such as that the parents yelled repeatedly at the person when he or she was a child, called the person names, degraded him/her, and/or bullied the child. Also, when a child often was left alone or abandoned, this item was scored as yes. Parental substance, parental criminal behavior, and the presence of parents during childhood were scored for both parents separately. Presence of the mother and presence of the father was defined by whether participants lived with their parents until age 16 years.

Substance use

If in the file stated that a person had a diagnosis of substance use disorder or substance dependence then the variable was scored as “yes”. Type of substances misused

was scored for alcohol, cannabis, and other/poly substances use. It was also scored whether the persons used substances before the age of 15 years or not.

Positive symptoms

Visual and auditory hallucinations, grandiose delusions, influence delusions, reference delusions, and persecutory delusions were scored as present or not.

Procedure

Reports to the court were consulted at the Observation Clinic of the Ministery of Justice in Utrecht (ES and FO), and the Department of Psychiatry of the Erasmus Medical Center in Rotterdam (SP). When a schizophrenia spectrum disorder was diagnosed in the ES, FO, and SP group, the case was included. Clinical diagnoses were standardized, using all five axes of the Diagnostic Statistical Manual. In order to qualify for a psychotic classification in our study, patients had to have an Axis I psychotic disorder according to the Diagnostic and Statistical Manual (APA, 1980, 1987, 1994), third edition (for those diagnosed in 1993) or fourth edition (for those diagnosed after 1993).The disorders included were schizophrenia, schizoaffective disorder, and delusional disorder. The variables in the ES, LS, and FO group were scored by graduate-level research assistants before group allocation.

Statistical Analyses

The main analysis was a multinomial logistic regression analysis to test which factors show the highest risk in becoming a particular subtype of offender. To do this, we used Chi-square test statistics to select those variables in the domains of life-functioning, abuse- and family-related problems, substance use, and psychiatric functioning that differed between the groups. Variables with a *p*-value below .10 were included in the multivariate analysis. In cases where cells had expected counts less than 5 we reported Fisher's exact test *p*-values. In the SP group, 39 cases had missing data for the abuse and

family- related problem variables, because colateral information was minimal in these cases. All analyses were conducted using a two tailed significance level ($p < .05$).

Results

For a summary of results for the bivariate analyses, see Table 2. Results for the multinomial logistic regression showed that the final model had an effect size of .52 (Nagelkerke R^2). The odds of becoming categorized as an ES as compared to a non-offender (SP) was increased with 5.73 (95% *CI* = 2.61-12.55, $p < .001$) when only lower education was obtained, with 8.34 (95% *CI* = 3.11-22.38, $p < .001$) when a person was emotionally neglected during childhood, with 9.38 (95% *CI* = 3.33-26.42, $p < .001$ when the mother was present during childhood, with 5.16 (95% *CI* = 1.61-16.54, $p = .006$) if the person had started to use substance before age 15, and with 3.80 (95% *CI* = 1.64-8.78, $p = .002$), and 2.84 (95% *CI* = 1.38-5.86, $p = .005$) respectively when grandiose delusions and persecutory delusions were present. There was a trend for an increased risk of 7.95 (95% *CI* = 0.93-68.09, $p = .058$) for categorization as an ES when a person used other/poly substances.

The risk of becoming categorized as a LS as compared with SP was also increased (with 6.18, 95% *CI* = 2.88-13.27, $p < .001$) when only lower education was obtained. The odds further increased with 4.96 (95% *CI* = 1.86-13.26, $p = .001$) when a person was emotionally neglected during childhood, with 8.02 (95% *CI* = 3.09-20.83, $p < .001$) when a mother was present during childhood, with 7.47 (95% *CI* = 2.37-23.48, $p = .001$) when a person started to use substances before age 15 years, with 4.48 (95% *CI* = 2.00-9.99, $p < .001$) if the person had grandiose delusions, and with 2.41 (95% *CI* = 1.21-4.79, $p = .012$) if the person had persecutory delusions

Risk of becoming categorized as a FO as compared with a SP was increased with 4.62 (95% *CI* = 1.46-14.65, $p = .009$) when a person only had obtained lower education, with 4.59 (95% *CI* = 1.24-17.02, $p = .023$) when the person was emotionally neglected

during childhood, with 3.77 (95% *CI* = 1.04-10.27, *p* = .042) when grandiose delusions were present, and with 4.64 (95% *CI* = 1.37-15.70, *p* = .013) when persecutory delusions were present. The odds of becoming as a FO decreased with 0.06 when a person used other/poly substances (95% *CI* = 0.01-0.70, *p* = .026), and decreased with 0.05 when a person used cannabis (95% *CI* = 0.01-0.59, *p* = .018).

Table 2. Percentages and results of the univariate tests regarding life functioning, abuse- and family related-problems, substance misuse, and positive symptoms.

	Early starters	Late starters	First Offenders	Schizophrenia ptients	Value[a]	*p*
Life functioning						
Married	7.2	10.0	19.2	7.8	Fisher	.280
Job	4.1	5.0	23.1	10.1	Fisher	.013
Lower education	53.6	54.0	38.5	22.2	25.37	<.001
Low IQ	10.3	6.0	7.7	1.1	Fisher	.040
Family-related problems						
Sexual abuse	5.2	8.0	11.5	2.2	Fisher	0.147
Physical abuse	30.9	18.0	11.5	12.2	12.14	.007
Emotional neglect	43.3	28.0	26.9	10.0	26.00	<.001
Substance father	23.7	15.0	19.2	10.0	Fisher	.080
Substance mother	4.1	8.0	7.7	0.0	Fisher	.021
Criminality father	12.4	8.0	3.8	1.1	Fisher	.013
Criminality mother	0.0	2.0	3.8	0.0	Fisher	.112
Presence father	62.9	54.0	80.8	64.4	6.86	.076
Presence mother	88.7	88.0	92.3	75.6	Fisher	.041
Substance use						
Substance misuse	60.8	46.0	26.9	53.5	11.08	.011
Alcohol	2.1	3.0	19.2	5.4	Fisher	.012
Cannabis	20.6	15.0	3.8	22.5	Fisher	.091
Other/Poly substances	38.1	28.0	3.8	25.6	12.81	.005
Substance > 15	24.7	27.0	7.7	4.7	Fisher	<.001

Cont. on next page

Positive symptoms						
Auditory	62.9	68.0	53.8	65.9	2.04	.564
Hallucinations						
Visual Hallucinations	18.6	30.0	26.9	24.8	3.55	.315
Grandiose delusions	37.1	40.0	30.8	13.2	24.84	<.001
Influence delusions	22.7	22.0	15.4	21.7	0.67	.880
Reference delusions	36.1	32.0	50.0	33.3	3.18	.365
Persecutory delusions	71.1	68.0	84.6	50.4	17.91	<.001

Note. ES = early starter, OF = offender without major mental disorder, FO = first offender, and SP = schizophrenia patient.
[a] *df* = 2

Discussion

The aim of the present study was to investigate which factors increase the risk that someone with schizophrenia will be categorized as an early starter, late starter or first offender. Results showed that when compared with non-offender patients with schizophrenia, factors with the highest risk of becoming categorized as an early starter were those associated with their (negative) childhood environment (emotional neglect, presence of the mother and completing only lower education). In addition, use of poly/other substances, especially at a young age, and presence of persecutory and/or when one has grandiose delusions was also predictive of becoming categorized as an early starter. The latter increased the risk to a lesser extent. Note that it is likely that delusions became apparent only *after* the onset of the criminal behavior in that early starters start their criminal career before the onset of the disorder. Not in line with our hypotheses, risk factors associated with becoming categorized as a late starter were comparable to those of becoming an early starter. Results showed that presence of the mother in childhood and substance use at an early age (before 15 years) had the highest risk of becoming categorized as a late starter compared with a non-offender with schizophrenia. As with the early starters, emotional neglect and obtaining lower education increased the risk, as did the presence of grandiose and persecutory delusions. Delusions slightly increased the risk of becoming categorized an early starter, as well as for becoming a late starters. In contrast, presence of persecutory and presence of grandiose delusions were strong predictors of becoming categorized as a first offender. But as with the other offenders, emotional neglect in childhood and obtaining only lower education were also risk factors. Note that the risk of categorization as a first offender is *decreased* when the person uses cannabis, poly substances, or other substances than alcohol or cannabis. This means that the use of cannabis, use of substances other than cannabis or alcohol or the use of poly substances are protective factors for becoming categorized as a first offender, while it increases the risk of categorization as an early starter or a late starter. The finding that

presence of mother is associated with a higher risk of becoming categorized as an early starter or late starter is not what one would expect, but currently we do not have an explanation for this finding.

Although previous studies examined differences between early starters and late starters (Jones et al., 2009; Mathieu & Côté, 2009; Pedersen et al., 2010; Tengström et al., 2001), no study compared these offenders to a control group of non offenders with schizophrenia, nor did they study what etiological factors result in a higher risk of categorization as an early starter, late starter, or a first offender. Previous studies mainly focused on the antisocial conduct problems in childhood as precursor of becoming an early starter (e.g. Matieu & Côté, 2009; Pedersen et al., 2010). The present study adds to the literature on early starters in that it shows that adverse childhood factors and substance use at an early age increase the risk of becoming categorized as an early starter among individuals who later develop schizophrenia. These predictors are not only predictive for early starters, but late starters as well. So, although in previous studies the risk factors associated with early starters and late starters were regarded as distinct, current results show that risk profiles are actually quite the same. That may be due to the difference in definition of the late starter between the present and previous studies. Previous studies did not include first offenders (these were thus allocated to the late start group, and defined late starter as being 18 years or older when they committed their first crime (e.g. Tenstrom et al., 2001). One common risk factor in early and late starters was the use of substances before age 15 years. This might be associated with the presence of conduct problems during childhood and adolescence, and leads to the hypothesis that early starters and late starters might have a (genetic) vulnerability for developing a psychotic disorder, which manifests itself in the context of particular risk factors (see Caspi et al., 2005; Caspi et al., 2008; Fergusson, Poulton, Smith & Boden, 2006; Henquet, Murray, Linszen, & Van Os, 2005).

Regarding first offenders, the presence of persecutory delusions and to a lesser extend grandiose delusions were strong predictors. Therefore we hypothesize that first offenders are less competent in coping with these delusions. Safety behaviors such as

defense (violence) and avoidance are actions performed to reduce threat experiences with persecutory delusions (Freeman et al., 2007). Although it is found that violence is the least common of safety behaviors (Wessely et al., 1993), it may be that first offenders adopt this strategy which results in serious offenses. Future research is needed to answer the question why someone with persecutory delusions acts upon these delusions with violent behavior (Junginger, Parks-Levy, & McGuire, 1998; Wessely et al., 1993).

There are three limitations of this study. Firstly, first offenders were selected by age above 35 years, but the non-offenders were not matched on age. This resulted in an age difference between the first offender and non-offender group. Therefore, one cannot rule out the possibility that persons in the non-offender group will become (first) offenders in the future. Secondly, in this study we used file data from two different sources. File data for the offender groups (early starters, late starters, and first offenders) are based on data of forensic assessments. File data for the non-offenders is based on standard file reports. These reports contain most important information of the patient, but are not as extensive as the forensic assessments. Subsequently, differences in the source of information can lead to an underscore of information in the non-offender group as compared with the two offender groups. For instance, information regarding abuse-and family related problems may have been underreported in the non-offender group. Third, this is a retrospective study were data is collected when the offenders were already known to the criminal justice system. Future studies using a prospective design and longitudinal data can inform us whether the predictors found in the present study actually play a causal role in becoming an early starter, later starter and first offender.in which one can determine which factors (in youth) and which psychopathological symptoms will actual predict offending (in adulthood).

This study also has several implications. Acknowledging these subtypes is important for effective treatment interventions that reduce the risk of becoming an offender. Current results point to the important role of negative childhood environment factors, and problem behavior present during childhood such as starting to use substances at an early age and only obtaining lower education. In addition, the use of risk assessment

instruments with a focus on specific symptoms such as persecutory delusions may signal risk factors for offending at an earlier stage more so than the diagnosis of a schizophrenia disorder or acute psychosis in general. Also, treatment interventions may focus on reducing delusional beliefs with antipsychotic medication and with psychotherapy focused on persecutory delusions.

In conclusion, the current study showed that possible etiological factors in early starters and late starters resemble each other and are related to adverse childhood factors (emotional neglect, completing only lower education) and antisocial personality characteristics (drug abuse, conduct disorder). Becoming categorized as a late starter could also be predicted by grandiose and persecutory delusions. The etiological factors associated with categorization as a first offender are related to adverse childhood environment (emotional neglect, completing only lower education) and positive symptoms (persecutory and grandiose delusions). Note that although we found that adverse childhood factors are associated with becoming categorized as an offender compared to a non-offender, these factors are not unique for these populations, but may reflect a 'cycle of violence (Widom, 1989).

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Part Two

Persecutory ideations, aggression, and the role of delusional distress

If men define situations as real
they are real in their consequences.

Thomas Theorem
W.I. Thomas

Chapter 5

Psychometric evaluation of the Dutch Persecutory Ideation Questionnaire (PIQ) and its relation to aggression

Josanne D. M. van Dongen

Nicole M. L. Buck

Anne-Marijn Kool

Hjalmar J. C. van Marle

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Abstract

Patients with schizophrenia and a violent past more often have persecutory delusions than other types of delusions. The main aim of the present study was to examine the relation between persecutory ideation and self-reported aggression in a community based and clinical population. A second aim was to evaluate the psychometric properties of the Dutch version of the Persecutory Ideation Questionnaire (PIQ; McKay et al., 2006). From the general population, 269 persons were included as well as 79 inpatients from different psychiatric facilities. In the community based sample, the PIQ appeared to be a reliable and valid instrument to measure persecutory ideation. Evaluation of the PIQ in a sample with patients with a psychotic disorder showed that the PIQ had good criterion validity. In addition, results showed that persecutory ideation was significantly related to self-reported aggression in the community based, and in the clinical sample. Moreover, in the community based sample, this association was higher than that between positive psychopathological experiences in general and aggression in the community based sample. In sum, persecutory ideation can be measured reliably with the PIQ, and there seems a robust relation between persecutory ideation in particular and aggression in both clinical and community based samples.

Introduction

Risk studies are important to improve risk assessment, and such studies have demonstrated the importance of clinical factors to risk assessment (Levine, 2009). Some authors argue that for violence risk assessment in persons with a psychotic disorder**,** it is important to focus more on individual symptoms of the psychotic disorder, such as delusions, than on broad diagnostic syndromes such as schizophrenia (Junginger, Parks-Levy, & McGuire, 1998; Junginger, 2006; Taylor, 1985; Taylor, 1998). In line with this, previous research showed that positive symptoms are indeed predictive of violent behavior in patients with schizophrenia (Cheung, Schweitzer, Crowley, & Tuckwell, 1997; Frésan et al., 2005; Nolan et al., 2005; Steinert, Wolfle, & Gebhardt, 2000; Swanson et al., 2006; Taylor, 1985). However, one often cited paper of the McArthur Risk Assessment Study (Monahan et al., 2001) found no relationship between delusions and violent behavior in a clinical population (Appelbaum, Robbins, & Monahan, 2000). It must be noted though, that the sample used in this study consisted of patients with a spectrum of different disorders, not only schizophrenia or other psychotic disorders. This makes comparability to other studies more difficult. In addition, the same data, that is data from the McArthur Risk Assessment Study, were later analyzed by Teasdale, Silver, and Monahan (2006) who did find a positive relation between positive symptoms of major mental disorders and violent behavior among individuals with a major mental disorder. The difference between the study of Appelbaum et al. (2000), and Teasdale et al. (2006) is that Teasdale included gender as a moderator and found that there is a relation between threat delusions in particular and violent behavior in men, though not in women. Threat is an important aspect of persecutory delusions, which may be a further promising predictor for aggressive behavior. For example, it is found that patients with a psychotic disorder and a violent past, more often have persecutory delusions than other types of delusions (Cheung et al., 1997; Taylor, 1985). The aim of the present study is to investigate the relation between persecutory ideations and self-reported aggression and violent behavior.

Paranoia in general and persecutory delusions are one of the most frequently studied delusions (see for a review Freeman & Garety, 2000). Persons with persecutory delusions have the conviction that others will cause them psychological, physical or social harm. The person feels that this harm will be inflicted currently or in the future. In addition, the person feels that the harm is intentional. Studies found that persecutory delusions are more often associated with violent behavior than other delusions (see for a review Björkly, 2002a, but see Frésan et al., 2005; Green, Schramm, Chiu, McVie, & Hay, 2009).

Paranoia is commonly used interchangeably with persecutory delusions, despite the fact that it also includes other delusional symptoms like delusions of reference, influence, and unwarranted jealousy (Freeman & Garety, 2000). Another related concept is threat/control override (TCO; Link, Monahan, Stueve, & Cullen, 1999; Link, Stueve, & Phelan, 1998). TCO symptoms are a broad set of symptoms that either make a person feel threatened (threat), or override internal controls that might otherwise block the expression of violent behavior (control-override) (Link et al., 1999). These symptoms can be seen as conceptually related to persecutory delusions in that delusions of persecution are inherently associated with feelings of being threatened. Both paranoia and TCO threat/control-override symptoms have been studied in relation to aggression, and studied in non-clinical samples (Fenigstein & Vanable, 1992; Peters, Joseph, & Garety, 1999). Interestingly, previous studies found that the threat component of the TCO symptoms are strongly associated with the violent behavior, whereas the control-override symptoms are not (Stompe, Ortwein-Swoboda, & Schanda, 2004; Teasdale et al., 2006). Therefore, and in line with other authors, we suggest more focus on purely persecutory delusions, so that the relation between persecutory delusions and aggression is not inflated by other aspects of more general paranoia, and TCO symptoms (Martin & Penn, 2001; McKay, Langdon, & Coltheart, 2006).

Several self-report scales have been developed to measure psychotic-like experiences and paranoia (e.g. Paranoia Scale, Fenigstein & Vanable, 1992; Paranoia/Suspiciousness Questionnaire, Rawlings & Freeman, 1996; Peters et al. Delusions

Inventory, Peters et al., 1999; Schizotypal Personality Questionnaire, Raine, 1991). Previous studies relating persecutory delusions to aggression assessed these delusions by clinical judgment, clinical assessment instruments such as interviews or rating scales which were not specifically designed to assess persecutory delusions. It is very important and valuable to have a standardized instrument to measure persecutory delusions. Only recently a measure has been developed that specifically measures persecutory ideation, which is the Persecutory Ideation Questionnaire (PIQ; McKay et al., 2006). The English version of the PIQ was found to have an excellent level of internal consistency in both a non-clinical (α = .87), and clinical evaluation (α = .90). In addition, the PIQ was found to have excellent convergent validity in both evaluations, and to have good criterion validity in the clinical evaluation as a measure of specifically persecutory ideation. Moreover, in the clinical evaluation, the PIQ was superior as a measure of specifically persecutory ideation to the Paranoia/Suspiciousness Questionnaire. Unfortunately, this questionnaire has not yet been translated and validated in other languages, nor in other countries.

Knowledge on the impact of particular psychotic symptoms, such as persecutory delusions, on aggression can increase predictive accuracy of aggressive and violent behavior. Furthermore, specific interventions can be developed that target these particular symptoms. Therefore, it is important to investigate further the specific role of persecutory delusions in the study of aggression and violent behavior using a measure that specifically measures persecutory delusions. The main aim of the present study was to examine the relation between persecutory ideation and self-reported aggression. In addition, the Dutch version of the PIQ is evaluated psychometrically.

Because psychotic-like experiences are not only present in clinical populations, but to some extent also in the general population (Ellett, Lopes, & Chadwick, 2003; Martin & Penn, 2001; McKay, Langdon, & Coltheart, 2005; McKay et al., 2006; Mojtabai, 2006; Peters et al., 1999), our hypothesis that persecutory delusions are related to aggression will be tested in a clinical sample, as well as in a community based sample. We hypothesized a positive relation between persecutory ideation and self-reported aggression.

Methods

Sample

The total sample for the community based evaluation of the PIQ consisted of 269 individuals (102 males, and 166 females, 1 missing gender) from the general population. Their mean age was 25.11 years (*SD* = 10.08) with a range of 17-73 years. In one case gender was a missing variable and in five cases age was a missing variable.

For the clinical evaluation, we included a total of 88 patients (81 males and 7 females) diagnosed with schizophrenia or schizoaffective disorder using the DSM-IV (APA, 2000) by senior psychiatrists. The patients were admitted to a psychiatric ward in an academic hospital (*n* = 44) or admitted to a general psychiatric hospital (*n* = 44). Their mean age was 29.01 years (*SD* = 9.32) with a range of 18-58 years.

Measures

Persecutory Ideation Questionnaire (PIQ)

The Dutch version of the PIQ (McKay et al., 2006) was constructen in different steps. First, the items of the PIQ were translated into Dutch by the first author. Then, the items were back-translated into English by a native speaker. The first and second author reviewed these back-translations and compared the items with the original version of the PIQ. Identification problems were discussed with the translator, and consensus was reached.

The PIQ consists of 10 items scored on a 5-point Likert scale ranging from 0 (*not true*) to 4 (*true*). This scale measures the degree of persecutory ideation. Total scores range from 0 to 40. A higher score refers to higher degree of persecutory ideation.

Community Assessment of Psychic Experiences (CAPE)

The CAPE (Konings, Bak, Hanssen, Van Os, & Krabbendam, 2006) consists of 42 items scored on a 4-point Likert scale ranging from 1 (*never*) to 4 (*nearly always*). The CAPE is designed to assess general psychic experiences in the *general* population, as

opposed to the PANSS, which is designed to use in clinical samples. The scale consists of three dimensions: a positive dimension, a negative dimension and a depressive dimension. Total scores range from 42 to 168. A higher score refers to more psychic experiences. This means for example, that higher scores on the positive dimension refer to higher levels of positive psychopathological experiences such as delusional beliefs. This instrument was used in the community based sample instead of the PANSS.

