Psychotic Symptoms, Anger, and Anxiety as Determinants of Aggressive Behavior

Angela F. Nederlof

Psychotic Symptoms, Anger, and Anxiety as Determinants of Aggressive Behavior

Angela F. Nederlof

The research presented in this dissertation was supported in part by Delta Psychiatric Center.

Cover picture based on a painting by Koos de Bruin/Zelfportret (1988)
Cover design by Rick Verweij (www.rickverweij.nl)
Lay out by Legatron Electronic Publishing
Printed by Ipskamp Drukkers B.V.

ISBN: 978-94-6191-090-5

Psychotic Symptoms, Anger, and Anxiety as Determinants of Aggressive Behavior

Psychotische symptomen, woede en angst als determinanten
van agressief gedrag

Proefschrift

ter verkrijging van de graad van doctor aan de
Erasmus Universiteit Rotterdam
op gezag van de
rector magnificus

Prof.dr. H.G. Schmidt

en volgens besluit van het College voor Promoties.

De openbare verdediging zal plaatsvinden op
Vrijdag 6 januari 2012 om 13.30 uur

door

Angela Francisca Nederlof
geboren te Dordrecht

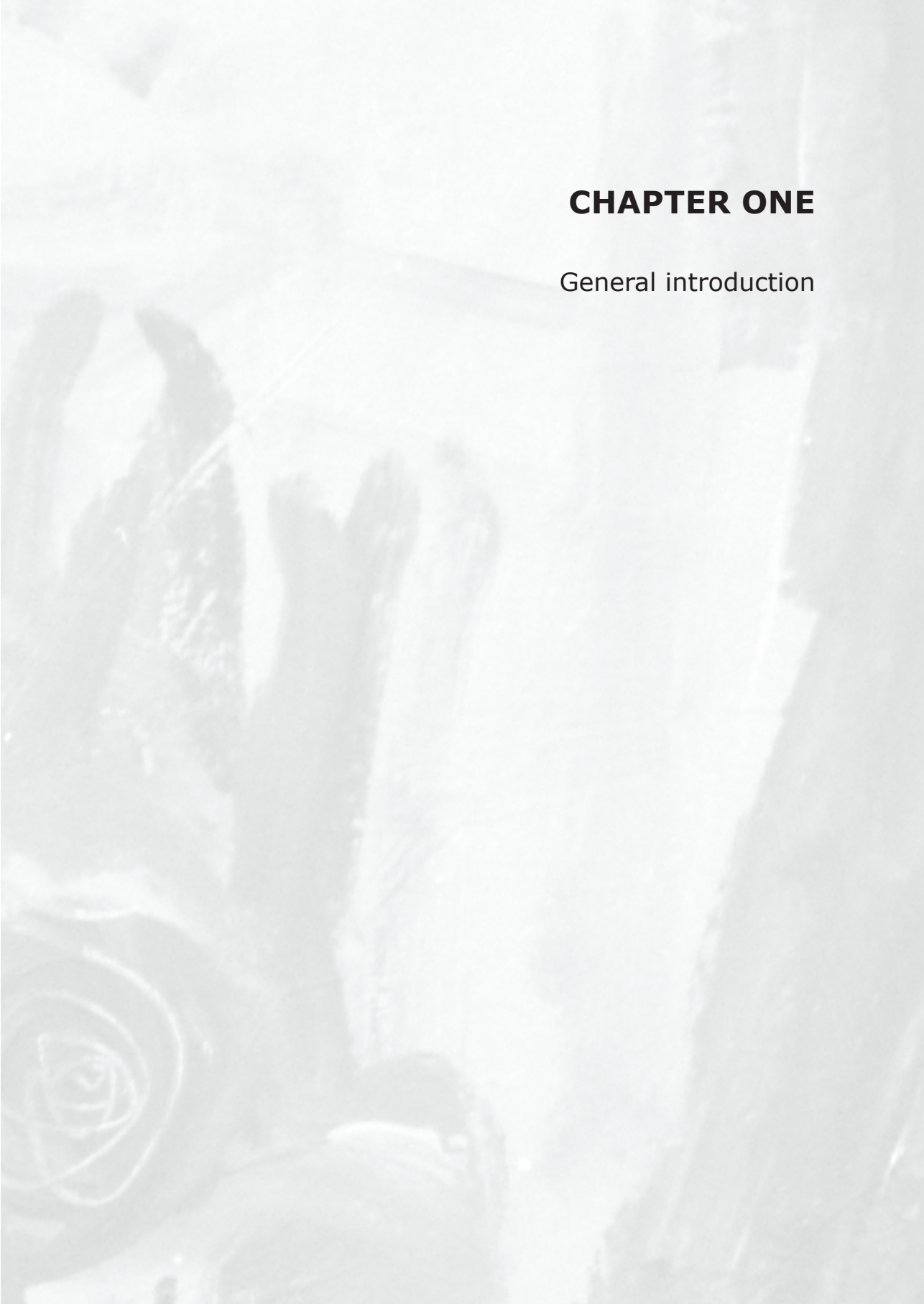
ERASMUS UNIVERSITEIT ROTTERDAM

Promotiecommissie

Promotoren:	Prof.dr. J.E.J.M. Hovens Prof.dr. P.E.H.M. Muris
Overige leden:	Prof.mr.dr. E.G.C. Rassin Prof.dr. I.H.A. Franken Prof.dr. A.J.M. Loonen

Voor mijn moeder, Mam, in mijn hart ben je altijd bij me,
en voor mijn vader, Dad, dankjewel voor je aanwezigheid, steun en vertrouwen.

Table of contents



CHAPTER ONE

General introduction

"Alphen a/d Rijn, Saturday afternoon, April 9, 2011. In a shopping mall, a young man, Tristan van der V., instantly took his firearms and shot around randomly. Six persons were killed, seventeen were injured. He finally committed suicide. This gunman appeared to be a 24-year-old man who was familiar with mental health services. He was diagnosed with paranoid schizophrenia."

As an introduction on the topic of this dissertation, it might be interesting to look at some other cases of psychiatric patients that displayed clear-cut aggressive behavior towards other persons.

Vignettes (Belfrage, 1998)

Case 1. Twenty-nine-year-old man, who stabbed his mother's fiancé in the chest with the intention to kill. He was on leave from a mental hospital where he had been admitted for the past eight years.

Case 2. Forty-four-year-old man, who has regularly been treated in mental hospitals over the past 15 years under the diagnosis schizophrenia. He had now been moved out to an apartment in the community. In connection with alcohol abuse, he murdered his male drinking partner by repeatedly stabbing him in the back as well as in the chest and the head. He states that he had not been feeling well for the last couple of weeks prior to the attack, but he had not taken his medication.