Aggression Questionnaire (AQ)

The AQ (Buss & Perry, 1992; Dutch version version by Meesters, Muris, Bosma, Schouten, & Beuving, 1996) consists of 29 items scored on a 5-point Likert scale ranging from 1 (*completely disagree*) to 5 (*completely agre*e). This questionnaire consists of four factors: Physical Aggression, Verbal Aggression, Anger and Hostility. Total scores range from 29 to 145. A higher score refers to more aggression and violent behavior.

Marlowe-Crowne Social Desirability Scale (MCSDS)

The MCSDS (Crowne & Marlow, 1992) consists of 33 dichotomous items (*true - not true*) and measures social desirability. A higher score refers to more social desirability.

Positive and Negative Syndrome Scale (PANSS)

The PANSS (Kay, Fiszbein, & Opler, 1987; Dutch version by De Ruiter & Hildebrand, 1999) consists of 30 items scored on a 7-point Likert scale ranging from 1 (*absent*) to 7 (*severe*). The PANSS is a semi-structured interview to assess symptomatology of psychotic disorders in clinical populations. It is a widely used measure, and its psychometric properties are good (Levine & Rabinowitz, 2007; Levine, Rabinowitz, & Rizopoulos, In press). Subscale scores can be obtained for positive symptoms of schizophrenia (7 items), negative symptoms of schizophrenia (7 items), and general psychopathology (16 items).

Procedure

Persons from the general population were recruited by approaching acquaintances, people on the street, persons working at the university or undergraduate students. They filled out demographic data, the Dutch version of the PIQ, CAPE, MCSDS, and AQ**.** A subsample of 38 participants (13 males and 25 females) filled out the PIQ again 3 weeks later to determine the test-retest reliability of this questionnaire. All participants received a candy bar for their participation. The subsample who filled out the PIQ twice received 5 euro for their participation.

Inpatients were personally approached on the ward and asked to participate in the study. Each patient filled out demographic data, the Dutch version of the PIQ, AQ, and MCSDS. Next, patients were clinically assessed by one of two trained investigators for their current psychopathology using the PANSS. They received 5 euro for their participation.

All participants gave informed consent. The study was approved by the local Medical Ethical Committee, and conducted in accordance with the Declaration of Helsinki, the provisions relating to Good Clinical Practice in the European Community (GCP) and with the current National Provisions.

Analysis strategy

Cronbach's alpha was computed to test the internal consistency of the PIQ both in the community based sample and in the clinical sample. Test-retest reliability was calculated using a Two Way Random Effects Model, Consistency type with Average Measures for the Intraclass Correlation Coefficient determining the Intraclass Correlation Coefficient (ICC) between the first and second time the subsample of participants from the community based sample filled out the PIQ.

As in many non-clinical samples, PIQ data were skewed to the right. Therefore, for determining the convergent and divergent validity, Spearman's correlations for non-parametric data were used for calculating correlations between the PIQ and the CAPE.

Criterion validity of the PIQ in the clinical sample was determined by dividing the sample into those with and those without persecutory delusions. Because the PIQ total score was not normally distributed in this sample, we used a Mann-Whitney U test to determine whether the patients in the persecutory delusions group scored higher on the PIQ than those in the non-persecutory delusion group. For the criterion validation of the PIQ, we included only those patients with a PANSS score (n = 68), and divided the patients on the basis of PANSS item 6 (suspiciousness/ persecution) in a persecutory delusion and non-persecutory delusions group (McKay et al., 2006). Using a cutoff score of 4 (moderate), we were able to differentiate between paranoid patients without persecutory delusions (n = 49, score on item 6 ≤ 4), and patients having persecutory delusions (n = 19, score on item 6 > 4). In the community based sample, data on self-reported aggression was available for 285 individuals. A median split on the PIQ total scores in the community based sample was performed to determine a low- and high PIQ score group. Group differences on the AQ were determined using an Independent-Samples T-test. Social desirability measured with the MCSDS was not related to the PIQ (r_s = -.15), and not related to the AQ (r_s = -.24). Therefore, social desirability was not included as a confounding factor in the analyses in the community based sample.

In the clinical sample, data on self-reported aggression was available for 44 patients. Social desirability measured with the MCSDS was not related to the PIQ (r_s = .18), but was significantly related to the AQ (r_s = .30). Therefore, we controlled for social desirability in the analyses. First, we determined the association between persecutory ideation (PIQ) and self-reported aggressive behavior (AQ) using Spearman's correlation coefficient and controlled for social desirability by correlating the PIQ and the AQ using partial correlations. Then, the sample was divided into a low- and a high score persecutory ideation group using a median split on the PIQ total scores. ANCOVA was used to test whether the low- and the high persecutory ideation groups differed on the self-reported aggression (AQ).

In all the analyses, a two tailed significance level was used (p < .05).

Results

Reliability and validity

In the community based sample, total PIQ scores ranged from 0 to 20. Mean score on the PIQ across the sample was 3.39 (*SD* = 3.28). In the clinical sample, total PIQ scores ranged from 0 to 40. The mean score on the PIQ across the sample was 13.65 (*SD* = 10.79).

Internal consistency of the PIQ in the community sample was good (Cronbach's α = .78), and in the clinical sample internal consistency of the PIQ was excellent (Cronbach's α = .89). Test-retest reliability of the scale was good (*ICC* = .82, $p < .001$).

Scores on the PIQ were positively correlated to the CAPE total score ($r_s = .46$, $p < .001$), and even more correlated to the CAPE positive symptom dimension ($r_s = .53$, $p < .001$). This is evidence for good convergent validity. Results showed that there was not much divergence of the PIQ. When we correlated the PIQ scores with the CAPE minus the items that correspond to persecutory delusions (item 7 and 10 of the CAPE), results showed that the correlation between the scores on the PIQ and the scores on the positive dimension of the CAPE hardly decreased ($r_s = .51$, $p < .001$).

To determine the criterion validity of the PIQ, we examined whether the PIQ score was higher in the persecutory delusions group of the clinical sample. Results showed that the persecutory delusions group scored significantly higher on the PIQ than the non-persecutory delusion group, *U = 256.00*, $p = .004$.

Persecutory ideation and aggression

There was a positive relation between PIQ scores and scores on the AQ in the community sample ($r_s = .45$, $p < .001$). This correlation was higher than the correlation between the CAPE positive dimension and the AQ ($r_s = .34$, $p < .001$). Thus, the predictive validity of the PIQ seems to be better than that of positive symptoms in general as assessed with the positive dimension of the CAPE. In addition, we divided the sample into a low (*n* = 164) and a high (*n* = 94) score persecutory ideation group by means of a median split on the PIQ total scores. The median was 3. The low score group had a mean score on the AQ of

54.05 (*SD* = 9.35) and the high score group had a mean score on the AQ of 66.32 (*SD* = 13.70). Results showed that the high PIQ score group scored significantly higher on self-reported aggression than the low PIQ score group, $t(143.49) = -7.71$, $p < .001$. In the clinical sample, results showed that there was a positive relation between PIQ scores and scores on the AQ ($r_s = .52$, $p < .001$). In addition, this relation became stronger when we controlled for social desirability ($r = .61$, $p < .001$). Also, we made a low and a high score persecutory ideation group by means of a median split. The median was 10. We had a low score group ($n = 22$) and a high score group ($n = 22$). Patients scoring low on the PIQ had a mean score on the AVL of 67.68 (*SD* = 12.57), and the high scorers had a mean AQ score of 84.18 (*SD* = 15.06). Results showed that, controlled for social desirability, there was a main effect of PIQ group, $F(1, 41) = 14.16$, $p = .001$.

Discussion

In this study we examined the relation between persecutory ideation and self-reported violence and evaluated the psychometric properties of the Dutch version of the PIQ in a community based and in a clinical sample. The results showed that the PIQ has good internal consistency and reliability in the community based sample and even an excellent internal consistency in the clinical sample. Moreover, results showed that the PIQ has good convergent validity in the community based sample as examined in relation to general positive symptoms as assessed with the CAPE. These results are consistent with the results obtained by McKay and colleagues (2006). Also, the Dutch version of the PIQ seems to have good criterion validity; patients who had persecutory delusions scored significantly higher on the PIQ than patients with no persecutory delusions.

The main aim of the study was to examine whether there is an association between persecutory ideation and aggression. The results showed that there was a significant association between persecutory ideation as measured by the PIQ and self-reported aggression as measured by the AQ in the community based sample, as well as in the clinical sample. In addition, the community based and clinical groups that scored high on the PIQ showed significantly more self-reported aggression than those with low scores on the PIQ. Further, it was hypothesized that the PIQ as a measure of persecutory ideation would be more related to aggression than broader concepts of paranoia, or positive symptomatology more generally. Results showed that the correlation between the persecutory ideation and self-reported aggression was higher than the correlation between positive symptomatology and self-reported aggression. The fact that persecutory ideation had a higher correlation with self-reported violent behavior is consistent with the findings that threat delusions as opposed to more general conceptualizations as paranoia and TCO, are more strongly associated with aggression and violent behavior (Stompe et al., 2004; Teasdale et al., 2006).

One limitation of this study is that the measures of persecutory ideation and aggression are self-reported. Although use of self-reports are common practice, it might

be that persecutory ideation and aggression are underscored. However, note that in this study the persecutory ideation in the clinical sample was significantly related to low and high scores on a clinical assessment tool for persecution (item 6 suspiciousness/persecution of the PANSS), and we controlled for social desirability. In addition, self-reports of aggression and violence seem to be more reliable than official records, because minor incidents are often not officially reported. Also, in non-clinical populations, it is necessary to use self-report measures since reliable observations are impossible.

A notable strength of this study is that we were able to replicate a significant association between persecutory ideation and aggression (e.g. Cheung et al., 1997) in a community based sample and in a clinical sample, even when these samples were not selected on the basis of aggressiveness or violent past. Thus, although in the literature there is debate whether or not persecutory delusions are related to violent behavior, in our study this association seems to be robust across different samples.

A further strength of the present study is that the community based sample consisted of a group of persons from the general population, not only of undergraduates. In addition, the clinical sample consisted of a group of patients from different inpatient facilities. Therefore, present findings can be generalized to other samples.

Future research might focus on experimental research examining the role of persecutory ideation in aggressive behavior, and may add to the understanding of the process by which persecutory delusions can lead to aggressive and violent behavior. In addition, because the PIQ has been shown to be a reliable and valid measure to assess persecutory ideation in both clinical and non-clinical populations, analogous experimental studies in non-clinical samples may be useful to gain insight into these specific psychiatric phenomena.

In sum, the PIQ has been shown to have good psychometric properties in both non-clinical and clinical samples, and therefore persecutory ideation can be measured reliably with the Dutch and English version of the PIQ in both clinical and community based samples. In addition, a relation was found between persecutory ideation in

particular, and self-reported aggression, in contrast to more general concepts of paranoia and positive symptomatology. Future studies may examine the process by which persecutory delusions result in aggression.

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Chapter 6

Positive symptoms, substance use, and psychopathic traits as predictors of aggression in persons with a schizophrenia disorder

Josanne D. M. van Dongen

Nicole M. L. Buck

Hjalmar J. C. van Marle

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Abstract

It is still not clear what the unique contribution is of persecutory ideations, psychopathy and substance use in explaining aggression in schizophrenia. The current study examined whether these factors are associated with different measures of aggressive behavior. We expected that persecutory ideations are associated with reactive aggression, and psychopathic traits are more associated with proactive aggression of inpatients. 59 inpatients with schizophrenia were included. Persecutory ideation, psychopathy and substance use were assessed. In addition, self-reported proactive and reactive aggression, aggression on an experimental paradigm, and observed aggression on the ward were measured. Results showed that psychopathy explains most of the variance in self-reported proactive and reactive aggression. In contrast, persecutory ideations explain most of the variance in observed aggression on the ward. Results implicate that it is important to acknowledge comorbid factors in patients with schizophrenia for more precise risk assessment and appropriate treatment for aggressive patients with schizophrenia.

Introduction

Previous studies found that there is a small but significant relation between psychosis and violent behavior (Douglas, Guy, & Hart, 2009; Fazel, Gulati, Linsell, Geddes, & Grann, 2009). The risk for committing homicide is about 8 to 15 times higher in patients with schizophrenia than in the general population (Eronen, Tiihonen, & Hakola, 1996; Tiihonen, Isohanni, Räsänen, Koiran, & Moring, 1997). There are several factors that can explain this higher risk of violent behavior in those who have schizophrenia. Firstly, psychotic symptoms of the schizophrenia disorder can play a role. Research has shown that persons with schizophrenia and a violent past have more positive psychotic symptoms than those who have no violent past (Fresan et al., 2005). Moreover, the more positive symptoms are present, the higher the chance of aggressive behavior (Steinert et al., 2000). Secondly, the comorbidity of substance use in patients with schizophrenia is related to an increased risk of violent and even homicidal behavior (Eronen et al., 1996; Soyka, 1994; Räsänen et al., 1998; Tiihonen et al., 1997). Some authors suggest that substance misuse mediates the relation between schizophrenia and criminal and violent behavior (Fazel et al., 2009; Fazel, Lanström, Hjern, Grann, & Lichtenstein, 2009). Thirdly, among persons with schizophrenia, psychopathic traits have been shown to predict both violent and non-violent crime (Tengstrom et al., 2000), and some studies conclude that psychopathy (as measured with the Psychopathy Checklist-Revised; PCL-R; Hare, 1991) is the best single predictor of future violence in those with a mental illness (Salekin, Rogers, & Sewell, 1996; Tenström, Grann, Langström, Kullgren, 2000). Despite the large amount of literature concerning the role of positive symptoms, substance use, and psychopathic traits in the relation between schizophrenia and violence, it is not clear what the unique contribution is of each of these factors.

Regarding the role of positive psychotic symptoms in the relation between schizophrenia and aggressive behavior, a study of Taylor and Gunn (1984) showed that 20% of the offenders with an acute psychotic episode committed the offense as a direct consequence of the psychotic symptoms, and Taylor (1985) found that psychosis was the

motivation in 90% of the offenses. In inpatient samples, positive psychotic symptoms (as measured for example with the Positive and Negative Syndrome Scale) seem to be predictive of inpatient aggressive behavior (Nolan et al., 2005; Nolan et al., 2003). Delusions seem to account for most of the (violent) offending of persons with a psychotic disorder (Taylor, 1985; Taylor et al., 1998; Swanson, Borum, & Swartz, 1996). Moreover, especially persecutory delusions are associated with aggressive behavior in individuals with schizophrenia (Cheung et al, 1997; Swanson et al., 2006; Taylor, 1985).

The relation between schizophrenia and both criminal and violent behavior is even stronger when there is a co-morbidity of substance misuse (Erkiran et al., 2006; Räsänen et al., 1998; Soyka, 1994; Soyka, 2000; Swanson, Holzer, Ganju, & Jono, 1990). One study that also looked into different types of substances related to aggressive behavior found that in persons with schizophrenia in community treatment, the subgroup using alcohol (34 %) was the largest group as compared to the use of other substances (Miles et al., 2003). The subgroup using stimulants (24 %) had significantly more often a history of violence as compared with the groups using other types of substances.

Different studies found that antisocial personality and psychopathic traits are more common in persons with schizophrenia than in persons from the general population, and these antisocial traits partly explain the relation between violence and schizophrenia (Moran & Hodgins, 2004; Mueser et al., 2006; Nolan, Volavka, Mohr, & Czobor, 1999; Tengström et al., 2000). For example, Nolan and colleagues (1999) found that persons with schizophrenia and a history of violence more often had a comorbid psychopathic personality. None of the persons with schizophrenia without a history of violence scored above the cut-off of 18 for psychopathic personality using the PCL-SV.

Hence, there could be a “triple diagnosis” in these persons which can explain the violent and criminal behavior in persons with schizophrenia (Hodgins, Tiihonen, & Ross, 2005; Putkonen, Kotilainen, Joyal, & Tiihonen, 2004; Tengström et al., 2004). This means that persons who have a psychotic disorder and both comorbid antisocial personality and substance sue disorder, have a combination of factors that can explain their risk of violent behavior. But despite the widespread research on the relation between psychosis and

aggression, the relation is not yet clearly understood. This may be the result of methodological differences. For instance, the selected samples and control groups vary in respect to institutional type and comparison groups used (Douglas et al., 2009). This may lead to different interpretations of the results and complicates comparability of results. In addition, there are different subgroups of offenders on the basis of comorbid traits (as explained in the previous paragraph) that explain the criminal behavior in these subgroups (Taylor et al., 2008; Van Dongen et al., unpublished). Nevertheless, there is little research conducted investigating the role of psychotic symptoms in conjunction with comorbid factors.

There is at least one study which did look into this combination of factors. Hodgins, Hiscoke, and Freese (2003) examined what variables predicted in patient violent behavior post discharge. Because psychopathy is regarded as the single best predictor of violence, this was one of the predictors of violence in the study. Substance misuse as a comorbid diagnosis to schizophrenia increases the likelihood to be criminal or violent and was therefore added as a predictor variable. The authors found that when controlling for both psychopathy and substance use, the presence of positive psychotic symptoms still predicted future violence of these patients. However, they could not say which positive symptom accounts for this predictive value. These results show that, although in cohort samples, psychopathy and substance use are strong predictors of violent behavior in those with a schizophrenia disorder. However, in inpatient samples, prediction of violent behavior of patients may benefit from the assessment of other factors influencing the violent behavior, such as delusions.

Aggression is a heterogeneous construct and if we want to examine factors associated with aggressive behavior it is important to differentiate between different types of aggressive behavior. There are at least two different types of aggression, reactive and proactive aggression (Crick & Dodge, 1996). Reactive aggressive behavior is characterized by hostility and associated with information-processing deficits (Dodge & Coie, 1987) and these information processing deficits may be associated with cognitive perceptual features (psychotic symptoms) of schizophrenia. Proactive (instrumental)

aggression is more cold-blooded aggressive behavior which is more motivated by external reward (Raine et al., 2006), which is characteristic of psychopathic personality. Therefore, psychopathy is more often associated with proactive aggression than with reactive aggression (Cornell et al., 1996). Although some authors suggest that true psychopathy is associated with proactive aggression, studies also found that the risk for reactive aggression is increased in persons with psychopathic traits (see Reidy, Shelley-Tremblay, & Lilienfeld, 2011 for a review).

The main aim of the present study was to examine the unique contribution of psychopathic traits, substance use, and persecutory ideations in the relation between these factors and aggression in inpatients with schizophrenia or related disorder. Based on the literature, we hypothesized that persecutory ideations, psychopathic traits and substance misuse each have their unique contribution in their relation with different measures of aggressive behavior. Aggression is operationalized as self-reported proactive and reactive aggressive behavior, aggression measured during a paradigm, and observed aggression on the ward. A second aim of this study was to examine whether persecutory ideation is associated with reactive aggressive behavior, and psychopathic traits are more associated with proactive aggressive behavior of inpatients. Knowledge on the influence of comorbid factors in the prediction of aggression in persons with schizophrenia is important to accurately assess risk for violence in those patients and to subsequently provide appropriate treatment for subgroups of aggressive patients.

Methods

Participants

The sample consisted of 59 male inpatients hospitalized in two different general psychiatric hospitals. All patients were diagnosed according to the DSM-IV-TR criteria (APA, 2000). Inclusion criteria were diagnosis of a schizophrenia and schizo-affective disorder present for at least 2 years, and age between 18 and 60 years of age. Patients

with mental retardation and presence of a neurological disorder, other than the schizophrenia disorder, were excluded.

Of the total patient sample, 83.3% met the diagnostic criteria for schizophrenia, 11.7% of the patients were diagnosed with a schizo-affective disorder, and 5% had a psychotic disorder NAO. 43.3% of the patients had a comorbid substance use disorder. All patients received prescribed medication. Haloperidol (23.3%) was most common, but also zuclopentixol (18.3%), clozapine (16.7%), and risperidon (15.5%) were often prescribed. Average age of the inpatients was 33.58 (*SD* = 9.81, range 19 to 58). 41.7% of the participants were Dutch, 8.3% were from other West-European countries, 11.7% were from the Dutch Antilles, 15% from Suriname, 15% were African, and 8.4% from other countries.

Measures

Diagnostics and positive symptoms

The Mini International Neuropsychiatric Interview (MINI-Plus; Sheehan et al., 1998; Dutch version by Van Vliet, Leroy & Van Megen, 2000) section M for psychotic disorders was used as a check for the presence of a psychotic disorder in the patients. The MINI-Plus is a short structural diagnostic interview, consisting of 26 modules assessing Axis-I disorders according to the DSM criteria.

The Positive and Negative Syndrome Scale (PANSS; Kay, Fiszbein & Opler, 1987; Dutch version by De Ruiter & Hildebrand, 1999) is a semi-structured interview for the assessment of positive and negative symptoms of psychosis and symptom severity. The interview consists of 30 items scored on a 7-point scale with a range between 1 (*absent of symptom*) tot 7 (*extreem severity*). Next to Total scores, scores on three subscales can be determined: positive subscale (7 items), negative subscale (7 items), and general psychopathology subscale (16 items).

The Persecutory Ideation Questionnaire (PIQ; McKay, Langdon, & Coltheart, 2006; Dutch version by Van Dongen et al., 2011) consists of 10 items scored on a 5-point Likert

scale ranging from 0 (*not true*) to 4 (*true*). This scale measures the level of persecutory ideation, and is suitable to be used as a measure of persecutory ideation in the general population (McKay et al., 2006; Van Dongen et al., 2011). Total scores range from 0 to 40, and a higher score refers to more persecutory ideations.

Psychopathic traits

The Psychopathy Checklist: Screening Version (PCL-SV; Hart, Cox, & Hare, 1999) is a semi-structured interview consisting of 12 items that can be rated on a 3-point scale with a range between 0 (*absent*) and 2 (*fully present*). The PCL-SV was used to assess psychopathy among the inpatients in this sample on the two factor structure of psychopathy, item 1-6 measures the interpersonal and affective symptoms, and items 7-12 the social deviance symptoms of psychopathy.

The Psychopathic Personality Inventory-Revised (PPI-R; Lilienfeld & Widows, 2005; Dutch version by Uzieblo, Verschuere, Jelicic, Rossi, Maesschalck & Crombez, 2006), is a questionnaire which measures psychopathic personality traits on a 4-point Likert scale ranging from 1 (*not true*) to 4 (*true*). The PPI-R consists of 154 items and consists of three different factors: Fearless-Dominance (PPI-R-I), Impulsive-Antisociality (PPI-R-II), and Coldheartedness (PPI-R-III).

Substance use

The Comprehensive Assessment of Symptoms and History (CASH; Andreasen et al., 1992) is a semi-structured diagnostic interview. The CASH section on substance use was administered to assess past and current substance use of the patient. The section consists of 35 items on the use of alcohol, soft drugs hard drugs and smoking and caffeine. For the current study, use of any substance in the previous month was used as a dichotomous variable in the prediction of aggression.

Aggressive behavior

Self-reported reactive and proactive aggression was measured using the Reactive Proactive Aggression Questionnaire (RPQ; Raine et al., 2006; Dutch version by Cima, Meesters, Popma, & Raine, in press). The RPQ consists of 23 items ranged on a scale between 0 (*never*) to 2 (*often*). Twelve items make up the proactive subscale, and 11 items make up the reactive subscale. Earlier studies have shown good internal reliabilities for total RPQ, reactive and proactive subscales (Raine et al., 2006).

Experimentally induced aggressive responding was measured using the Point Subtraction Aggression Paradigm (PSAP; Cherek, 1992). The PSAP is a well validated measure of aggressive behavior in a laboratory setting (Cherek & Lane, 1999; Cherek, Moeller, Schnapp, & Dougherty, 1997; Gerra et al., 1996; Gerra et al., 1997; Lane et al., 2009). The version we used in the current study is a one session version of the PSAP which has shown to be a valid measure (see Golomb, Cortez-Perez, Jaworsky, Mednick, & Dimsdale, 2007). The session duration was 25 minutes, in which the participant was told that he could earn money based on his performance on a computer task, during which he would be paired with a (fictitious) opponent. The goal was to gain as many points as possible because these points would be exchangeable for money at the end of the experiment. Participants sat in front of a computer monitor and had a box in front of them with 3 response buttons: Button A was the point reward button, and Button B was the button for stealing points (aggressive response). Patients were told that pressing Button A hundred consecutive times would lead to 10 cents increase on their counter. They were told that pressing Button B ten times would lead to stealing a point from their opponent, but these points will not be added to their counter. In contrast, they were told that points stolen from their counter (provocation) would be added to the counter from the opponent.

Observed aggression on the ward was measured with the Social Dysfunction and Aggression Scale (SDAS; Wisted, Rasmussen, Pedersen, Malm, Träskman-Bendz, Wakelin et al., 1990; Dutch version by Van der Werf & Staverman, 1999). Using this scale, dysfunctional behavior of the patient is registered. The scale is filled out by the staff

members/nurses on the ward. It consists of 11 items scored in a 5-point Likert scale ranging from 0 (*not present*) to 4 (*severely present*). The two items regarding self harm were excluded so that we only assessed externally oriented aggressive tendencies.

Procedure

First, in consultation with the hospital staff and on the basis of patient records, eligibility of patients was determined. Patients were approached and asked to participate in the study and received both verbal and written information. They were also told that they would receive 5 Euros plus an additional amount of reward ranging from 0 to 6 Euros (depending on the winning during the PSAP task). After being informed, they had about one week to reconsider their participation. We planned an interview session in which we first asked the patient for informed consent and then we interviewed the patient for assessment with the MINI-plus, and the PANSS. Often, a break or second interview session was required to conduct the PCL-SV interview. The interviews were conducted by trained psychologists and research assistants. The PCL-SV interview was administered by the principal investigator who was formally trained for the use and assessment of this measure. Within one week, the patient participated in the experimental session. First some questions on the CASH were answered and subsequently the PSAP task was performed. After the task, the patient filled out the PIQ, PPI-R and RPQ questionnaires. The participants were told explicitly that the persecutory ideation questions were asked with respect to thoughts *in general in daily life*. Three control questions about the task session were answered to assess whether or not the patient believed he was playing against an (fictitious opponent). These questions were: (a) “From the beginning of the experiment, with how many people do you think you were paired with to play the game?” (b) “Describe the person(s) you are paired with” (c) “Did the other person (or have the other persons) earn more money or did you? Why?” On the basis of the answers given by the participants we decided to exclude 10 individuals from the study.

When the patient finished the interview session and the experimental sessions, the staff was asked to fill out the SDAS at the end of the week in which the patient was included in the study.

This study is approved by the medical ethical committee and the institutional review boards in accordance with the Declaration of Helsinki 1989.

Statistical analyses

Except for the SDAS scores, all variables were normally distributed. After log transformation of the SDAS scores, these scores were approximately normally distributed. Secondly, we conducted correlation analyses to explore the relations between the predictor variables (positive symptoms, persecutory ideation, substance use and psychopathy) and the aggression measures (proactive aggression, reactive aggression, general aggression, aggression on the PSAP and on the ward). Thirdly, multiple regression analyses were used to examine the contribution of each predictor variables (psychopathic traits, substance use, and persecutory ideations) in their relation with aggressive behavior. Part correlations were calculated to determine the unique contribution of each factor in their relation with the different aggression measures.

Results

Sample characteristics

Of the total sample, 3 persons of the 59 had an antisocial personality diagnosis and 9 persons had antisocial traits on Axis II of the DSM IV. Mean score on the PCL-SV was 10.28 (*SD* = 4.82) with a range from 2 to 19. 6.9 % of the patients had a PCL-SV total score higher than the recommended cutoff for psychopathy of 18. 27.6% fell in the range of PCL-SV total score between 12 and 18, indicating higher change of having a psychopathic personality. Mean score on the PPI-R was 305.86 (*SD* = 43.53; range from 171 to 407). The PCL-SV and PPI-R were highly correlated (r = .47, p = .01). Since only 29 of the patients had a PCL-SV assessment procedure, and 59 patients filled out the PPI-R, we used total PPI-R

scores as a measure of psychopathy in the regression analyses. The above analyses show that the PPI-R is a good alternative to measure psychopathy (as compared to the PCL-R) in this sample.

With respect to substance misuse as measured with the CASH, 48 persons completed an assessment with the CASH. Results showed that 43.3% of the patients had used one substance in the previous month. 35.4% of the persons had used alcohol, 8.3% had used soft drugs, and 35.4% had used hard drugs during the month preceding participation in the study.

Psychotic symptoms were assessed with the PANSS. Mean score of the total PANSS was 85.10 (*SD* = 18.80; range = 48-126). Mean score on the positive scale was 21.25 (*SD* = 7.02; range = 7-36). Mean score on the negative scale was 21.87 (*SD* = 6.41; range = 7-34). Mean score on the general psychopathology scale was 41.68 (*SD* = 9.49; range = 23-66). Because we also assessed self-reported persecutory ideation using the PIQ, we also calculated the positive PANSS scale score minus item 6 which measures ideas of persecution. The mean score of this measure was 17.73 (*SD* = 5.94; range = 6-30). Mean score on the PIQ was 14.88 (*SD* = 11.78; range = 0-39).

Aggressive behavior was assessed with a self-report measure (RPQ), with an experimental task (PSAP), and on the ward (SDAS). Mean score on the Reactive Aggression Scale was 9.05 (*SD* = 3.79; range = 2-11). Mean score on the Proactive Aggression Scale was 3.45 (*SD* = 2.95; range = 0-11). Aggressive responding on the PSAP task had a mean score of 319.69 (*SD* = 292.01; range = 0-112). SDAS scores were available in only 44 patients, because unfortunately not all forms were completed by the staff. The mean score was 5.11 (*SD* = 6.49; range = 0-23). Because the SDAS also has two items that measure suicidal tendencies we only used the SDAS score minus these items as an aggression measure. Mean scores on observed aggressive behavior was 4.98 (*SD* = 6.53; range = 0-23).

Correlations between the predictors and the different aggression measures are shown in Table 1. Overall, correlations showed that self-reported proactive, and reactive aggression are positively related to psychopathic traits. Aggression during the PSAP task is

positively related to cannabis use. Observed aggression on the ward is negatively associated with alcohol use and positively related to positive psychotic symptoms.

Table 1. Correlation coefficients for the relation between the predictors and the aggression measures.

	Aggression measures			
Predictors	Proactive aggression (RPQ)	Reactive aggression (RPQ)	Aggression on task (PSAP)	Observed aggression (SDAS)[a]
PPI-Rtotal	.39**	.38**	.16	.02
PPI-R-I	.22	.14	.21	-.14
PPI-R-II	.42***	.44***	.03	.13
PPI-R-III	.05	.11	.17	-.10
Substance use	.20	.03	.05	-.17
CASHalcohol	.06	.12	.04	-.35*
CASHsoftdrugs	.09	.19	.34*	-.15
CASHharddrugs	.23	.02	-.05	-.06
PANSSpos.-paranoia	-.05	.27*	-.02	.44**
PIQ	.15	.28*	.00	.47***

[a] Correlation analyses with Spearman's Rho

* Correlation is significant at the .05 level (two-tailed).

** Correlation is significant at the .01 level (two-tailed).

*** Correlation is significant at the .001 level (two-tailed).

Predicting proactive aggression (RPQ)

Results showed that using psychopathy, substance use, and persecutory ideation scores to predict proactive aggressive responding, a significant model emerged ($F(3,55) = 3.89$, $p < .014$), which explained 17.5% of the variation in proactive aggression scores. Only psychopathy was a significant predictor in the model with B = .02 ($\beta = .36$, $t(58) = 2.80$, $p < .007$). Part correlations also showed that psychopathy had the greatest unique contribution in predicting proactive aggression, with 11.6% explained variance ($r_{sp} = .34$).

Predicting reactive aggression (RPQ)

Using psychopathy, substance use, and persecutory ideation scores as predictors, together explained 19% of the variation in reactive aggression ($F(3,55) = 4.31$, $p = .008$). Only psychopathy was a significant predictor in the model with B = .03 ($\beta = .33$, $t(58) = 2.62$, $p = .011$). Part correlations showed that psychopathy uniquely explained 10.2% ($r_{sp} = .32$) of the variance in reactive aggression.

Predicting aggression on the PSAP

When psychopathy, substance use and persecutory ideations were used as predictors in a model to predict aggressive responding on the PSAP, the model was non-significant ($p = .675$). The unique contribution of the factors, as determined by the part correlation, was almost zero for all three variables.

Predicting observed aggression (SDAS)

When we used psychopathy, substance use, and persecutory ideations to predict observed aggression on the ward, the model was also non-significant ($p = .095$). However, this was probably attributable to the fact that substance use had a zero relation to aggression on the ward and influenced the model with an extremely low beta (B = 2.631E-5). Therefore, the data was reanalyzed without substance use as a predictor. Using only psychopathy and persecutory ideation scores as predictors to predict aggression on the ward, the model was significant ($F(2,30) = 3,62$, $p = .039$), and explained 19.4% of the variation in inpatient aggression. Only persecutory ideation was a significant predictor in the model with B = .02 (□□= .46, $t(32) = 2.67$, $p = .012$). Unique explained variance in inpatient aggression by persecutory ideations was 19.4% ($r_{sp} = .44$).

Discussion

The main aim of the present study was to examine the unique contribution of positive symptoms, psychopathic traits, and substance use in the prediction of violent behavior in inpatients with schizophrenia or related disorder. We hypothesized that these predictors would each have an unique predictive value in different aggression measures. A second aim of this study was to examine whether persecutory ideation is associated with reactive aggressive behavior, and psychopathic traits are more associated with proactive aggressive behavior of inpatients.

Results showed that only psychopathy had a significant unique contribution to the prediction of proactive aggression, and explained most of the variance in the prediction model. This is consistent with our hypothesis, and findings of other studies that proactive aggression is mostly associated with higher levels of psychopathic traits (Cornell et al., 1996; Vitacco et al., 2009). Also, although it is suggested that the fearless-dominance factor (PPI-I) of psychopathy is more associated with proactive aggression as compared to reactive aggression (Cima & Raine, 200; Reidy et al., 2011), we found that impulsive-antisocial traits of psychopathy are more strongly associated with proactive (and also reactive) self-reported aggressive behavior.

The finding that self-reported reactive aggressive behavior was only significantly explained by psychopathic personality traits was not in line with our hypothesis. It was hypothesized that reactive aggression would be associated with persecutory ideations. And although this was indeed so in univariate analysis (e.g. correlation), when psychopathy and substance use were added as predictors, persecutory ideation did not significantly predict self-reported reactive aggression anymore.

None of the factors (psychopathy, substance use and persecutory ideations) predicted aggressive responding on the PSAP task. This is not what we expected either, and not consistent with studies that showd the validity of the PSAP as an aggression measure (Cherek & Lane, 1999; Cherek, Moeller, Schnapp, & Dougherty, 1997; Gerra et al., 1996; Gerra et al., 1997; Lane et al., 2009). Aggressive behavior as measured

with the PSAP task, was only related to the use of cannabis in the month prior to the inclusion in the study. This can be explained by a so called *cannabis-withdrawal syndrome* (Kouri & Pope, 2000). Kouri, Pope, and Lukas (1999) found that persons 3 to 7 days into abstinence of long term cannabis use acted more aggressively than controls and also more aggressively than after longer period of abstinence. A large proportion of our participants are tested in the first few weeks of admission. Therefore, if they were frequent cannabis users, they were abstinent following admission to the psychiatric hospital and could have experienced a *cannabis-withdrawal syndrome*. In addition, it is likely that because aggression as measured with the PSAP occurs in a particular context it may not correlate with general measures of aggression. This argument is likely true for most behavioural measures of aggression however: The most frequently used measure of aggression and the most trusted (at face value), the Taylor Aggression Paradigm, also shares very small and non-signigicant associations with self-reported aggressive behaviour (Ferguson & Rueda, 2009). Findings for observed aggression on the ward showed that only the level of persecutory ideation significantly explained the variance in observed aggression. This finding is consistent with findings that positive psychotic symptoms (e.g. delusions and hallucinations) predict inpatient violent behavior (McDermott, Edens, Quarbeck, Busse, & Scott, 2008; Nolan et al., 2005; Rasmussen & Levander, 1996; Steinert et al., 2000; Steinert et al., 2002; Tengstrom et al., 2006), even when controlling for psychopathy (Hodgins et al., 2003). It was also found that inpatient aggression had a strong negative association with alcohol use in the month prior to inclusion in the study. This finding is consistent with the findings of Rasmussen and Levander (1996). An explanation for this finding can be that alcohol use is only related to aggressive behavior at the moment that patients are intoxicated.

With respect to the question whether psychopathy is more related to proactive aggression and positive symptoms are more related to reactive aggression, results showed that psychopathy is predictive of both self-reported proactive aggression and reactive aggression. Moreover, we found that the impulsive-antisociality factor of the PPI-R was associated with both self-reported proactive and reactive aggression. The

finding that also reactive aggression is associated with psychopathy is consistent with previous findings (see Reidy et al., 2011 for a review). Self-reported reactive aggression was also associated to positive symptoms and persecutory ideation, but when controlled for psychopathy and substance use, the persecutory ideation was not a significant predictor anymore. Persecutory ideation was the only significant predictor of observed aggression on the ward, whether the observed aggression is reactive or proactive in nature.

One of the limitations of the current study is that only those patients were included who were able to participate in a relatively extensive study. This could have led to a selection bias of those who are not too severely impaired by their psychotic illness. Another limitation was that, because of the limited sample size, we had to limit the number of variables included as predictors in the regression models. Therefore, we could not explore the predictive value of different psychopathic traits (e.g. Factor 1 and 2) and of the different substances. Future research may test the predictive value of different aspects of psychopathy, and of different substances. A last limitation of this study was that the patients were not medication free. But note that all patients received prescribed antipsychotic medication.

One of the strengths of this study is that, to our knowledge, this is the first study that examined the predictive value of multiple factors in different measures of aggressive behavior in persons with schizophrenia.This has led to more insight in why some results regarding the association between schizophrenia and aggressive behavior are inconsistent. Also, the present results point to the importance of acknowledging different motives for aggressive behavior in patients with a schizophrenia disorder.

In conclusion, although psychopathic traits are seen as the single best predictor of violence in the community (Rice & Harris, 1992; Tengström et al, 2000), this is not the best predictor for aggression in all types of settings and not in all aggression types. Comorbid psychopathic traits are predictive of proactive aggression and reactive aggression in general (e.g. in the community), while positive symptoms, especially persecutory ideations, are predictive of observed inpatient aggression. These findings

implicate that it is important to acknowledge comorbid factors in patients with schizophrenia for more precise risk assessment and appropriate treatment for aggressive patients with schizophrenia.

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Chapter 7

The role of ideational distress in the relation between persecutory ideations and reactive aggression

Josanne D. M. van Dongen

Nicole M. L. Buck

Hjalmar J. C. van Marle

In press, *Criminal Behaviour and Mental Health*

Abstract

People with schizophrenia are more likely to be violent than the people without. Feeling driven to act on persecutory delusions may be one explanation for this, but it remains unclear why some should act on such delusions but some not. Acquisition of data from people who are very ill is problematic. Our study explores testing of hypotheses on similar ideational and behavioural associations among healthy recruits from the general population. The main aim was to test the effect of distress induced by persecutory ideas on any relationships between those ideas and aggressive behaviour, and the effect of gender. Twenty-four men and 53 women from the general population participated in this study. The measures of aggressive behaviour were experimentally induced aggressive responding and self-reported personal style, reactive, and proactive aggressive behaviours. Among men, persecutory ideation predicted reactive aggressive responding and aggressive style of behaviour only in those who experienced higher levels of persecutory ideational distress. Among women, with generally lower levels of aggression, the role of ideational distress was more complicated; there was a relation between persecutory ideations and aggression, also in those who had lower levels of ideational distress. For neither men nor women were there links between persecutory ideation and proactive aggression, regardless of distress. These findings show that also in the general population, there is a relation between persecutory ideations and aggressive behavior. In addition, ideational distress is a moderator in this relation.

Introduction

There is evidence that people with a psychotic disorder have a higher risk of criminal and violent behaviour than people from the general population (Douglas et al, 2009; Taylor, 2008). Researchers have tried to find an explanation for this relationship. Several studies have found that positive psychotic symptoms are associated with aggressive behaviour (Bjorkly, 2002a, 2002b; Frésan et al., 2005; Krakowski et al, 1999; Swanson et al., 2006; Walsh et al, 2002). Of these, delusions (rather than hallucinations) account for the most of this relationship (Taylor, 1985; Taylor et al., 1998; Swanson et al, 1996). *Persecutory* delusions may be particularly important role in this respect (Cheung et al, 1997). Further, Van Dongen et al (2011) found a positive association between self-reported persecutory ideation and self-reported aggressive behaviour in both patients with schizophrenia and people from the general population. Some authors suggest that the violent and homicidal behaviour of psychotic individuals could be explained by a so called *acting upon the delusion* or *symptom consistent violence* (Buchanan et al., 1993; Junginger et al 1998; Wessely et al., 1993). Still, it is not clear what causes aggressive action on (persecutory) delusions.

People with persecutory delusions have the conviction that others will cause them harm, currently or in the future (Freeman & Garety, 2000), and that the harm will be intentional. Freeman and colleagues (2007) proposed that people with such experiences use *safety behaviours*, such as avoidance or aggression, to reduce the threat that they perceive. Although avoidance behaviours appeared to be the most common of these, and aggression one of the least likely, there is a positive and significant association between persecutory delusions and aggression. A possible link in this relationship may be the presence of delusion-related distress (see Buchanan et al 1993; Bjorkly, 2002a).

Ideational/delusional distress is defined as negative affect reported as consequent upon the delusion (Buchanan et al, 1993). Some researchers have found that people with persecutory delusions have more negative affect associated with the delusion (Buchanan et al, 1993; Cheung et al, 1997), in turn associated with acting on persecutory

delusions (Appelbaum et al, 1999; Buchanan, 1997). More recent findings, however, have shown differences between women and men in this respect, with women less likely to respond to delusions with aggression than men (Taylor et al., 2000; Teasdale et al, Monahan, 2006).

Persecutory ideations are not only present in patients with a psychotic disorder, but also in between 1% and 17.5% of the general population (Eaton et al, 1991; Van Os et al, 2000; Wiles et al, 2006). A meta-analysis gave the range as 5%-8% (Van Os et al, 2009). Van Os and colleagues suggested a continuum between psychotic ideation to delusions, with one implication that research with a non-clinical sample may lead to insight into the clinical phenomenon (Van Os et al., 2000). The advantage of using a nonclinical sample is that there are no clinical confounding factors such as antipsychotic medication or co-morbid factors that may influence results. Our research questions will be examined in a general population sample.

Our first aim was to examine the relationship between persecutory ideas, persecutory ideational distress and aggressive behaviour. We hypothesized that an association between persecutory ideation and aggression would be found only when distress secondary to those ideas was high. Our second aim was to examine whether there are gender differences in any such relationships. We hypothesized that this mediating role of ideational distress between persecutory ideas and aggression would be prominent among men but not women.

Methods

Participants

The total sample consisted of 77 individuals (24 men, 53 women) from the general population. Over two-thirds of them (54, 69.9%) were of Dutch origin, 6 (8.2%) Surinamese, 4 (5.5%) Belgian and 13 (16.4 %) from other nationalities. The mean age of the men was 21.63 years (*SD* = 3.26, range 18–30 years) and of the women 22.43 years (*SD* = 6.03, range 18-50).

Measures

Persecutory Ideation Questionnaire (PIQ)

The PIQ (McKay et al, 2006; Dutch version by Van Dongen et al., 2011) consists of 10 items, each scored on a 5-point Likert scale ranging from 0 (*not true*) to 4 (*true*). This scale measures the level of persecutory ideation and is suitable for use with the general population (McKay et al., 2006; Van Dongen et al., 2011). A higher total score refers to higher levels of persecutory ideation.

Distress associated with the persecutory ideation

Ideational distress was measured according to Peters et al (2004). After each delusional item of the PIQ, the respondent was asked how much that ideation distressed him/her ranging from 1 (*not distressing*) to 5 (*very distressing*).

Aggression Questionnaire (AQ)

The AQ (Buss & Perry, 1992; Meesters et al, 1996) consists of 29 items scored on a 5-point Likert scale ranging from 1 (*completely disagree*) to 5 (*completely agree*). The scale measures general aggressive tendencies and behaviour, and has four factors: physical aggression, verbal aggression, anger and hostility. For this study, we used total scores only (range 29-145, with higher scores reflecting more aggression).

Reactive Proactive Aggression Questionnaire (RPQ)

The RPQ (Raine et al., 2006; Dutch version by Cima et al, in press) was used to measure reactive and proactive aggression. The RPQ consists of 23 items of which 12 items make up the proactive subscale, and 11 items make up the reactive subscale. The items are scored on a 3-point Likert scale ranging from 0 (*never*) to 2 (*most of the time*).

The Point Subtraction Aggression Paradigm (PSAP)

The PSAP (Cherek, 1992) is a well validated measure of aggressive behaviour in a laboratory setting (Cherek & Lane, 1999; Cherek et al, 1997; Gerra et al., 1996; Gerra et al., 1997; Lane et al., 2009). Since its original version, which takes six sessions and three hours to administer, some modifications and shorter versions have been developed. The version we used has good psychometric properties, and requires only three sessions and 40 minutes to complete (see Carré & McCormick, 2008). Each of the three sessions lasts 12 minutes. The participant is told that he or she could earn money based on his/her performance on a computer task. Further instructions are that the participant will be paired with an opponent (in fact, fictitious), and that the goal is to gain as many points as possible, which are exchangeable for money at the end of the experiment. Participants sit in front of a computer monitor and keyboard and have two response options available to them: Option 1 is the point reward button, and Option 2 the button for stealing points (aggressive response). The response options correspond to numbers 1 and 2 of a standard computer keyboard. Pressing option 1 a hundred consecutive times would lead to 10 cents increase on their counter, and pressing option 2 ten times would lead to stealing a point from their opponent. Prior to experiment, in a pilot study, in order to maximise the number of people who believed in the reality of an opponent, we tested different instructions (the corresponding author may be contacted for more information). In the final instruction, participants were told that they would not receive their subtracted point on their own counter and that the condition of the opponent was unknown (maybe s/he would get the subtracted points, maybe not).

At the end of the PSAP task the participants answered three control questions about the task to assess whether or not the instructional deception regarding the fictitious opponent had been established. These questions were: (a) “From the beginning of the experiment, with how many people do you think you were paired with to play the game?” (b) “Describe the person(s) you were paired with” (c) “Has the person earned more money or did you? Why?”

Procedure

Participants were recruited by advertisements, and by approaching acquaintances and undergraduate students. All of them gave were asked for informed consent. Consenting participants gave demographic data, then completed three experimental sessions (PSAP task). Next, they were asked to fill out the PIQ and the ideational distress questions, followed by the RPQ and AQ. Participants were told explicitly that the persecutory ideation questions were asked with respect to thoughts *in general in daily life*.

Statistical analyses

Based on answers to the control questions of the PSAP task, 10 individuals were excluded from the study because they did not believe the deception.

We checked whether the independent and dependent variables were normally distributed. Results showed that the PIQ scores, ideational distress, and proactive aggression scores were highly skewed to the right. We calculated Spearman's rho correlation coefficients for a first impression on the relation between persecutory ideation, ideational distress and the aggression measures.

Next, to examine in which condition (i.e. high or low level of ideational distress) persecutory ideations are predictive of aggressive behaviour, we divided the participants into low and high ideational distress groups on the basis of a median split. Among the men, the median was 1, putting 15 of them in the low distress group and 10 in the higher distress group. Among the women, the median was 3, putting 26 of them into the low distress group and 17 in the higher distress group. Four regression analyses were conducted for men and women separately, each with the four different indices of aggressive behaviour as the dependent variable. Proactive aggression had a skewed distribution, and transforming the data did not lead to normal distributed data. Therefore, we dichotomized this variable and performed a logistic regression. The independent variable was the total score of the persecutory ideation scale. For all regression analyses we used a two-tailed test with a significance level of $p = .05$.

Results

Sample characteristics

Descriptive statistics for the dependent and predictor variables for men and women are summarized in Table 1. Results show that the correlations between persecutory ideation and ideational distress on the one hand and the aggression measures on the other range between low and high (see Table 2).

Table 1. Summary of descriptive statistics for the dependent and predictor variables for males and females.

		N	Minimum	Maximum	Mean	Std.Deviation
Males	PSAP scores	24	110	2232	868.13	530.65
	Aggression Questionnaire	24	47	109	67.17	15.27
	ReAggression	23	4	14	8.43	2.56
	ProAggression	22	0	7	2.09	2.14
	Persecutory Ideation	23	1	23	4.3	4.6
	Ideational distress	23	0	23	3.48	5.66
Females	PSAP scores	50	0	1050	519.08	270.51
	Aggression Questionnaire	52	41	97	60.77	12.55
	ReAggression	52	1	14	6.71	2.88
	ProAggression	53	0	8	1.15	1.47
	Persecutory Ideation	53	0	23	3.74	4.17
	Ideational distress	52	0	17	3.77	4.75

Table 2. Correlations between persecutory ideation and ideational distress, and the four aggression measures.

		Persecutory Ideation	Ideational distress
Males	PSAP scores	.34	.11
	Aggression Questionnaire	.50*	.47*
	ReAggression	.37	.31
	ProAggression	.21	.32
Females	PSAP scores	.10	-.09
	Aggression Questionnaire	.66***	.66***
	ReAggression	.36**	.36**
	ProAggression	.22	.17

* Correlation is significant at the .05 level (two-tailed).

** Correlation is significant at the .01 level (two-tailed).

*** Correlation is significant at the .001 level (two-tailed).

Persecutory ideation and distress as predictors of aggressive responding on the PSAP task

Results for men showed that there is no relationship between persecutory ideation and aggression on the PSAP, neither in the low ideational distress nor in the higher ideational distress group. Among women, however, results showed that the PIQ significantly predicted aggression (β = .45, $t(25) = 2.44$, p =.023) in the low distress group, and explained 19.8% of the variation in aggression scores ($F(1,24) = 5.93$, p = . 023).

Persecutory ideation and distress to predict aggressive responding on the AQ

Results for men showed that the PIQ significantly predicted self-reported general aggression only in the higher ideational distress group (β = .75, $t(9) = 3.21$, p = .012); it explained 56.2% of variation in aggression scores ($F(1,8) = 10.28$, p =.012). Among the women, the PIQ also significantly predicted general aggression, both in the lower and in the higher ideational distress group. In the low distress group, PIQ scores predicted aggression (β = .48, $t(26) = 2.76$, p = .011), and explained 23.4% of the variation in

aggression scores ($F(1,26) = 7.64$, $p = .011$). In the higher distress group, PIQ scores predicted aggression scores ($\beta = .72$, $t(16) = 3.99$, $p = .001$), and explained 51.5% of the variation in aggression scores ($F(1,16) = 15.95$, $p = .001$).

Persecutory ideation and distress in relation to reactive aggressive responding on the RPQ

There was a trend towards men in the higher ideational distress group being more likely to show general aggression according to the PIQ ($\beta = .60$, $t(9) = 2.15$, $p = .067$); this explained 35.9% of variation in aggression scores ($F(1,8) = 4.48$, $p = .067$). Among women, no relationship at all was found between PIQ scores and self-reported reactive aggression.

Persecutory ideation and distress to predict proactive aggressive responding on the RPQ

Neither lower nor higher ideational distress was associates with self-reported proactive aggression, regardless of gender.

Discussion

Our first hypothesis – that, overall, persecutory ideation will be more likely to be associated with aggression in the presence of higher ideation related distress – was sustained with respect to self-reported aggressive style. Our second hypothesis that there would be a gender difference in this relationship was also confirmed for this self-report. For men a relationship between persecutory ideations and aggressive behaviour held only in the higher ideational distress group, but for women there was a relationship at all levels of distress.

Although there was a moderate relationship between persecutory ideation and aggressive responding on the PSAP, contrary to our hypothesis we found no influence from ideational distress on aggressive responding during the experimental task. One explanation for the results on the PSAP task might be that the sample of men was very small (n = 23), reducing the power. Persecutory ideation was not associated with self-reported proactive aggression, regardless of ideational distress. This is in line with our hypothesis that the persecutory ideation would be driving any aggression; on the RPQ (reactive-proactive questionnaire) aggression was reported as a reaction to the idea.

We found that, overall, the women showed less aggressive responding than the men, but that, on the PSAP tasks, links between persecutory ideation and reactive aggression were, at first sight paradoxically, in the *low* ideational distress group. This suggestion that the women were less likely to show aggression when most distressed is consistent, however, with the theory that females are more likely to adopt a *tend-or-befriend* coping strategy when under threat (Taylor et al., 2000; Teasdale et al, 2006), and less likely to show aggression as a safety behaviour. We found no relationship at all, however, between persecutory ideation and *self-reported* reactive aggression among the women. By contrast, when we analysed the data on self-reported aggression in general (AQ) we found a relationship between persecutory ideations and aggression in both low and higher ideational distress groups. Moreover, the relationship was stronger in the higher distress group, suggesting that women may feel be more ready show aggression

when feeling more distressed, and in this they were more similar to the men. Among the women, as among the men, there was also no relation between persecutory ideations and proactive aggression.

Two main limitations of our study must be acknowledged when interpreting our results. First, our sample size was small, particularly of the men. The power to detect any significant effect was thus weak when comparing lower and higher ideational distress. Nevertheless, even among the men, we did find large effects despite low power. Secondly, because of the cross-sectional design of the study no causal inferences can be made.

An important strength of our study is that it was testing a theory of acting on persecutory ideas, rather than confining ourselves to post-hoc observations. It was, however, reliant on two major assumptions – that paranoid ideation among healthy people may be used as a proxy for delusions and that these various measures of aggression may separately or together be an adequate proxy for actual violence. Buchanan and colleagues (1993) found that acting on delusions in patients is more likely when the patient experiences feelings of distress, but they were referring to fully formed pathological beliefs among people who were sufficiently unwell to need hospitalisation and the acts recorded were of actual physical violence. The fact that our findings not only linked ideation to aggressive reactions and style, but that this relationships was in some of the associations mediated by ideational distress in ways that were more similar than not to the delusions-actual violence findings, suggest that such evaluations may be a useful way forward for further research into explanations for associations between delusions and violence and possibly even in the clinic.

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Chapter 8

Delusional distress partly explains the relation between persecutory ideations and inpatient aggression on the ward

Josanne D. M. van Dongen

Nicole M. L. Buck

Hjalmar J. C. van Marle

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Abstract

Previous research showed that there is an association between persecutory delusions and inpatient aggression. However, it is not clear why some persons act upon their delusions with aggression. Research showed that persons with persecutory delusions have higher levels of delusional distress resulting from these delusions. This may explain why some persons act upon their delusions. Persecutory ideations lead to ideational distress which in turn can lead to aggression. The main aim of the present study was to test whether persecutory ideations have an indirect effect on inpatient aggression through delusional distress. The sample of the study consisted of 44 male inpatients from different general psychiatric inpatient wards. Results showed that the effect of persecutory ideations on inpatient aggression was partly explained by the level of delusional distress. Insight in the theory of acting upon delusions can be obtained by acknowledging this role of delusional distress in the relation between persecutory ideation and inpatient aggression. Early diagnosis of persecutory ideations and experienced delusional distress can be used in risk assessment of inpatients. Early interventions to reduce delusional distress, such as cognitive behavioral therapy, may prevent inpatient aggression.

Introduction

Although there is a positive relation between psychosis and criminal and violent behavior (Douglas et al., 2009; Fazel et al., 2009), not all persons with a psychotic disorder are violent. The population-attributable risk of patients with severe mental illness on violent crime is 5%, although it varies by gender and age (Fazel and Grann, 2006). The risk for committing a homicide is 10 times more likely for those with schizophrenia than for those from the general population (Eronen et al., 1996). Multiple factors can explain the higher risk of aggressive behavior in patients with schizophrenia. These include positive symptoms, comorbid substance use and traits of antisocial personality disorder or psychopathy (Hodgins et al., 2003). One recent review showed that paranoid thinking (such as persecutory ideations) is one of the factors associated with aggression on the ward (Cornaggia et al., 2011). However, we still do not know how persecutory delusions lead to aggression.

A study by Wallace and colleagues (1998) showed that 7.2% of the males who are convicted of murder are diagnosed with schizophrenia. In addition, research has shown that persons with schizophrenia and a violent past have more positive psychotic symptoms than those without a violent past (Frésan et al., 2005), and the more positive symptoms, the more aggressive behavior (Steinert et al., 2000). Decades ago, research already focused on the motivational role of psychosis in committing violent crime. Taylor (1998) reviewed studies that contributed to the etiology of violence and mental disorder and showed that the more serious the act by those with a psychotic disorder, the more likely it was that their delusions directly caused the aggression. Moreover, in 20% to 90% of cases offenses were motivated by psychosis in schizophrenia disordered offenders (Junginger et al., 1998; Taylor 1985; Taylor and Gunn, 1984). Junginger and colleagues (1998) concluded that there is a moderate risk for a person with a mental illness that delusions will motivate violence.

With respect to positive symptoms, delusions especially seem to account for most of the (violent) offending of persons with a psychotic disorder (Taylor, 1985; Taylor

et al., 1998; Swanson et al., 1996). Moreover, mostly delusions involving threat or persecutory delusions seem to be associated with aggressive behavior in individuals with schizophrenia (Bjorkly, 2002; Cheung et al., 1997a; Taylor, 1985). Persons with persecutory delusions have the conviction that others will cause them psychological, physical or social harm (Freeman and Garety, 2000). The person feels that this harm will be inflicted currently or in the future. In addition, the person feels that the harm is intentional.

The link between persecutory delusions and aggressive behavior is not yet clearly understood. Some authors suggest that this violent behavior could be explained by a so called *acting upon the delusion* or *symptom consistent violence* (Buchanan et al., 1993; Junginger et al., 1998; Wessely et al., 1993). Freeman and colleagues (2007) showed that patients adopt safety behaviors to cope with their persecutory delusions and that patients adopt more safety behavior when feeling distressed. And although aggression is a less common safety behavior (Freeman et al., 2007), presence of delusional distress resulting from persecutory delusions may explain why people act upon their delusion with violent behavior (e.g. Cheung et al., 1997b). Delusional distress is defined as negative affect and stress associated with the delusional beliefs. It is suggested that delusional distress is one of the factors likely to cause the person acting upon persecutory delusions (Buchanan et al, 1993).

The main aim of the present study was to test whether persecutory ideations have an indirect effect on inpatient aggression by delusional distress resulting from these persecutory ideations. We expected that persecutory ideations predict inpatient aggressive behavior, and that delusional distress partly explains this relation. More insight in the theory of acting upon delusions of persons with a psychotic disorder is important for improvement of risk assessment and the development of specific interventions. If the presence of delusional distress increases the likelihood of acting upon delusional with aggression, then early diagnosis of persecutory ideations and the level of delusional distress is desirable.

Methods

Participants

The sample consisted of 44 male inpatients hospitalized in two different general psychiatric hospitals in the Netherlands. We used male inpatients on closed wards because of gender differences in aggression (e.g. Teasdale et al., 2006). Closed wards were included because observation of behavior was the focus of this study. All patients were diagnosed according to the DSM-IV-TR criteria (APA, 2000). Diagnoses included were: Schizophrenia, schizo-affective disorder and psychotic disorder NOS. In order to ascertain that delusional symptoms were due to schizophrenia or related disorder and not due to other factors (e.g. drug or stress induced) that could contaminate the results, we had the following exclusion criteria: schizophreniform disorder, brief psychotic disorder, shared psychotic disorder, psychotic disorder due to a general medical condition and substance induced psychotic disorder. Also, presence of mental retardation and/or presence of a neurological disorder were excluded criteria. We made sure that diagnosis of schizophrenia or related disorder was present for more than 2 years, and that age ranged between 18 and 60 years.

Of the total patient sample, 83.3% met diagnostic criteria for schizophrenia, 11.7% of the patients were diagnosed with a schizo-affective disorder, and 5% had a psychotic disorder Not Otherwise Specified (NOS). 43.3% of the patients had a comorbid substance use disorder (not the cause of the schizophrenia disorder). All patients received prescribed medication. Haloperidol (29.5%) was most common, but also zuclopentixol (25.0%), and clozapine (15.9%) were often prescribed. Average age of the inpatients was 33.27 (*SD* = 9.92, range 19 to 58). 40.9% of the participants were Dutch, 13.6% were from the Dutch Antilles, 15.9% from Suriname, 6.8% were African, and 22.8% from other countries.

Measures

Diagnostics and positive symptoms

The Mini International Neuropsychiatric Interview (MINI-Plus; Sheehan et al., 1998; Dutch version by Van Vliet et al., 2000) section M for psychotic disorders was used as a check for the presence of a psychotic disorder in the patients. The MINI-Plus is a short structural diagnostic interview, consisting of 26 modules assessing Axis-I disorders according to the DSM criteria.

The Positive and Negative Syndrome Scale (PANSS; Kay et al., 1987; Dutch version by De Ruiter and Hildebrand, 1999). De PANSS is a semi-structured interview for the assessment of positive and negative symptoms of psychosis and symptom severity. The interview consists of 30 scored on a 7-point scale with a range between 1 (*absent of symptom*) to 7 (*extreme severity*). Next to Total scores, scores on three subscales can be determined: positive subscale (7 items), negative subscale (7 items), and general psychopathology subscale (16 items).

The Persecutory Ideation Questionnaire (PIQ; McKay et al., 2006; Dutch version by Van Dongen et al., 2011) consists of 10 items scored on a 5-point Likert scale ranging from 0 (*very untrue*) to 4 (*very true*). This scale measures the level of persecutory ideation, and totals scores range from 0 to 40 (McKay et al., 2006; Van Dongen et al., 2011). A higher score refers to more persecutory ideations. The Dutch version of the PIQ has good internal consistency, reliability, and validity (Van Dongen et al., 2011). In the current patient sample results showed that the PIQ has excellent internal consistency (Cronbach's $\alpha = .91$).

Delusional distress was measured following Peters and colleagues (2004). After each delusional item of the scale, the respondent was asked how much that ideation distressed him/her ranging from 1 (*not distressing*) to 5 (*very much distressing*). Delusional distress also has excellent internal consistency in the current sample (Cronbach's $\alpha = .93$).

Aggressive behavior

Observed aggression on the ward was measured with the Social Dysfunction and Aggression Scale (SDAS; Wisted et al., 1990; Dutch version by Van der Werf and Staverman, 1999), is an observation of dysfunctional behavior of the patient. The scale is filled out by the staff members/nurses on the ward. It consists of 11 items scored in a 5-point Likert scale ranging from 0 (*not present*) to 4 (*severely present*). This scale measures besides aggressive behavior also social dysfunctional behavior. One important advantage over using the SDAS instead of other observed aggression measures (e.g. SOAS-R; Nijman et al., 1999), is that it assesses a general aggressive attitude and behavior, instead of observation after a specific incident. Because the scale includes two items regarding self harm (item 9 and 11), we excluded those items so that we only assessed externally oriented aggressive tendencies. Results regarding reliability of the SDAS (minus the two items) showed that in this sample the internal consistency was very good (Croncach's α = .89).

Procedure

Eligible patients were approached and asked to participate in the study. After informed consent the patients had about one week to reconsider their participation. We planned an interview session in which we first asked the patient for informed consent and then we interviewed the patient for assessment with the MINI-plus, and the PANSS. Assessment with the MINI and the PANSS was conducted to confirm diagnosis stated in the patient file. The assessment was performed by a formally trained researcher (JvD). Within one week, the patient filled out the PIQ and delusional distress questions and participated in an experimental session (not further discussed in this paper). The participants were told explicitly that the persecutory ideation questions were asked with respect to thoughts *in general in daily life*. Level of experienced distress associated with the described ideations followed each ideation item. When the patient finished the interview and experimental

sessions, the staff was asked to fill out the SDAS at the end of the week in which the patient was included in the study.

Statistical analyses

Reliability analyses for the different measures were conducted to test the internal consistency of these constructs within this patient sample. Because all variables (observed aggression, persecutory ideation and delusional distress) were skewed to the right, Spearman's Rho correlation analyses were used to explore the relation between the different variables. Subsequently, to test for indirect effects by delusional distress in the relation between persecutory ideation and observed aggression, we used the Bootstrap method for analyzing indirect effects as defined by Preacher and Hayes (2004). In these analyses we used the Z values of the variables so that we were able to compare the regression coefficients of the different regressions conducted. All analyses were conducted with a significance level of .05.

Results

Aggression on the ward

Results regarding the out warded directed (aggressive) actions assessed by the scale showed that the patients showed low levels of aggressive behavior. Mean score for the patients on the scale was 5 (SD = 6.5). The scores on the scale ranged between 0 and 23. The data was highly skewed to the right meaning that most of the patients scored at the lower end of the scale and a few patients scored higher. Most patients showed verbal aggressive behavior (25%), and directed aggressive behavior such as threats (18.2%). 2.3% of patients showed physical aggressive behavior towards staff, however 0% of the patients showed physical aggression towards other persons. However, 9.1% of patients showed physical aggression toward objects.

Persecutory ideation, aggression and the role of delusional distress

Results show that the relation between persecutory ideation and delusional distress associated with these ideations is strong (r = .72, p < .001). In addition, the relation between persecutory ideation and observed aggression (r = .47, p = .001), and between delusional distress and observed aggression (r = .44, p = .003) are moderate. Collinearity statistics showed that there is no problem with multicollinearity between persecutory ideations and delusional distress (VIF = 2.47).

To test whether delusional distress indirectly effects the relation between persecutory ideation and aggressive behavior, we used the bootstrap method. See Figure 1 for the model of indirect effects. When using persecutory ideation to predict aggression group, prediction resulted in a significant model (F(2,41) = 10.72, p =.0002), explaining 34.3% of variation in observed aggression. Higher levels of persecutory ideations significantly predicted higher aggression group with B = 0.50 (SE = 0.14, t = 3.71, p = .0006). Also, persecutory ideations significantly predicted delusional distress B = 0.77 (SE = 0.10, t = 7.87, p < .001). Higher levels of delusional distress also predicted the higher aggression group B = 0.49 (SE = 0.20, t = 2.46, p = .0183). Most important, when controlling for delusional distress in the model, persecutory ideations did not significantly predicted aggression group anymore B = 0.12 (SE = 0.20, t = 0.60, p = .55). This means that the effect of persecutory ideations on aggressive behavior can be partly explained by the delusional distress associated with the persecutory ideations. This indirect effect was significant with a 95% confidence interval of 0.1152-0.9656.

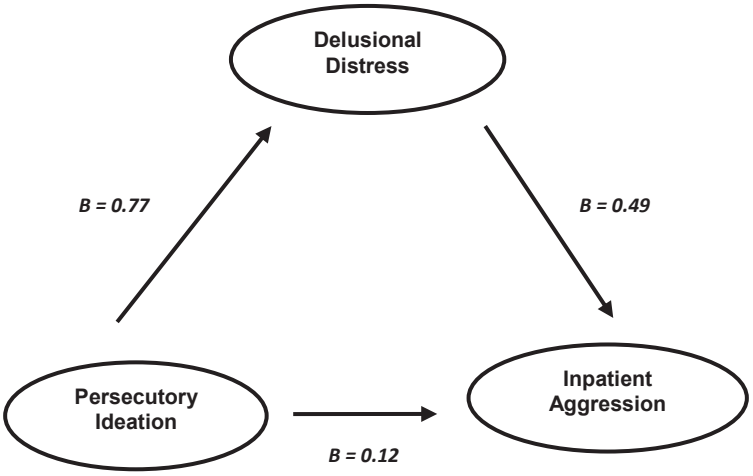

Figure 1. Model of indirect effects.

Delusional distress indirectly effects the relation between persecutory ideation and inpatient aggressive behavior. The model significantly explains 34.3% of variance in inpatient aggression (F (2,41) = 10.72, p =.0002). Initially, the predictive value of persecutory ideation for inpatient aggression was significant B = 0.50 (SE = 0.14, t = 3.71, p = .0006). However, after addition of delusional distress as predictor in the model, the predictive value of persecutory ideation became non-significant (B = 0.12, *ns*). This means that delusional distress partly explains the relation between persecutory ideation and aggression in this inpatient sample.

Discussion

It is desirable to gain more insight in the theory of acting upon delusions with aggressive behavior. Therefore, the main aim of the present study was to test whether delusional distress resulting from experiencing persecutory ideations indirectly effects the relation between persecutory ideations and observed aggression on the ward among patients with schizophrenia or related disorder. Results showed that overall, the level of (physical) aggressive behavior on the ward was low. This is consistent with other studies examining aggressive behavior of patients with the SDAS in inpatient wards (e.g. Hovens et al., 2005; Steinert et al., 2000). In line with our hypothesis, results showed that patients who show more aggression on the ward (higher aggression group) report higher levels of persecutory ideations than patients who show less aggression on the ward (low aggression group). Moreover, delusional distress mediated the relation between persecutory ideation and aggression on the ward as was hypothesized. In other words, the effect of persecutory ideations on predicting observed aggression on the ward was explained by the level of experienced delusional distress.

The finding that delusional distress partly explains the relation between persecutory ideation and aggression is consistent with other findings (Freeman et al., 2007; Wessely et al., 1993) and can be an explanation for the so called *acting upon the delusions* or *symptom consistent violence* (Buchanan et al., 1993; Junginger et al., 1998; Wessely et al., 1993).

Some limitations have to be taken into account when interpreting the results. Firstly, only patients who were physically and mentally able to participate in the study were included which resulted in a small sample size (n = 44). Also, only inpatients from two different psychiatric hospitals and a limited number of wards were included in the study. Therefore, the generalizability of the results is limited and results have to be replicated in larger samples. Secondly, all patients used antipsychotic medication which could have influenced the results. For example, it has been shown that different types of antipsychotics are associated with a reduced risk for aggressive behavior (see Volavka et

al., 2004). However, the fact that these patients were all on medication also shows that this process of acting upon delusions not only occurs in acute psychotic individuals without medication.

The current findings have important implications for clinical practice. The present findings show that person with persecutory ideations have a higher risk of becoming aggressive, but that the presence of delusional distress explains this higher risk. These results are important for risk assessment and management in clinical psychiatric inpatient facilities. Up until now, it was assumed that only patients with an acute psychosis show aggressive behavior resulting from the symptoms of the disorder. The present findings show the importance of acknowledging that also patients with more chronic type of schizophrenia may act upon delusions with aggressive behavior. Patients with persistent persecutory delusions worry about the content of their delusions which in turn increases the level of delusional distress (Freeman and Garety, 1999; Freeman et al., 2001; Startup et al., 2007). This worry and delusional distress leads to persistence and maintenance of the persecutory delusions in the patients. If these patients are at higher risk of showing aggressive behavior, then it is important to focus on the reduction of delusional distress to reduce negative outcomes and persistence of delusional ideation (a vicious cycle).

By using early diagnosis of persecutory ideations and experienced delusional distress, early interventions can prevent inpatient aggressive behavior. In a previous study (Van Dongen et al., 2011), and the current study, the PIQ is found to be reliable tool for the assessment of persecutory ideations and delusional distress. Treatment of inpatient aggression relies on antipsychotic medication and mood stabilizers, but there is only evidence for the effectiveness of clozapine (Volavka and Citrome, 2008). However, given the present findings cognitive behavioral therapy may be a promising treatment intervention for reduction of delusional distress. For example in a recent randomized controlled trial, it was found that a brief cognitive behavioral worry intervention to reduce delusional distress significantly reduced the levels of delusional distress in patients with persistent persecutory delusions (Foster et al., 2010). If cognitive behavioral therapy can be used at an early stage, then the vicious cycle of delusional ideations, subsequent

delusional distress and persistence of the delusions might be broken, and the risk of acting upon delusions is reduced. Maybe the use of benzodiazepines for the sedation of patients who already are too agitated and distressed can be prevented. Thereby, the negative consequence of patients becoming dependent on benzodiazepines may be tackled as well. The use of early diagnosis and interventions may be a key in the risk management of acting upon delusions with aggressive behavior.

Future research might focus on delusional distress as a mediator in the relation between other types of delusions and aggression, and in other settings than a general psychiatric ward. In that way, it would be possible to generalize the finding that delusional distress acts as a mediator in the relation between delusions and aggressive behavior. If we find again that this process is a key factor for the explanation of acting upon delusions and symptom consistent violence, future research might test with a randomized controlled trial whether we can reduce inpatient aggression with the use of early diagnosis and treatment interventions.

In conclusion, the present study found that patients with schizophrenia or related disorder who behave more aggressively report higher levels of persecutory ideations than patients with low levels of aggressive behavior. Moreover, the delusional distress explained the relation between persecutory ideations and aggression on the ward. This process can be an explanation for acting upon delusions with aggressive behavior. By using early diagnosis of persecutory ideations and experienced delusional distress, early interventions such as cognitive behavioral therapy may prevent inpatient aggressive behavior.

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Chapter 9

General discussion

If we knew what it was we were doing,
it would not be called research, would it?

Albert Einstein

General discussion

Summary

The main aim of this dissertation was to further elucidate criminal and violent behavior in schizophrenia. To achieve this, several studies were conducted. These studies were described in two different parts of this dissertation. Part One concentrated on subtyping offenders with schizophrenia, and aimed to explain which factors predict whether one becomes an early starter, late starter or first offender as compared with a non-offender with schizophrenia. Part Two of this dissertation aimed to examine the unique contribution of persecutory ideations, substance use, and psychopathic traits in predicting inpatient aggression. A second aim of this part was to clarify the role of persecutory ideations and delusional distress in the relation between schizophrenia and aggressive behavior. **Chapter 1** reviewed the literature on violence in schizophrenia, and gave an outline of the aims of this thesis.

Studies in Part One were conducted using retrospective file based data from reports to the court of the Netherlands Institute of Forensic Psychiatry and Psychology (NIFP), and from a psychiatric ward in a general hospital. In **Chapter 2** the justification of a third type within the early/late start typology of offenders with schizophrenia, the first offenders, was examined. It was hypothesized that first offenders would differ from early starters and late starters in a variety of domains. Results showed that first offenders differ most from early starters, while early starters and late starters seem to be more comparable. It was concluded that a subgroup of first offenders is justified within the early/late start typology of offenders with schizophrenia. In **Chapter 3** we tested hypotheses on the etiology of the different subtypes formulated in the early/late start offender theory. This typology assumes that early starters resemble life-course-persistent offenders without major mental disorder (e.g. schizophrenia) in that the criminal behavior of both offender groups is thought to be attributable to antisocial personality characteristics. The criminal behavior of late starters and first offenders is thought to be attributable to positive psychotic symptoms. We tested whether early starters resemble

offenders without schizophrenia with respect to antisocial personality, and whether late starters and first offenders are characterized by different types of positive psychotic symptoms as compared with non-offenders with schizophrenia. The results suggested that the start of criminal behavior of early starters is indeed attributable to premorbid antisocial personality characteristics, and that the offending of late starters and first offenders is likely to be attributable to persecutory delusions and grandiose delusions. In **Chapter 4**, we aimed to reveal which etiological factors predict whether a person with schizophrenia becomes an early starter, late starter or a first offender. Using multinomial logistic regression, we found that the risk of becoming an early starter and a late starter is higher in those who have had a negative childhood environment (such as emotional neglect), had obtained only lower education, and misuse substances (also at an early age). Factors with the highest risk of becoming a first offender were when one has persecutory delusions and grandiose delusions. Misuse of particular substances (e.g. cannabis or poly substances) seemed to be protective for becoming a first offender as compared with a non-offender with schizophrenia. In other words, the risk of becoming a first offender was decreased when one used cannabis, or other types of drugs.

Part Two described several quasi-experimental studies that were carried out to examine the unique contribution of persecutory ideations, substance use and psychopathic traits. These studies also aimed to investigate the role of delusional distress in the relation between persecutory ideations and aggression. The main aim in **Chapter 5** was to examine the relation between persecutory ideation and self-reported aggressive behavior in a community based and clinical sample. In addition, in these two samples, psychometric properties of the Dutch version of the Persecutory Ideation Questionnaire (PIQ; Van Dongen, Buck, Kool, & Van Marle, 2011) were examined. Results showed that the Dutch PIQ is a reliable and valid instrument to measure persecutory ideations in both the general population and clinical population. In addition, by evaluating the PIQ in a clinical sample with patients with psychosis, we showed that the PIQ has good criterion validity. Additionally, persecutory ideations were significantly related to self-reported aggression in both the community sample and in the clinical sample. The study described

in **Chapter 6** examined the unique contribution of psychopathic traits, substance use, and persecutory ideations in the prediction of inpatient aggression. Results showed that while psychopathy explained most of the variance in self-reported proactive and reactive aggression, persecutory ideations explained most of the variance in observed aggression on the ward. To further investigate the relation between persecutory ideations and reactive aggression, we conducted an analogous study with persons from the general population, described in **Chapter 7**. It was hypothesized that the relation between persecutory ideations and aggression would depend on the level of distress associated with the ideations. We found that ideational distress moderated the relation between persecutory ideations and aggression. However, this effect differed in men and women (see next sections for a discussion). In the last study, described in **Chapter 8**, the role of delusional distress in the relation between persecutory ideations and aggression was studied. Since we found that persecutory ideations predicted inpatient aggression on the ward (Chapter 6), we tested whether delusional distress would mediate this relation. Results demonstrated that the effect of persecutory ideations on inpatient aggression was partly, but significantly explained by the level of delusional distress.

In the next paragraphs outcomes of the studies will be discussed. In addition, limitations, implications for practice, and directions for future research will be described.

Subtyping offenders with schizophrenia

On the basis of comorbid factors, such as premorbid antisocial personality, one can define subtypes of offenders with schizophrenia. This subtyping is important for more accurate risk assessment and the development of effective treatment interventions for these specific subgroup of offenders. For decades, several experts in the field pointed to the importance of distinguishing between early start and late start offenders among offenders with major mental illness (e.g. Hodgins, 1995; Humphreys, Johnstone, MacMillan, & Taylor, 1992; Jones, Van den Bree, Ferriter, & Taylor, 2009). In these theories early starters are defined as persons with a premorbid antisocial personality who will commit

their first crime before the onset of the schizophrenia disorder. Late starters are defined as those persons with a schizophrenia disorder who start to offend after the onset of the schizophrenia disorder. Recently, Hodgins (2008) proposed a third type of offender, the first offenders. She described first offenders are persons in their late thirties with schizophrenia who suddenly commit a very serious offense. However, to our knowledge no study is published on the differentiation of this third type within the early/late start typology. In different studies, described in Part One of this thesis, we investigated the first offenders, the early starters and late starters to see whether the first offenders are justified as a third type in the offender typology, and to see what factors are associated with becoming an early starter, late starter or first offender. These studies are the first in which all three offender types are compared. In addition, slightly different definitions of the early start, late start and first offenders were used. That is, previous studies defined early starters on the basis of a first offense prior to age 18 year, and late starters were defined as those with a first offense after age 18 years (e.g. Tengström, Hodgins, & Kullgren, 2001). Other studies defined them on the basis of whether one has had a conduct disorder in childhood (early starters) or not (late starters) (e.g. Jones et al., 2009). However, in that way one cannot be sure that early starters are not actually late starters when the onset of schizophrenia was before age 18. Therefore, we defined early starters and late starters on the basis of first offense prior or after the onset of the schizophrenia disorder (including the prodromal phase). Additionally, first offenders were excluded from the late start group, and those persons who were above 35 years (see Hodgins, 2008) were regarded as the first offender group.

Previous studies on the typology relied on the assumptions formulated by Hodgins (1995) that criminal behavior of early starters is attributable to a premorbid antisocial personality, and the criminal behavior of late starters is attributable to cognitive and perceptual symptoms (e.g. delusions and hallucinations) of the psychotic disorder. However, these assumptions, including the existence of the third type, have not been tested empirically in previous studies.

Early starters

Results in the current thesis showed that early starters resemble offenders with no major mental disorder with respect to antisocial personality (Chapter 3). This is consistent with the idea that the criminal career of early starters is caused by antisocial personality characteristics early in life. However, these findings do not exclude the possibility that the continuing of offending by early starters is also due to positive symptoms of the schizophrenia disorder. We did not find any difference on positive symptoms between the early starters, late starters, and first offenders (see Chapter 2 and 3). Also, early starters were more likely than non-offenders to have grandiose delusions and persecutory delusions (Chapter 3 and 4). Therefore, it was concluded that the offending of early starters may be initiated by a premorbid antisocial personality, whereas the continuation of offending might also be attributed to positive symptoms of the schizophrenia disorder, such as persecutory delusions and grandiose delusions.

Differentiation in etiological risk factors for becoming an early starter has not been the focus of study in previous research. These studies often concentrated on the conduct problems in youth (e.g. Jones et al., 2009). In the current thesis we excluded antisocial personality characteristics in the analysis, because these factors can be regarded as tautological for becoming an offender. Results showed that the chance that one with schizophrenia becomes categorized as an early starter is increased when one has had an adverse childhood environment has obtained only lower education and misuses substances (including use at an early age). If one has persecutory delusions or grandiose delusions, the risk of becoming categorized as an early starter was increased to a lesser extent. This is important, because it reveals that the early starter is characterized by a variety of problem domains that can be a starting point for the development of early interventions to reduce the negative outcomes in these persons. These implications are further discussed in the section called “Implications for practice” on page 20.

Although early starters resembled life course persistent offenders with no major mental illness, we also found early starters to be more likely to have conduct problems in youth and adolescence. This was not expected, because this difference was found despite

the fact that we selected the offenders with no major mental disorder on the basis of cluster B personality characteristics. Early starters also differed in substance use, in that offenders without psychosis were more likely to misuse only alcohol and early starters were more likely (although at trend level) to misuse cannabis. It might be that early starters are more likely to have conduct problems in childhood and adolescence as a precursor associated with the development of schizophrenia (e.g. Ferdinand & Verhulst, 1995; Kim-Cohen, 2005). However, taking all results into account (Chapter 2 and 3), it is more likely that the conduct problems are comorbid factors in the development of schizophrenia, because these were not only present during the prodromal phase of schizophrenia disorder but also thereafter. In addition, the results showed that there are differences in the proportion of persons with conduct problems across the schizophrenia offender groups (e.g. early starters, late starter, and first offenders), thereby showing that conduct problems are related, yet can be distinct from the development of schizophrenia (see also Hodgins, Tiihonen, & Ross, 2005).

The illustrative case of Gregory (Box 4, Chapter 1) is an example of an early starter. He started to use substances at an early age and also had conduct problems in youth. His robberies were instrumental, which is consistent with the findings that early starters are more likely than other offender subtypes to commit proactively motivated crimes. Additionally, the fact that these offenses took place in a public area is also found to be characteristic for early starters (see Chapter 2). Gregor also has psychotic symptoms (delusions and hallucinations). However, these symptoms do not seem to explain his criminal behavior. Yet, we do not know to what extent these beliefs maintain his criminal behavior. Focused forensic psychiatric examination is necessary to investigate in which extent these psychotic symptoms played a role in Gregor's offenses.

Late starters

Although previous studies found clear differences between early starters and late starters, in the current thesis we have shown that late starters resemble early starters more than

we had hypothesized (Chapter 2, 3, and 4). That is, both early starters and late starters have had an adverse childhood environment, and also late starters have antisocial personality characteristics, including conduct problems in adolescence. However, as assumed by the early/late start offender typology (Hodgins, 1995), we did found that late starters are likely to offend due to particular positive symptoms of the schizophrenia disorder. Even though late starters do not differ from early starters and first offenders regarding positive symptoms, they are more likely to have persecutory delusions and grandiose delusions as compared to non-offenders with schizophrenia (see Chapter 3 and 4). Therefore, and because late starters per definition began their criminal career after the onset of their disorder, it is concluded that their offending can be attributable to the particular symptoms of the disorder.

Compared with first offenders, late starters, like early starters, are more likely to have antisocial personality characteristics such as antisocial personality traits and conduct disorder in childhood. Thus, although late starters start their offending after the onset of schizophrenia, they do have antisocial personality characteristics. This can partly be explained by the fact that they have had multiple convictions, which is likely to lead to a diagnosis of antisocial personality when one also had a conduct disorder in childhood. One has to note however, that we found that late starters are also more likely than first offenders to misuse different substances and to have started to use substances at an early age (before age 15 years). As mentioned before, this is comparable with early starters, although the proportion of early starters having these characteristics is higher.

Looking into the etiological risk factors (Chapter 4), we found that, as with early starters, risk of becoming categorized as a late starter was higher when one had an adverse childhood environment. In addition, risk was increased when one obtaining only lower education, and had used substances before age 15 years. The risk was increased to a lesser extend when one has grandiose delusions and/or persecutory delusions.

On the basis of previous studies (e.g. Mathieu & Côté, 2009; Pedersen, Rasmussen, Elsass, & Hougaard, 2010; Tengström et al., 2001), we expected that late starters would differ more from early starters. We did not expect to find that they have

comparable risk factors. These findings may be explained by the fact that in our studies we extracted the first offenders from our group of late starters. And because it was shown that these first offenders are a distinct group (see Chapter 2), it may be that current results differ from previous studies which had included first offenders in their late start group.

The case of Roland in the General introduction (Box 2, Chapter 1), was described as an illustration of a late starter. He is diagnoses with schizophrenia, and since the onset of this disorder he committed several offenses. He did not finish high school and was in trouble since then. It is likely that at the same time he started to use substances. These all are found to be risk factors for becoming a late starter (see Chapter 4). After years in and out psychiatric services, Roland killed his mother under the influence of delusional thoughts and hallucinations. The fact that his victim was a family member and that the crime was committed in her home, is consistent with the current findings. It was found that compared with early starters, late starters are more likely to have a family member as victim, and are less likely than early starters to commit a crime in a public place (Chapter 2).

First offenders

Although offending decreases with age after adolescence (see for example Moffit, 1993 on the age-crime curve), this is not true for homicide in schizophrenia, which is found to be likely to have been committed by persons who do not have a criminal history (Beaudoin, Hodgins, Lavoie, 1993). First offenders are those late starters who commit their first offense when they are in their late thirties (Hodgins, 2008). In our study, first offenders were more likely than early starters and late starters to have homicide as their index offense (Chapter 2). This can be explained by the fact that those who do not have a criminal record and are accused of homicide, are more likely to have been referred for observation and psychiatric evaluation. While one would argue that therefore, the results

are based on a selection bias, results are in line with the assumption that first offenders suddenly commit a very serious crime (Hodgins, 2008).

The fact that first offenders do not have a criminal record implies that they function better than early starters and also than late starters. This was confirmed in our current studies. First offenders are more likely to have been employed at the time of the offense, and the proportion of first offenders that is married and finished secondary school is higher than that of early starters and late starters (Chapter 2). However, as with early starters and late starters, the risk of becoming a first offender is increased when one only obtained lower education.

Hodgins (2008; 2009) hypothesized that the offending of first offenders is associated with particular symptoms, named Defective Affective Experiences (DAE; Moran & Hodgins, 2004). These are factors associated with psychopathic personality, including shallow affect, callousness, lack of remorse, and failure to accept responsibility for ones actions. Although negative symptoms in schizophrenia can mimic some of these characteristics (e.g. shallow affect), current research does not point in the direction of a causal role of these DAE factors in first offenders' offending. That is, although we did not directly study these factors, we found that none of the first offenders had psychopathic traits, nor did they have an antisocial personality (see Chapter 2). Characteristic in these first offenders was that they are more likely to have persecutory delusions and also grandiose delusions as compared to non-offenders with schizophrenia (Chapter 3 and 4). In addition, they are more likely than early starters and late starters to misuse alcohol. But, the current research also showed that misuse of cannabis or other substances than alcohol or cannabis (such as amphetamines), or poly substances decreased the risk of becoming categorized as a first offender. That is, while misuse of those substances may increase the risk of categorization as an early starter or late starter, it may be a protective factor for becoming a first offender. This may be explained by the fact that the first offenders that were older as compared with the non-offenders in the general hospital, but it may also reflect the fact that first offenders function better in life and show no signs of antisocial conduct. These all suggest that it is more likely that first offenders commit their

very serious crime under the influence of specific delusions (such as persecutory delusions), and not because of underlying antisocial personality characteristics.

First offenders are, similar to late starters, more likely than early starters to commit a reactive offense in response to provocation. It is also more likely that their victim is an acquaintance or a family member. This is consistent with the literature, in that psychotic offenders are more likely to commit reactive (or impulsive) crimes than offenders with an antisocial personality (e.g. Joyal, Putkonen, Paavola, & Tiihonen, 2004; Woodworth & Porter, 2002), and more likely to have acquaintances (or family) as their victim (e.g. Johnston & Taylor, 2003; Joyal et al., 2004).

Referring to Willem's case (Box 3, Chapter 1), one sees that Willem was married and employed at the time he committed his crime, and therefore seemed to function very well. He was stable on medication but nevertheless he suffered from paranoid delusions. More specific, he thought that his new colleague was the rapist of his sister. Distressed by this idea, Willem eventually murdered him. While it could be that Willem killed his colleague to take revenge, without any empathy, this seems to be unlikely. Looking at this case in more detail, it shows that Willem was very anxious by the idea that his colleague was a rapist and thus capable of horrible things. In addition, after the crime, Willem was very disturbed with the fact that he had murdered someone.

In sum, Part One of this dissertation gives an outline of different subtypes of offenders with schizophrenia that is the early starters, late starters and first offenders. Thereby, it contributes to the understanding of different pathways to (violent) criminal offending in schizophrenia. To our knowledge, these are the first studies conducted on first offenders within the early/late start offender typology. It was shown that first offenders are distinct from early starters and late starters in a variety of domains. Therefore, first offenders are justified as a third subtype within the typology. Most notably, while the offending of early starters is likely to be attributable to a premorbid antisocial personality, the offending of late starters and first offenders is likely to be attributable to specific delusions (i.e. grandiose and persecutory delusions) of schizophrenia. Additionally, while the risk of becoming an early starter and late starter is

especially increased when one has had a negative childhood environment, obtained only lower education, and misuses substances (particularly at an early age), risk of becoming a first offender is especially increased when one has persecutory delusions and grandiose delusions. Moreover, misuse of cannabis and other drugs are protective factors for becoming a first offender.

Persecutory ideations and aggression

Part One of this dissertation has shown that persecutory ideations play an important role in offending, especially in first offenders. Namely, offending in first offenders might be motivated by persecutory delusions. This underlines the importance for violence risk assessment to focus more on individual symptoms of the psychotic disorder, such as delusions, than on broad diagnostic syndromes such as schizophrenia (Junginger, Parks-Levy, & McGuire, 1998; Taylor, 1985; 1998). Subsequently, another important aim of this dissertation was to examine the role of persecutory ideations and delusional distress in aggressive behavior by persons with schizophrenia.

Previous studies relating persecutory delusions to aggressive behavior have assessed these delusions by clinical judgment, clinical assessment instruments such as interviews, or rating scales which were not specifically designed to assess persecutory delusions. In the current studies, the Dutch version of the Persecutory Ideation Questionnaire (PIQ; McKay Langdon, Coltheart, 2006) was used, which we first validated in a clinical and non-clinical sample (see Chapter 5). We found that this instrument was a valid and reliable tool to measure persecutory ideations and related delusional distress.

We found a significant relation between persecutory ideations and aggression across all studies (Chapters, 5, 6, 7, and 8). In an inpatient sample we measured aggression on the ward using the Social Dysfunction and Aggression Scale (Wistedt et al., 1990). Although the proportion of physical violence was low, persecutory ideations explained a significant part of the aggressive behavior displayed by the patients on the ward (Chapter 6 and 8). Results also showed that persecutory ideations were the single best predictor of

observed inpatient aggression, when substance use and psychopathic traits were controlled (Chapter 6). This is consistent with findings that positive symptoms (e.g. delusions and hallucinations) predict inpatient violent behavior (Nolan et al., 2005; Steinert, 2002; Steinert, Wolfle, & Gebhardt, 2000), while psychopathic traits do not (McDermott, Edens, Quarbeck, Busse, & Scott, 2008; Rasmussen & Levander, 1996; Tengström, Grann, Langström, & Kullgren, 2004). But to our knowledge, this study is the first investigating the role of persecutory ideations, substance use, and psychopathic traits in inpatient aggression in a prospective design (see Chapter 6). Additionally, current studies showed that persecutory ideations are especially related to reactive aggression (Chapter 6 and 7). That is, reactive aggression, but not proactive aggression, results from social-information processing deficits (Dodge and Coie, 1987). And because it is assumed that these deficits underlie persecutory ideations, it was hypothesized that persecutory ideations are related to reactive aggression, and not to proactive aggression. This hypothesis was confirmed in the current studies (Chapter 6 and 7).

What makes this research interestingly, is that we not only found a relation between persecutory ideations and aggression in offenders (Part One), and in patients with schizophrenia (Chapter 5, 6, and 8), but also in the general population (Chapter 5 and 7). And although previous studies found a relation between psychotic-like experiences and aggression in the general population (Kinoshita et al., 2011; Mojtabai, 2006), current studies confirmed this relation in a quasi-experimental design (Chapter 6). Findings in this dissertation add to the evidence that psychotic like experiences are also present in the general population (Van Os, Hanssen, Bijl, & Ravelli, 2000; Wiles, Zammit, Bebbington, Singleton, Meltzer & Lewis, 2006), and form a continuum in the general population (e.g. Yung, Nelson, Baker, Buckby, Baksheev, & Cosgrave, 2009). This may be a model for clinical importance of early diagnosis and intervention because psychotic like symptoms at earlier age can predict psychosis later I life (Poulton et al, 2000). We will discuss this further in the 'Implications for practice' section. Further, it shows that clinical relevant topics can be studied in non-clinical samples. Using non-clinical samples increases possible

sample sizes and excludes confounding factors associated with clinical samples, such as medication use, which can influence the results.

The role of delusional distress

Part One of this dissertation has shown that persecutory delusions and grandiose delusions increase the risk of becoming an offender as compared with non-offenders with schizophrenia. Additionally, quasi-experimental studies showed that persecutory ideations are related to aggressive behavior in both a clinical sample and in the general population (Chapters 5, 6, 7 and 8). These findings are in line with previous findings that delusions account for most of the (violent) offending in persons with a psychotic disorder (Taylor, 1985; Taylor et al., 1998; Swanson, Borum, & Swartz, 1996), and findings that patients with a psychotic disorder and a history of violence more often report having persecutory delusions than other delusions (Cheung et al, 1997; Taylor, 1985). However, an explanation for the relation between persecutory ideations and aggression was still lacking.

Some authors have suggested that the violent and homicidal behavior of psychotic individuals could be explained by a so called *acting upon delusions* or *symptom consistent violence* (Buchanan et al., 1993; Junginger et al., 1998; Wessely et al., 1993). In other words, persons with delusions have different strategies to cope with these delusions and related affect. These are called safety behaviors (Freeman, Garety, Kuipers, Fowler, Bebbington, & Dunn, 2007). Although most patients will avoid threatening situations (in the case of persecutory ideations) some will cope with threat using aggression (Freeman, Garety, & Kuipers, 2001; Wessely et al., 1993). Previous studies found that emotional distress (including delusional distress) is higher in patients with persecutory delusions than in patients with other delusions (see Björkly, 2002). This led to the hypothesis that delusional distress plays a role in aggression in patients with persecutory delusions. And even though the role of negative affectivity in this seems to be a logic one, this is not systematically studied in previous studies. In the current dissertation, we explored the role

of delusional distress in the relation between persecutory ideations and aggressive behavior.

It was found that in males and females from the general population, the relation between persecutory ideations and aggressive behavior was moderated by the level of ideational distress associated with these ideations (see Chapter 7). This relation was found in self-reported reactive aggression, not in proactive aggression. In males, there only was a relation between persecutory ideations and aggression in those who had higher levels of ideational distress. The same was found in females. However, in females, there was also a relation between persecutory ideations and aggression in the low distress group. This difference in moderating effect of ideational distress may be explained by a gender difference in the use of safety behaviors (Freeman et al., 2007) in response to delusions. Females are more likely to adopt a *tend-or-befriend* coping strategy when under threat (Taylor et al., 2000; Teasdale, Silver, & Monahan, 2006), and are less likely compared to males to show aggression as a safety behavior.

Delusional distress was also found to partly explain the relation between persecutory ideations and inpatient aggression on the ward (Chapter 8). We found that while physical violence was scarce, levels of persecutory ideations were related to observed inpatient aggression. Moreover, when we added delusional distress in this relation, the effect of persecutory ideations in explaining aggression almost disappeared. These findings contrast recent findings of Nederlof, Muris, and Hovens (2011), who found no role of emotional reactions to delusional beliefs in relation to delusions and aggression. However, this may be explained by the fact that they studied anxiety and anger in response to TCO delusions and did not specifically measure persecutory ideations and related delusional distress.

The theory of acting upon delusions can be better understood when one considers the role of delusional distress in the relation between persecutory ideations and reactive aggressive behavior. Violent persons with schizophrenia may not have a violent intention per se, but may be overwhelmed by the distress associated with their delusional ideations, which are threatening. For instance, in an inpatient setting, avoiding a

threatening situation cannot always be accomplished. Subsequently, distress in delusional patients on the ward may result in an increased risk of aggressive behavior (see Nijman, Campo, Ravelli, and Merckelbach, 1999 for a tentative model for inpatient aggression).

In sum, results from Part Two of this dissertation confirm different pathways to violence in schizophrenia. Comorbid factors, such as antisocial personality and substance use have to be taken into account when assessing violence risk in different situations. While psychopathic traits are related to aggressive behavior in general and proactive aggression in particular, persecutory ideations are related to reactive aggression. Moreover, persecutory ideations, but not psychopathy, predict observed aggression on the ward. Additionally, persecutory ideations play an important role in aggression by persons with schizophrenia. Delusional distress is a vital factor in this relation, thereby contributing to the understanding of the theory of acting on delusions.

Limitations

There are some methodological limitations that have to be taken into account when interpreting the results. First, in Part One of this dissertation, we used retrospective file based data to study the usefulness of subtyping offenders with schizophrenia. As a result, we cannot infer causality. For instance, the study described in Chapter 4 examined etiological factors in the prediction of who becomes an offender or not. Although early starters seem to be more likely to have problems in a variety of domains, we actually do not know whether these factors were directly related to their criminal behavior. That is, although substance misuse at a young age increases the risk of becoming an early starter and late starter, we cannot infer a causal relation. Similarly, it is concluded that the criminal behavior of early starters is attributed to a premorbid antisocial personality, and offending in late starters and first offenders is attributed to their delusional beliefs (e.g. persecutory delusions and grandiose delusions). Even though multiple results point to these conclusions, we cannot say for sure that these factors have caused their criminal behavior. For example, we do not know whether persecutory delusions have caused homicide by first offenders. A related limitation is that because the studies in Part One

relied on file data, we do not know precisely when particular symptoms were present. This results in difficulties in interepreting the results. For example, there is no detailed information on whether positive symptoms were present during the offense or at another time, or at any point in that person's life. This makes it difficult to infer a causal relation between psychopathology and offending.

Second, Part Two of this dissertation mainly used self-report questionnaires to study persecutory ideations, antisocial personality traits and aggressive behavior. Patients do not always have insight into their illness, and are not always able to reflect on their ideations or feelings very well. This limits the conclusions that we can draw from the results. On the other hand, persecutory delusions and delusional distress are not always visible to others. Thus these self-reports may be more useful than observation. Self-reports to measure aggression may be preferable, because it also reveals behavior not reported in criminal records (e.g. threats or minor assaults). Also, using self-reports one can reveal the intrinsic motivation behind the act, while this motivation is often uncertain for the observer (Raine et al., 2006). In that way, the distinction between proactive and reactive aggression can be studied.

Strengths

This dissertation also has several strengths. First, to our knowledge, studies described in Part One of the thesis are the first that investigate first offenders as a subgroup of offenders with schizophrenia in the early/late start typology. In addition, we do not know of another study that directly compared these subtypes with two contrast groups (i.e. offenders without major mental disorder, and non-offenders with schizophrenia). Therefore, this research adds to the literature on subtyping offenders with schizophrenia and has further clarified factors that are associated with criminal and violent behavior by these persons.

A second strength of this thesis is that it is very extensive in its covered research. Using a multi-method approach different aspects in relation to violence in schizophrenia

were studied. We conducted both retrospective file based studies using data from reports to the court which contain a lot of detailed information from different sources. We also carried out quasi-experimental studies using self-reports, and an experimental task. The patient study was prospective, in that it predicted observed aggression on an inpatient ward. In addition, we did not focus on one aggression variable, but instead investigated criminal behavior as well as different measures of aggression (self reports and observed aggression), as also different types of aggression (i.e. reactive and proactive aggression). Using this multi-method approach, results are shown to be valid and generalizable because we found similar findings across different studies.

Thirdly, samples studied in this thesis are representative for the populations under study. In Part One, we studied defendants under psychiatric observation. Since defendants in the Pieter Baan Center are referred from different district in the Netherlands, they are representative for the Dutch population of offenders with schizophrenia. Patients studied in Part Two came from different inpatient wards. Although from an urban area, this sample is representative of inpatients with schizophrenia because patients were studied without excluding their comorbid psychopathology. Especially these comorbid factors (e.g. antisocial personality characteristics and substance use) are key in the study of violence in schizophrenia. Therefore, this study is more valid than studies excluding these factors.

Implications for (clinical) practice

The present thesis has shown that acknowledging different subtypes of offenders with schizophrenia is important, because they are associated with different factors increasing their violence risk. This is also a starting point for possible treatment interventions for these different subgroups. For example, outcomes of Part One of this thesis show that persons at risk to become early starters may benefit from early interventions in childhood and adolescence. When already developed as an early starter, treatment of these offenders has to focus on their antisocial personality (including substance use problems),

besides the treatment of their psychotic illness. Specifically early starters might benefit from cognitive behavioral therapy for personality disorders (Davidson et al., 2009). A promising therapy studied in the Netherlands is the Schema Focused Therapy, a treatment intervention for severe personality disordered offenders in forensic settings (Van den Broek, Keulen-de Vos, & Bernstein, 2011). Although these therapies are intended for personality disordered offenders, they may be useful in those offenders with schizophrenia and comorbid antisocial and psychopathic traits who exhibit persistent violent criminal behavior (i.e. early starters).

First offenders may benefit from brief cognitive behavioral worry intervention to reduce their delusional distress. This also applies to inpatients that are violent in response to their delusions and related delusional distress. In one recent randomized controlled trial it was shown that a brief worry intervention significantly reduced the levels of delusional distress in patients with persistent persecutory delusions (Foster, Startup, Potts, & Freeman, 2010). This intervention may be used instead of sedative medication (e.g. benzodiazepines or classic antipsychotic medication) that are used in agitated patients. In inpatient situations, the PIQ (McKay et al., 2006; Van Dongen et al., 2011) can be used assess persecutory ideations and delusional distress at an early stage.

Early diagnosis is not only important in violence risk assessment in psychosis. It is increasingly recognized that screening and early diagnosis of delusional ideations is also necessary in non-clinical samples. Persons with vulnerability for psychosis are especially at risk as the expression of delusional ideations (such as persecutory ideations) may subsequently result in clinically relevant psychotic symptoms. This depends on the degree of environmental risk factors the person is additionally exposed to (see Kaymaz et al., 2012 for a systematic review and meta-analysis). As shown in the present thesis, this developmental process into psychosis poses a risk for future violence in these individuals. Detecting those who are prone to psychosis and violence has an economic advantage. Early intervention may result in a reduction of costs related to long term treatment in psychiatric hospitals, and costs related to the criminal justice system.

For risk assessment purposes, we know that subtyping offenders with schizophrenia is necessary, because these offender types are characterized by different psychopathological, childhood environmental, and offense characteristics that can be used in the risk assessment and profiling of these offenders. Current findings also showed that different risk factors are predictive of aggression in different situations. For instance, although psychopathy is found to be a good predictor for self-reported aggression (reactive and proactive), it does not predict inpatient aggression. This is consistent with the findings that psychopathy has the weakest relation to physical violence misconduct in institutional settings (Guy, Edens, Anthony, and Douglas, 2005). Other factors seem to be important when predicting violence in inpatient settings. This dissertation shows that inpatient aggression is better predicted by the level of persecutory ideations and associated delusional distress, than by psychopathic traits or substance use. These findings can be used for the development of actuarial measures or in structured professional judgment approaches, thereby improving risk management in these different subtypes.

The PIQ with distress questions can be used as a screening tool for persecutory ideations and associated delusional distress. We know from the data presented in this dissertation that the PIQ predicts aggression scores on different aggression measures quite well. Importantly, it predicts observed inpatient aggressive behavior. Therefore, the PIQ would be a reliable tool for violence risk assessment in inpatient settings, and possibly in other settings. For instance, the PIQ can be used in case-finding in persons at risk for psychosis. In addition, in Assertive Community Treatment (FACT in Dutch; Van Veldhuizen, 2007), a multidisciplinary team of professionals deliver care and treatment for persons with a severe mental illness living in the community. In that process, the PIQ can be a useful screening tool to assess who is at risk for acute psychosis. Additionally it can be used as a violence risk assessment tool for those who have persistent persecutory delusions.

Future research

Although current findings point to different pathways to violence in schizophrenia, longitudinal research is needed to study the etiology of these different pathways. Using a longitudinal design, one can study the etiology of the different offender subtypes. That is, although we have found different factors associated with a higher risk of becoming an early starter, late starter or first offender, we do not know to what extent these factors are causal. In a prospective design it is also possible to make causal inferences on the role of delusional distress in the relation between persecutory ideations and aggressive behavior. Current findings show that delusional distress partly explains the relation between persecutory ideations and aggression on the ward, but these are conclusions based on correlation research, from which we cannot infer causality. In future studies one may use the Maudsley Assessment of Delusions Schedule (MADS; Taylor et al., 1994) which assesses different aspects of delusional idea held by the patient. Content of the delusions, persons involved, and associated emotional feelings can all be assessed. Moreover, the *acting on delusions* of patients can be studied. In this way, one can interfere in this process at an early stage, thereby reducing the risk for violence in those persons.

A next step would be to evaluate specific treatment interventions for the different offender subtypes, and in patients with persistent persecutory delusions. For instance, treatment in first offenders, as also in patients with persistent persecutory delusions and delusional distress has to focus on the reduction of this distress. As mentioned before, a brief worry intervention in Cognitive Behavioral Therapy (see Foster et al., 2010) may be promising for reducing delusional distress. Future research may evaluate the effectiveness of such an intervention in the reduction of violence risk and violent recidivism.

Also interesting, and already mentioned in the implications in the previous sectiontitled, would be the use of the Dutch PIQ as a screening tool for violence risk, especially in inpatients. Because delusional ideations and associated distress is not always visible by the observer, it may be effective to assess these with such a screening tool. The

usefulness of this instrument and effectiveness in violence risk reduction has to be studied empirically in a prospective design.

Another line of future research may focus on the neurobiology of the different pathways to violence in schizophrenia. For instance, in molecular genetic studies it can be tested whether early starters and late starters have a (genetic) vulnerability to develop schizophrenia in the context of early drug abuse (e.g. cannabis). Specifically, previous studies found that use of cannabis is a causal factor in the development of schizophrenia (Henquet, Murray, Linszen, & Van Os, 2005), and this may be moderated by a particular variation in the gene coding for catechol-o-methyltransferase (COMT) (Caspi et al., 2005; Henquet et al., 2006). In a prospective study, one can investigate whether particular variants of the COMT gene are associated with particular offender subtypes, and whether cannabis use moderates this relation.

Marker studies can also be used to study neurobiological correlates in violence by persons with schizophrenia. Recent research has shown that offenders with schizophrenia related disorders and comorbid antisocial traits differ in neuro-anatomy (Barkataki, Kumari, Das, & Sharma, 2006) from those patients with schizophrenia without comorbid antisocial personality. Those patients also differ from one another with respect to electrodermal (Kumari et al., 2009; Schug, Raine, & Wilcox, 2007), neuropsychological (Schug & Raine, 2009), and neurophysiological responses (Schug et al., 2011). These findings suggest that early starters may have a different neurobiological basis than late starters and first offenders.

Conclusions

The present dissertation has shown that there are different pathways to violence in schizophrenia. Furthermore, we can draw some important conclusions from the current research:

1. Within the early/late start typology of offenders with schizophrenia, first offenders are justified as a third offender subtype. These offenders differ from early starters and late starters in a variety of domains.
2. While criminal behavior of early starters is attributed to a premorbid antisocial personality, offending in late starters and first offenders is attributed to particular delusions (i.e. persecutory delusions and grandiose delusions).
3. Acknowledging different pathways to violence in schizophrenia will lead to more accurate risk assessment and treatment interventions in these offenders.
4. Inpatient aggression on the ward is better explained by the level of persecutory ideations than by psychopathic traits.
5. Ideational distress is a moderator in the relation between persecutory ideations and aggression in the general population, this shows that clinically relevant issues can also be studied in non-clinical samples.
6. Acting on delusions is better understood by recognizing delusional distress as an important factor in the relation between persecutory ideations and reactive aggression.

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Summary

Summary

Schizophrenia is one of the psychotic disorders formulated by the DSM-IV-TR. This syndrome is defined by positive symptoms (e.g. delusions and hallucinations), negative symptoms (e.g. affective flattening), and disorganization (e.g. disorganized behavior). In addition, persons with schizophrenia experience social and/or occupational dysfunction caused by the disorder. For a diagnosis of schizophrenia, these disturbances have to continue for at least 6 months including at least 1 month of persistent characteristic symptoms (e.g delusions or hallucinations).

In **Chapter 1** of this dissertation, the literature on violence in schizophrenia was reviewed. It was described that there is a long held general belief in society that persons with severe mental illness are dangerous. During the seventies, this belief became more and more criticized. Since then, results from studies on violence in schizophrenia have been inconsistent. However, recent reviews showed that there is a small, but significant relation between psychosis and (violent) criminal behavior. Although much research is published on this topic, violence in schizophrenia is not yet fully understood.

To study aggression and violent behavior, it is important to have a clear definition of these concepts. In the current dissertation, aggression and violence are defined as follows: Aggression is overt behavior involving intent to inflict noxious stimulation or to behave destructively toward another organism. And, regarding aggression towards inanimate objects: Destructive behavior against inanimate objects is only considered if frustration or aversive stimulation is involved. Violence refers to aggressive behavior among humans, thereby excluding aggressive behavior in animals or against objects. Different types of aggression can be distinguished. Reactive aggression is characterized by negative affect including hostility, and often is a response to provocation. Proactive aggression is characterized by goal directed behavior that is most often planned, cold-blooded and is more in line with the acquisition of imitative aggressive acts by role models.

Aggression and (violent) offending in schizophrenia can be explained by different (comorbid) factors. That is, research has shown that positive symptoms are associated with violence. In addition, comorbid antisocial personality and substance use increase this risk. Thus, a triple diagnosis in persons with a psychotic disorder makes them triple disabled, and more prone to exhibit violent and criminal behavior. On the basis of the aforementioned comorbid factors, one can subtype offenders in schizophrenia. Subtyping of offenders with schizophrenia adds to the understanding of different pathways into violent behavior in those individuals. Early starters begin their criminal behavior at an young age, before the onset of the psychiatric disorder. Their criminal behavior is attributed to a pre-morbid antisocial personality. The late starters on the other hand, begin their criminal behavior *after* the onset of the psychiatric disorder. Recently, a third offender type within this typology was formulated. These are men in their late thirties with a schizophrenia disorder who suddenly commit a very serious crime. They commit this first offense after the onset of their disorder, and may be so called *first offenders*. Previous research did not study this third offender type within the typology of offenders with schizophrenia. In addition, empirical data on the etiological of different pathways to violent offending in these subtypes is lacking.

Besides subtyping of offenders with schizophrenia, it is also important to gain more insight in the different (comorbid) factors associated with aggressive behavior within persons with schizophrenia. Particularly, with respect to positive symptoms, we still do not know the exact relation between these symptoms and violent behavior in persons with schizophrenia. Persecutory delusions are found to be most strongly related to aggressive behavior. However, the exact relation between the two is not yet clearly understood. Some authors suggest that violent behavior could be explained by a so called acting upon the delusion or symptom consistent violence. Delusional distress resulting from persecutory delusions may explain this process.

The main aim of this dissertation was to further explain different pathways to violence in schizophrenia. As a result, different studies were conducted, described in two separate parts of this thesis. Part One focused on subtyping offenders with schizophrenia.

In these studies we specified the first offenders as a third type within the early/late start typology of offenders with schizophrenia, and further investigate the etiology of offending in these subgroups. Part Two focused on persecutory ideations and delusional distress as pathways to violence in persons with schizophrenia. We examined the unique contribution of persecutory ideations in the prediction of inpatient aggression next to psychopathic traits and substance use. In addition, the role of delusional distress in this relation was further investigated.

In **Chapter 2**, a third type of offender, the first offenders, within the early/late start typology was investigated. The aim of this study was to examine the justification of this first offender type. We conducted a retrospective file study consisting of 97 early starters, 100 late starters, and 26 first offenders. Variables in different domains were scored. Results showed that there were significant differences between the groups within the domains life functioning, abuse and family-related problems, psychiatric functioning, substance misuse, antisocial personality and offense characteristics. Most differences were between the early starters and first offenders. The existence of the first offender type was justified by these findings, thereby underscoring the importance of offender subtyping for better offender treatment interventions.

In **Chapter 3** we described a study which investigated the hypotheses that are proposed in Hodgins (1995) offender typology. This theory hypothesizes that early starters resemble life-course-persistent offenders without schizophrenia in that the criminal behavior of both offender groups is thought to be attributable to antisocial personality characteristics. The criminal behavior of late starters is thought to be attributable to positive psychotic symptoms. This is also likely to be the case in first offenders. The aim of the retrospective file study was to examine whether early starters (*n* = 97) resembled offenders without schizophrenia (*n* = 115) with respect to antisocial personality, and to see whether late starters (*n* = 100) and first offenders (*n* = 26) were characterized by different types of positive psychotic symptoms than persons with schizophrenia without a criminal history (*n*

= 129). The results suggested that the start of criminal behavior of early starters is indeed attributable to premorbid antisocial personality characteristics, and that the offending of late starters and first offenders is likely to be attributable to persecutory delusions and grandiose delusions. It was concluded that acknowledging these subtypes of offenders with a schizophrenia disorder can result in the development of more effective treatment and interventions that reduce violence risk.

The study described in **Chapter 4** had the aim to examine different risk factors that are associated with becoming an early starter, late starter, or first offender compared with non-offenders with schizophrenia. Using a retrospective file study, it was examined which etiological factors predicted who is likely to be classified as an early starter (*n* = 97), late starter (*n* = 100), or first offender (*n* = 26) compared to a non-offender with schizohrenia (*n* = 129). Using multinomial logistic regression, we found that the risk of classification as either an early starter or a late starter is higher in those who have had a negative childhood environment, finished merely lower education, and misused substances (especially at an early age). The risk to become classified as a first offender was increased when one had persecutory delusions and/or grandiose delusions. The risk was reduced when the person uses cannabis, poly substances, or when one uses substances other than alcohol or cannabis, such as amphetamines. It was concluded that knowledge on these different etiological factors associated with the diverse offender subtypes add to our understanding of different pathways to (violent) offending in these types. These results can be used for early assessment in patients with schizophrenia to specify the risk of becoming a specific offender subtype, thereby reducing the risk at an early stage.

Part two of the dissertation focused on the role of persecutory delusions and delusional distress in different pathways to aggressive behavior in schizophrenia. The aim of the study described in **Chapter 5**, was to examine the relation between persecutory ideation and self-reported aggression in a community based and clinical population. A second aim was to evaluate the psychometric properties of the Dutch version of the Persecutory

Ideation Questionnaire (PIQ; McKay et al., 2006). We included 269 persons from the general population, as well as 79 inpatients from different psychiatric facilities. The PIQ appeared to be a reliable and valid instrument to measure persecutory ideations in the general population. Evaluation of the PIQ in a sample with patients with a psychotic disorder showed that the PIQ also had good criterion validity. In addition, results showed that persecutory ideations were significantly related to self-reported aggression in the community based, and in the clinical sample. These results indicated that the PIQ is a reliable tool to study the role of persecutory ideations in aggression.

The study described in **Chapter 6** had the aim to examine the unique contribution of psychopathy, substance misuse, and persecutory ideations in the prediction of inpatient aggression as measured with different aggression measures. We expected that persecutory ideations are associated with reactive aggression, and that psychopathic traits were more associated with proactive aggression of inpatients. We included 59 inpatients with schizophrenia from different psychiatric wards. Persecutory ideations, psychopathy and substance use were assessed. In addition, self-reported proactive and reactive aggression, aggression in an experimental paradigm, and observed aggression on the ward were measured. Results showed that psychopathy explained most of the variance in self-reported proactive and reactive aggression. In contrast, persecutory ideations explained most of the variance in observed aggression on the ward. It was concluded that these results implicate that it is important to acknowledge comorbid factors in patients with schizophrenia for more effective risk management in different situations (e.g. in the community or in inpatient facilities).

In **Chapter 7**, a quasi-experimental analogous study was described. In that study we aimed to clarify the relation between persecutory ideations and aggression. That is, to clarify why some persons act upon persecutory ideations and others do not. The main aim was to test the effect of ideational distress resulting from persecutory ideations on any relationships between those ideations and aggressive behavior. The effect of gender was also studied.

Twenty-four men and 53 women from the general population participated in this study. Aggressive measures included experimentally induced aggressive responding and self-reported proactive aggression, reactive aggression, and aggression style. Among men, persecutory ideations predicted reactive aggressive responding and aggressive style of behavior only in those who experienced higher levels of persecutory ideational distress. Among women, with generally lower levels of aggression, the role of ideational distress was more complicated; there was a relation between persecutory ideations and aggression, also in those who had lower levels of ideational distress. For neither men nor women were there links between persecutory ideation and proactive aggression, regardless of distress. These findings shows that also in the general population, there is a relation between persecutory ideations and aggressive behavior, and that in addition, ideational distress is a moderator in this relation.

Because persecutory ideations were predictive of aggressive behavior in the patient sample (Chapter 6), and ideational distress seems to play a role in this relation (Chapter 7), we conducted another study in inpatients. **In Chapter 8** we described an inpatient study that aimed to study the role of delusional distress in the relation between persecutory ideations and inpatient aggression on the ward. The sample of the study consisted of 44 male inpatients from different general psychiatric inpatient wards. Using a bootstrapping method, results showed that the effect of persecutory ideations on inpatient aggression was partly explained by the level of delusional distress. We concluded that this result gives us more insight in the theory of acting upon delusions. Acknowledging this role of delusional distress in the relation between persecutory ideation and inpatient aggression is important for the violence risk in inpatient settings. In addition, early interventions to reduce delusional distress, such as cognitive behavioral therapy, may prevent inpatient aggression.

In **Chapter 9,** the results of the studies described in Part One and Part Two were discussed**.** Two limitations have to be taken into account when interpreting the results. First, we used retrospective file data for the studies in Part One, and mainly cross-sectional data for the

studies in Part Two. Therefore, we cannot infer causality. Second, Part Two of this dissertation mainly used self-report questionnaires to study persecutory ideations, antisocial personality traits and aggressive behavior. Patients do not always have insight into their illness, and are not always able to reflect on their ideations or feelings very well. This limits the conclusions that we can draw from the results. On the other hand, persecutory delusions and delusional distress is not always visible to others. Thus these self-reports may be more useful than observation. Self-reports to measure aggression may be preferable, because it also covers behavior not reported in criminal records.

This dissertation discussed also several strengths of the studies that were conducted. First, to our knowledge, studies described in Part One of the thesis are the first that investigated first offenders as a subgroup of offenders with schizophrenia in the early/late start typology. In addition, we do not know of another study that directly compared these subtypes with two contrast groups. A second strength of this thesis is that it is very extensive in its covered research. Using a multi-method approach different aspects in relation to violence in schizophrenia were studied. Thirdly, samples studied in this thesis are representative for the populations under study. In Part One, we studied a large group of defendants referred for psychiatric observation. In Part Two different sample from the general population, as well as inpatient samples were included without excluding comorbidity in this latter group. Especially these comorbid factors (e.g. antisocial personality characteristics and substance use) are key in the study of violence in schizophrenia. Therefore, this study is more valid than studies excluding these factors.

Promising implications were also proposed. Early starters are found to have problems in a variety of domains. Therefore, early interventions in persons prone for the development of schizophrenia can be effective when negative environmental factors are reduced. In that way the risk to become an early starter is reduced. Treatment of early starters has to focus on their antisocial personality (including substance use problems), besides the treatment of their psychotic illness. Specifically, early starters might benefit from cognitive behavioral therapy for personality disorders. First offenders may benefit from brief cognitive behavioral worry intervention to reduce delusional distress. This also

applies to inpatients who are violent in response to their delusions and related delusional distress. It is increasingly recognized that screening and early diagnosis of delusional ideations is also necessary in non-clinical samples, especially in those persons with vulnerability for psychosis. The PIQ with distress questions can be used as a screening tool for persecutory ideations and associated delusional distress to reduce subsequent risk for violence.

For future research it was discussed that longitudinal studies are needed to study the causal relations in the pathways to violence. Using a longitudinal design, one can study the etiology of the different offender subtypes. That is, although we have found different factors associated with a higher risk of becoming an early starter, late starter or first offender, we do not know to what extent these factors are causal. A prospective design can also be used to further investigate causality between persecutory ideations, delusional distress and aggressive behavior. A further step would be to evaluate specific treatment interventions for the different offender subtypes, and in patients with persistent persecutory delusions at risk for violence. Also interesting would be to study the usefulness of the Dutch PIQ as a screening tool for case-finding in individuals prone for psychosis and as a violence risk assessment tool. A last proposed line of future research involves the neurobiological basis of the different pathways to violence in schizophrenia. Using molecular genetic studies and marker studies, one will obtain more knowledge on neurobiological correlates associated with different offender subtypes.

Conclusions

The present dissertation showed that there are different pathways to violence in schizophrenia. Furthermre, we can draw some important conclusions from the current research:

1. Within the early/late start typology of offenders with schizophrenia, first offenders are justified as a third offender subtype. These offenders differ from early starters and late starters in a variety of domains.

2. While criminal behavior of early starters is attributed to a premorbid antisocial personality, offending in late starters and first offenders is attributed to particular delusions (i.e. persecutory delusions and grandiose delusions).
3. Acknowledging different pathways to violence in schizophrenia will lead to more accurate risk assessment and treatment interventions in these offenders.
4. Inpatient aggression on the ward is better explained by the level of persecutory ideations than by psychopathic traits.
5. Ideational distress is a moderator in the relation between persecutory ideations and aggression in the general population, this shows that clinically relevant issues can also be studied in non-clinical samples.
6. Acting on delusions is better understood by recognizing delusional distress as an important factor in the relation between persecutory ideations and reactive aggression.
7. By using screening instruments and early diagnosis of persecutory delusions and delusions distress one can offer adequate treatment aimed at reducing distress resulting from the delusions. This will lead to a reduction of violence risk in individuals with persecutory delusions.

Summary in Dutch

(Samenvatting)

Samenvatting

Schizofrenie is een van de psychotische stoornissen zoals gedefinieerd in de DSM-IV-TR. Dit syndroom wordt gekenmerkt door positieve symptomen (zoals wanen en hallucinaties), negatieve symptomen (bv. affectieve vervlakking) en desorganisatie (bv. gedesorganiseerd gedrag). Bovendien, mensen met schizofrenie ondervinden disfunctioneren op social en /of beroepsmatig terrein als gevolg van de stoornis. Om schizofrenie te diagnosticeren moeten de verstoringen voor minstens 6 maanden aanhouden, met ten minste een maand van aanhoudende karakteristieke symptomen (zoals wanen of hallucinaties).

In **Hoofdstuk 1** is een overzicht gegeven van de literatuur aangaande geweld in personen met schizofrenie. Daarin wordt beschreven dat in de algemene populatie een overtuiging heerst dat mensen met een ernstige psychiatrische stoornis gevaarlijk zijn. Maar sinds de jaren zeventig wordt dit idee steeds meer bekritiseerd. Bovendien blijken de resultaten in onderzoek naar geweld in schizofrenie ook tegenstrijdig. Echter, recente systematische overzichtsartikelen en meta-analyses laten zien dat er een kleine, maar significante relatie is tussen psychose en (gewelddadig) criminel gedrag. De precieze relatie tussen geweld en schizofrenie is echter nog niet helemaal duidelijk.

Om goed onderzoek te kunnen doen naar agressie en geweld in schizofrenie dienen we deze constructen goed te definiëren. Daarom werden de definities van agressie en geweld beschreven die gebruikt zijn in deze dissertatie. Agressie is openlijk gedrag met de intentie om schade te berokkenen of toe te brengen aan een ander levend wezen. Bovendien, ten aanzien van agressie tegen levenloze objecten: destructief gedrag tegen levenloze objecten wordt alleen gezien als agressie als dit gepaard gaat met frustratie of aversieve stimulatie. Geweld verwijst naar agressief gedrag tussen mensen. Agressief gedrag tegen dieren of tegen objecten wordt hierin dus uitgesloten. Verschillende vormen van agressie kunnen worden onderscheiden. Reactieve agressie wordt gekenmerkt door negatief affect waaronder vijandigheid en is vaak een reactie op provocatie. Ook lijkt dit type aggressief gedrag te ontstaan door een gebrekkige sociale informatieverwerking.

Proactieve agressie wordt gekenmerkt door doelgericht gedrag dat wordt gepland en is vaak koelbloedig. Men denkt dat deze vorm van agressie wordt aangeleerd door imitatie van rolmodellen die dit gedrag vertonen.

Er werden in Hoofdstuk 1 ook verschillende psychopathologische factoren beschreven, die het verhoogde risico op geweld in personen met schizofrenie kunnen verklaren. Eerder onderzoek heeft aangetoond dat positieve symptomen gerelateerd zijn aan geweld. Daarnaast kunnen comorbide factoren zoals een antisociale persoonlijkheidsstoornis en middelengebruik het risico op gewelddadig gedrag verhogen. Een zogenoemde triple diagnose bij mensen met een psychotische stoornis maakt ze een driedubbele beperking hebben dat kan leiden tot een verhoogd risico op gewelddadig gedrag.

Op grond van eerder genoemde comorbide factoren kan men verschillende subtypen van daders met schizofrenie onderscheiden. Subtypering van deze daders geeft meer inzicht in de verschillende wegen naar gewelddadig gedrag in personen met schizofrenie. Vroege starters beginnen hun criminele gedrag op jonge leeftijd voor het begin van de psychiatrische stoornis. Het criminele gedrag van vroege starters wordt toegeschreven aan een premorbide antisociale persoonlijkheid. De late starters beginnen hun criminele gedrag nadat de psychiatrische stoornis zich heeft geopenbaard. Recent werd er een derde type dader binnen de vroege/late start typologie beschreven, de *first offenders*. Dit zijn voornamelijk mannen van achter in de dertig, die lijden aan schizofrenie en die plotseling een zeer ernstig misdrijf plegen.

Naast het subtyperen van plegers met schizofrenie is het ook belangrijk om de rol van positieve symptomen in geweld door personen met schizofrenie te onderzoeken. Eerdere studies laten zien dat vooral achtervolgingswanen gerelateerd zijn aan het gewelddadige gedrag. Het is echter nog niet duidelijk waarom sommige personen met deze wanen agressief gedrag vertonen en anderen niet. Sommige auteurs suggereren dat gewelddadig gedrag verklaard kan worden door het handelen naar wanen of symptoom consistent gedrag. Waanstress als gevolg van achtervolgingswanen zou deze principes kunnen verklaren.

Het belangrijkste doel van dit proefschrift was om verschillende wegen naar geweld in personen met schizofrenie te onderzoeken. Hiertoe zijn verschillende studies uitgevoerd die zijn beschreven in de twee aparte onderdelen van de dissertatie. Deel Een van het proefschrift heeft zich gericht op de subtypering van daders met schizofrenie. In die studies specificeerden we de *first offenders* als derde type binnen de vroege / late start typologie, en onderzochten we etiologische factoren van crimineel gedrag binnen deze subtypen. Deel Twee van dit proefschrift was gericht op onderzoek naar de rol van achtervolgingswanen en waanstress in agressief gedrag door personen met schizofrenie. We hebben gekeken naar de unieke bijdrage van deze wanen in de voorspelling van agressief gedrag in opgenomen patiënten, naast trekken van psychopathie en middelengebruik als risicofactoren. Ook hadden de studies als doel te onderzoeken wat de rol van waanstress is in de relatie tussen achtervolgingswanen en agressief gedrag.

In **Hoofdstuk 2** werd een studie beschreven waarin een derde type dader, de first offender, binnen de vroege / late start typologie werd onderzocht. Het doel van deze studie was nagaan of deze derde groep als typering is gerechtvaardigd. We onderzochten variabelen in verschillende domeinen door retrospectief dossieronderzoek in 97 vroege starters, 100 late starters en 26 first offenders. Er werden significante verschillen gevonden in sociaal functioneren, misbruik en andere familie-gerelateerde problemen, psychiatrisch functioneren, drugsmisbruik, antisociale persoonlijkheid en kenmerken van de gepleegde misdrijven. De vroege starters en first offenders verschilden het meest van elkaar. De conclusie was dat het bestaan van de first offenders als derde groep binnen de typologie van daders is gerechtvaardigd. Bovendien werd geconcludeerd dat de bevindingen het belang van subtypering onderstrepen om zo te komen tot effectievere interventies in de verschillende typen daders.

In **Hoofdstuk 3** beschreven we een studie waarin Hodgins' (1995) aannamen over de etiologie van crimineel gedrag van vroege en late starters werd onderzocht. De dadertypologie gaat ervan uit dat vroege starters lijken op levensloop-persistente daders

zonder schizofrenie, omdat het criminele gedrag van beide dadergroepen wordt toegeschreven aan antisociale persoonlijkheidskenmerken. Het criminele gedrag van de late starters wordt toegeschreven aan positieve psychotische symptomen. Dit is waarschijnlijk ook het geval in de first offender groep. Het doel van de beschreven studie was, om door middel van retrospectief dossieronderzoek te onderzoeken of vroege starters (n = 97) lijken op daders zonder schizofrenie (n = 115) met betrekking tot antisociale persoonlijkheid. Ook werd onderzocht of late starters (n = 100) en first offenders (n = 26) verschillen van personen met schizofrenie zonder strafblad (n = 129) op het gebied van positieve symptomen. Uit de resultaten bleek dat de start van crimineel gedrag van de vroege starters inderdaad geweten kan worden aan premorbide antisociale persoonlijkheidskenmerken, terwijl het criminele gedrag van late starters en first offenders toegeschreven kan worden aan achtervolgingswanen en grootheidswanen. We concludeerden dat erkenning van deze verschillende paden naar crimineel gedrag in deze groepen kan bijdragen aan een effectievere risicobeoordeling en behandeling van deze typen daders.

De studie beschreven in **Hoofdstuk 4** had als doel om risicofactoren te onderzoeken die samenhangen met het zich ontwikkelen tot een vroege starter, dan wel een late starter, of first offender. Dit werd gedaan door de dadergroepen te vergelijken met patiënten met schizofrenie die geen strafblad hebben. Met behulp van een retrospectief dossieronderzoek werd onderzocht, welke etiologische factoren samenhangen met vroege starters (n = 97), late starters (n = 100), en first offenders (n = 26) in vergelijking met patiënten zonder strafblad (n = 129). Resultaten lieten zien dat het risico om ofwel als vroege starter of als late starter geclassificeerd te worden hoger was bijdegenen die een negatieve jeugdomgeving hebben gehad (bv. seksueel misbruik), alleen de lagere school hebben afgemaakt, en middelen gebruiken (voornamelijk op jonge leeftijd). Het risico om geclassificeerd te worden als een first offender was hoger als men achtervolgingswanen of grootheidswanen had. Dit risico was juist lager als de persoon middelen gebruikt. We concludeerden dat inzicht in deze verschillende etiologische factoren kan bijdragen aan de

ontwikkeling van interventies die in een vroeg stadium kunnen worden toegepast. Op die manier kan in bepaalde personen, die een hoger risico hebben om zich te ontwikkelen tot een bepaald type dader, de kans worden verkleind dat zij zich ook daadwerkelijk tot dader ontwikkelen.

In Deel Twee van deze dissertatie werden verschillende studies besproken waarin de rol van achtervolgingswanen en waanstress in agressief gedrag werd onderzocht. Het in **Hoofdstuk 5** beschreven onderzoek had als doel om de relatie tussen achtervolgingswanen en zelfgerapporteerde agressie te onderzoeken door middel van een steekproef uit de algemene bevolking en in een klinische steekproef. Een tweede doel was om de psychometrische eigenschappen van de Nederlandse versie van de Persecutory Ideation Questionnaire (PIQ) te evalueren. De steekproef uit de algemene bevolking bestond uit 269 deelnemers. De klinische steekproef bestond uit 79 patiënten met een psychotische stoornis die waren opgenomen in verschillende psychiatrische instellingen. De resultaten lieten zien dat de PIQ een betrouwbaar en valide instrument is om achtervolgingswaanideeën te meten. Bovendien, uit de evaluatie van de klinische steekproef bleek dat de PIQ een goede criteriumvaliditeit heeft. Daarnaast lieten de resultaten zien dat de mate van achtervolgingswanen significant gerelateerd was aan zelfgerapporteerde agressie in zowel de klinische, als niet-klinische steekproef. Er werd geconcludeerd dat de Nederlandse versie van de PIQ een geschikt instrument is om de mate van achtervolgingswanen te meten. Ook concludeerden we dat met dit instrument de rol van deze wanen in agressie onderzocht kan worden.

De studie beschreven in **Hoofdstuk 6** had als doel te onderzoeken wat de unieke bijdrage is van achtervolgingswanen, psychopathie en middelengebruik in de voorspelling van agressie in opgenomen patiënten. Daarbij werd de rol van deze comorbide factoren in verschillende maten van agressie onderzocht in een quasi-experimenteel design. De steekproef bestond uit 59 opgenomen patiënten met schizofrenie. De resultaten toonden aan dat psychopathie het grootste deel van de variantie in zelfgerapporteerde proactieve

en reactieve agressie in patiënten verklaard. Echter, aanwezigheid van achtervolgingswanen verklaarde het grootste deel van de variantie in geobserveerde agressie op de afdeling. De resultaten impliceren dat het belangrijk is om comorbide factoren te onderkennen bij patiënten met schizofrenie voor meer nauwkeurige risico-evaluatie en een passende behandeling voor agressieve patiënten met schizofrenie.

In **Hoofdstuk 7** werd een analoge studie met quasi-experimenteel design beschreven. Op basis van eerder onderzoek wisten we dat achtervolgingswanen gerelateerd zijn aan agressie. Echter, het was nog niet duidelijk waarom de ene persoon met die wanen wel agressief gedrag vertoont en de andere persoon niet. Hierin werden verschillen tussen mannen en vrouwen ook onderzocht. De steekproef bestond uit 24 mannen en 53 vrouwen uit de algemene bevolking. Agressief gedrag werd onderzocht door gebruik te maken van een experimentele agressie taak en zelfrapportage vragenlijsten. Bij de mannen was de mate van achtervolgingswaanideeën alleen gerelateerd aan zelfgerapporteerde agressie in de groep personen met hogere mate van waanstress. Bij de vrouwen, met over het algemeen lagere niveaus van agressie, was deze relatie ingewikkelder. Daar lieten de resultaten zien dat de mate van achtervolgingswaanideeën gerelateerd was aan zelfgerapporteerde agressie in zowel de groep met hoge als ook met lage mate van waanstress. Uit deze bevindingen kon geconcludeerd worden dat er ook in de algemene bevolking een relatie bestaat tussen achtervolgingswaanideeën en agressief gedrag en dat deze relatie wordt beïnvloed door de mate van waanstress die ervaren wordt.

Tot slot werd bekeken of de relatie tussen achtervolgingswanen en geobserveerde agressie in opgenomen patiënten verklaard kan worden door de mate van waanstress die zij ervaren. Deze studie werd beschreven in **Hoofdstuk 8**. De steekproef van het onderzoek bestond uit 44 mannelijke, opgenomen patiënten van verschillende psychiatrische afdelingen. We maakten gebruik van de bootstrapping methode om de relatie tussen achtervolgingswanen, waanstress en geobserveerde agressie te

onderzoeken. De resultaten toonden aan dat de relatie tussen achtervolgingswanen en agressief gedrag voor een significant deel verklaard wordt door de mate van waanstress die de patiënten ervaren. Deze bevindingen geven ons inzicht in het handelen naar wanen agressie in patiënten met schizofrenie. Met een vroege diagnose van achtervolgingswanen en waanstress die daarmee gepaard gaat, kan het geweldsrisico bij opgenomen patiënten worden verlaagd. Ook werd geconcludeerd dat de resultaten zouden kunnen bijdragen aan de ontwikkeling van behandeling in opgenomen patiënten. Die behandeling zou zich dan kunnen richten op het verlagen van waanstress in patiënten die achtervolgingswanen hebben en neigen tot agressief gedrag.

De resultaten van de verschillende studies die beschreven zijn in Deel Een en Deel Twee werden in **Hoofdstuk 9** bediscussieerd. Er zijn een tweetal beperkingen van het onderzoek die in acht gehouden moeten worden wanneer we de bevindingen goed willen interpreteren. Ten eerste, in de studies in Deel Een van de dissertatie werd gebruik gemaakt van retrospectief dossieronderzoek en in de in Deel Twee besproken studies waren de data cross-sectioneel verkregen. Hierdoor kunnen we geen conclusies trekken over de causaliteit van de bestudeerde factoren. Ten tweede, in de studies die besproken zijn in Deel Twee is ook gebruik gemaakt van zelfrapportage vragenlijsten voor het meten van achtervolgingswanen, waanstress, psychopathie, en agressief gedrag. Patiënten hebben niet altijd inzicht in hun ziekte en zijn niet altijd in staat om te reflecteren op hun waanbeelden en gevoelens van stress. Dit beperkt de conclusies die we kunnen trekken uit de resultaten. Aan de andere kant, achtervolgingswanen en waanstress zijn niet altijd zichtbaar voor een buitenstaander, daarom kan zelfrapportage in dit geval toch nuttiger zijn. Zelfrapportage van agressief gedrag heeft tevens als voordeel dat op die manier gedragingen in kaart kunnen worden gebracht die niet gedocumenteerd zijn bij justitie.

In de discussie zijn ook een aantal sterke punten van het onderzoek beschreven. Ten eerste zijn, naar beste weten, de studies naar subtypering van daders de eerste studies die de *first offenders* in de vorege / late start typologie hebben onderzocht. Tevens zijn het, naar ons weten, ook de eerste studies die deze dadergroepen heeft afgezet tegen

twee contrastgroepen: een dadergroep zonder schizofrenie en een patiëntgroep zonder strafblad. Een ander sterk punt van het onderzoek in dit proefschrift is dat het zeer uitgebreid en veelomvattend is. Er is gebruik gemaakt van meerdere methoden die het thema van geweld in schizofrenie op verschillende manieren hebben benaderd. Dit heeft ertoe geleid dat we een beter beeld hebben gekregen van verschillende wegen naar geweld in personen met schizofrenie. Ten derde, de steekproeven zijn representatief voor de populaties die wij wilden onderzoeken. In Deel Een is bijvoorbeeld een grote steekproef van verdachten onderzocht die vanuit verschillende Nederlandse districten waren doorverwezen voor psychiatrisch onderzoek. Voor de studies in Deel Twee hebben we deelnemers onderzocht die uit de algemene bevolking komen, dus niet alleen studenten. Voor het onderzoek onder opgenomen patiënten zijn deelnemers geworven die werden behandeld op verschillende psychiatrische afdelingen in verschillende centra. Ook hebben we in deze patienten geen personen uitgesloten voor deelname op basis van comorbide factoren. Juist deze factoren zijn belangrijk in de studie naar geweld in schizofrenie. Dat maakt de gebruikte steekproeven meer representatief dan de steekproeven die gebruikt zijn in studies waar deze comorbide factoren wel werden uitgesloten. Deze punten maken dat het huidige onderzoek een valide onderzoek naar geweld in schizofrenie.

In de discussie zijn ook een aantal implicaties van dit onderzoek beschreven. We hebben gevonden dat vroege starters problemen hebben op veel verschillende domeinen. Daarom kan vroegtijdige interventie effectief zijn om te voorkomen dat deze personen nog meer in de problemen raken. Daarbij zal de behandeling van vroege starters, naast de behandeling van hun schizofrenie, zich moeten richten op hun (premorbide) antisociale persoonlijkheidsstoornis (met inbegrip van gebruik van verschillende middelen). First offenders kunnen, net als patiënten zonder strafblad, profiteren van cognitieve gedragstherapie die gericht is op het verlagen van waanstress die gepaard gaat met achtervolgingswanen. Ook is screening en vroegtijdige diagnose van waanideeën en stress belangrijk in niet-klinische populaties, in het bijzonder in mensen met een kwetsbaarheid

voor psychose. De Nederlandse PIQ met bijbehorende stress vragen kan gebruikt worden als screening instrument.

Toekomstig onderzoek zou baat hebben bij een longitudinaal design, zodat de causaliteit van de gevonden risicofactoren onderzocht kan worden. Zo kan men de etiologie van de verschillende type daders bestuderen. In een prospectief design kan ook de temporele relatie tussen achtervolgingswanen, waanstress en agressie beter worden onderzocht. Een volgende stap zou zijn om specifieke behandelinterventies te ontwikkelen en te evalueren. Onderzoek naar de effectiviteit van de Nederlandse PIQ als een screening instrument voor case-finding en risicotaxatie in patiënten met schizofrenie behoort ook tot de aanbevelingen. Tot slot is besproken dat onderzoek naar de neurobiologische basis van de verschillende wegen naar geweld in schizofrenie ook interessant is. Met behulp van moleculaire genetische studies of marker studies, zal men bijvoorbeeld meer inzicht kunnen verkrijgen in specifieke (neuro)biologische correlaten van verschillende typen daders.

Conclusies

Dit proefschrift heeft aangetoond dat er verschillende wegen zijn naar geweld in schizofrenie. Bovendien kunnen we een aantal belangrijke conclusies trekken uit het huidige onderzoek.

1. In de vroege / late start typologie van daders met schizofrenie is de specificatie van de *first offenders* als derde dadertype gerechtvaardigd, omdat deze groep op veel verschillende gebieden verschilt van de andere typen daders met schizofrenie.

2. Crimineel gedrag van vroege starters kan worden toegeschreven aan een premorbide antisociale persoonlijkheid, terwijl crimineel gedrag van late starters en first offenders eerder moet worden toegeschreven aan bepaalde wanen (bijv. achtervolgingswanen of grootheidswanen).

3. Erkenning van verschillende wegen naar het geweld in schizofrenie zal leiden tot meer accurate risico-evaluatie en behandelinterventies bij deze verschillende type daders.

4. Geobserveerde agressie van opgenomen patiënten wordt beter verklaard door het niveau van achtervolgingswanen, dan door trekken van psychopathie.

5. De bevinding dat waanstress een modererende factor is in de relatie tussen achtervolgingswanen en agressie in de algemene bevolking, laat zien dat klinisch relevante kwesties ook kunnen worden bestudeerd in niet-klinische populaties.

6. Het handelen naar wanen wordt beter begrepen door de onderkenning dat waanstress een belangrijke factor is in de relatie tussen achtervolgingswanen en reactieve agressie.

7. Door het gebruik van screening instrumenten kunnen we door middel van vroege diagnose van achtervolgingswanen en waanstress gepaste behandeling aanbieden die gericht is op het reduceren van die waanstress. Hierdoor kan het geweldsrisico van personen met achtervolgingswanen gereduceerd worden.

Acknowledgements in Dutch

(Dankwoord)

Dankwoord

Ik ben altijd een onderzoeker geweest; het “irritante” meisje in de klas die steeds maar vraagt: “waarom?” Hierdoor wist ik zeker dat ik wilde promoveren, al was ik vooraf gewaarschuwd dat het zwaar zou worden. De afgelopen vier en een half jaar heb ik gewerkt aan een onderzoek dat echt “mijn kindje” was. Ik ben dol op de forensische psychiatrie als wetenschap en ben zeker van plan in deze richting onderzoek te blijven doen.

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Beste nieuwe collega’s van de sectie criminologie. Bedankt voor deze mooie baan en het vertrouwen in mij als academicus.

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About the author

Curriculum Vitae

Josanne van Dongen (Sanne) was born on August 24th, 1983, in Rotterdam, The Netherlands. After she finished her secondary education (VWO) at the Rudolf Steiner College (Vrije School), Rotterdam, she started her study in psychology at the Erasmus University Rotterdam (EUR) in 2003. She obtained her BSc. degree in 2006, and one year later she graduated (MSc. degree) in biological and cognitive psychology. During the last 6 months of her master's she completed a research internship at the Institute of Psychology at the EUR. Her study was on differences in the *novelty p3* of the event-related brain potentials of the electroencephalogram in Highly Sensitive Persons as compared to controls. Because of her interest in research, especially in neurobiological psychology, she decided to pursue a PhD degree. To accomplish that, she started a research master in neuroscience at the Erasmus Medical Center Rotterdam (Erasmus MC). After a few months in the Department of Neuroscience, she obtained a position as PhD student in the department of Psychiatry at the Erasmus MC in November 2007. Under supervision of Prof.dr. Hjalmar van Marle and Nicole Buck, PhD, she conducted her doctoral research on subtypes of offenders with schizophrenia and the role of persecutory delusions and delusional distress in aggressive behavior (described in the current thesis). In addition, she studied the role of psychophysiological (e.g. heart rate and skin conductance), hormonal levels (i.e. cortisol and testosterone), and a polymorphism in the catechol-o-methyltransferase gene (COMT gene) in aggressive behavior. Sanne is now appointed as an assistant professor at the Erasmus School of Law (section of criminology) at the EUR, The Netherlands.

Publications

Papers

Van Dongen, J.D.M., Buck, N.M.L., & Van Marle, H.J.C. (2009). Early versus Late start offenders with schizophrenia: The necessity of a multimodal approach of criminal behavior". In: T.I. Oei, & M.S. Groenhuijsen (Eds.). The forensic psychiatry and its borders – actuality, history and future (In Dutch).

Van Dongen, J.D.M., Buck, N.M.L., Kool, A. & Van Marle, H.J.C. (2011). Psychometric evaluation of the Dutch Persecutory Ideation Questionnaire (PIQ) and its relation to aggression. *Personality and Individual Differences, 51, 527-531.*

Van Dongen, J.D.M., Buck, N.M.L., & Van Marle, H.J.C. (Epub ahead of print). Persecutory ideations indirectly effect inpatient aggression through delusional distress. *Psychiatry Research*.

Van Dongen, J.D.M., Buck, N.M.L., & Van Marle, H.J.C. (Epub ahead of print). The role of ideational distress in the relation between persecutory ideation and reactive aggression. *Criminal behavior and Mental Health.*

Van Dongen, J.D.M., Buck, N.M.L., & Van Marle, H.J.C. (Accepted for publication). First offenders: The real late starter in the early and late start offender typology within offenders with schizophrenia. *Crime and Delinquency.*

Van Dongen, J.D.M., Buck, N.M.L., & Van Marle, H.J.C. (submitted). Positive symptoms, substance use, and psychopathic traits as predictors of aggression in persons with a schizophrenia disorder.

Van Dongen, J.D.M., Buck, N.M.L., Barendregt, M. Van Beveren J.M., De Beurs, E. & Van Marle, H.J.C. (Submitted). Subtyping Offenders with Schizophrenia: Explaining Criminal Offending of Early Starters by Premorbid Antisocial Personality, and the Offending of First Offenders by Positive Psychotic Symptoms.

Van Dongen, J.D.M., Hendry, M. Douglas, K., Buck, N.M.L., & Van Marle, H.J.C. (Submitted). The robustness of the early and late start offender typology: A conceptual replication.

Measures and Tools

Van Dongen, J.D.M., Buck, N.M.L., Kool, A. & Van Marle, H.J.C. (2011). Dutch version of the Persecutory Ideation Questionnaire (PIQ).

Van Dongen, J.D.M., Van den Berg, W., Soe-Agnie, S., & Van Marle, H.J.C. (2011). Dutch version of the Short Boldness Scale.

Soe-Agnie, S.E., **Van Dongen, J.D.M.,** Loomans, M.M., Patrick, C.J., Nijman H.L.I., C.A.J. De Jong, & Van Marle, H.J.C, (2011). Dutch version of the Triarchic Psychopathy Measure.

Van Dongen, J.D.M., Hempel, I.S., Van den Berg, W., & Van Marle, H.J.C. (2011) Dutch version of the Brief Sensation Seeking Scale.

PhD portfolio

Name PhD student: J.D.M van Dongen	Promotor: Prof. dr. H.J.C. van Marle
Erasmus MC Department: Psychiatry	Co-promotor: N.M.L Buck, PhD
PhD period: November 2007 – March 2012	

1. PhD training	Year	Workload
General courses		
- Classical Methods for Data-analysis (NIHES)	2008	160
- Research Integrity (Erasmus MC)	2008	60
- Biomedical English Writing and Communication (Erasmus MC)	2010	110
Specific courses		
- Risk assessement of the Psychopathy Checklist-Revised (PCL-R) (Forum Educatief, Utrecht)	2008	24
- Professional training in the use of the Positive and Negative Syndrome Scale (PANSS)	2008	12
- Presenting in English (Language Centre of the Free Univerity, Amsterdam)	2008	24
- Cognitive Neuroscience (ONWAR)	2009	40
- Course in regression analysis (NIHES)	2010	160
National and international conferences, presentation, seminars, and workshops		
- 8th Conference of the International Asssociation of Forensic Mental Health Services (IAFMHS), Vienna, Austria	2008	20
- 9th Conference of the IAFMHS, Edinburgh (oral presentation)	2009	30
- The NOR 'On tour' symposium of the Netherlands Institute of Forensic Psychiatry and Psychology (NIFP), Rotterdam, The Netherlands (oral presentation in Dutch).	2009	20
- Annual Spring Conference of the Netherlands Society of Psychiatry, Maastricht, The Netherlands	2010	30
- Endo-Neuro-Psycho Meeting, Doorwerth, The Netherlands	2010	20
- Work visit Cardiff University, Wales, UK (visit and oral presentation)	2010	30

- 10th Conference of the IAFMHS, Vancouver, Canada (oral presentation)	2010	30
- Working visit Simon Fraser University, Burnaby, Canada (6 week visit and oral presentation)	2010	120
- 50th annual meeting Society for Psychophysiological Research (SPR), Portland, USA	2010	20
- 11th Conference of the IAFMHS, Barcelona, Spain (oral presentation)	2011	30
- Biannual conference of the Society for the Scientific Study of Psychopathy, Montreal, Canada (oral presentation)	2011	30
- 12th conference of the IAFMHS, Miami, Florida (oral presentation)	2012	30
2. Teaching activities		
- Supervising Master's theses (8 MSc theses)	2008-2012	400
- Tutorial first year medical students	2010-2011	80
- Second year "keuzeonderwijs" for medical students	2008-2011	160
- Annual workshop on psychophysiological techniques used in research in psychiatry for residents in psychiatry	2009-2011	80
- Annual workshop in psychophysiological tools for second year neuroscience research master students	2010-2011	40
Total (hours)	1760