Case 3. Twenty-year-old man, with no known previous psychiatric symptoms. He tried to kill his younger brother by pounding his head repeatedly (more than 40 times) against a stone floor.

Case 4. Thirty-year-old woman, who has regularly been treated in mental hospitals for many years, mostly under the diagnosis paranoia. She has made several suicide attempts. Here she tried to kill her mother by first strangling her with an electric cable and then by setting her bed on fire. She stated that her mother both read her mind and took it away from her.

Case 5. Twenty-nine-year-old man, regularly treated with neuroleptics as well as electro-convulsive shock treatment in mental hospitals over a period of several years. He has repeatedly been the subject of involuntary psychiatric treatment after having threatened to kill his grandmother. Finally, he stabbed her to death with a knife to the heart. He stated that he felt persecuted by his grandmother.

Case 6. Twenty-nine-year-old man, regularly treated in mental hospitals for the past decade, mostly for depression. He tried to kill his father by stabbing him with a knife in the chest. He has not given any explanation for his action. Just a month prior to the crime, he was discharged from a mental hospital where he was the subject of involuntary psychiatric treatment.

Case 7. Forty-six-year-old man, regularly treated in mental hospitals for many years, usually with a diagnosis of paranoia. He often complained that his food was poisoned and that he was being persecuted. He tried to kill a female neighbor by hitting her repeatedly with a crowbar. During the month prior to the crime, he had not bothered to take his neuroleptics.

Case 8. Sixteen-year-old man, with no previous contact with psychiatry. He had, though, a troublesome adolescence including alcohol and drug abuse, and criminality. He entered a police station and tried to fire a loaded gun at a police officer (the gun misfired).

Case 9. Forty-six-year-old man, living in a hostel for alcohol abusers. He had no known history of mental illness, although he did have a severe drinking problem. He stabbed his roommate to death, after they had become disunite.

These vignettes are in line with the case of Tristan van der V. (The Netherlands, April 9th 2011) and were described by Belfrage (1998) as part of the article that he wrote on his ten-year follow-up study of criminality in mental patients. The cases illustrate various examples of patients in forensic psychiatric treatment, all diagnosed with schizophrenia, and convicted for (attempted) murder or manslaughter. Although these cases represent extreme forms of violent behavior, minor violent crimes are also a point of concern in this patient group. In real-life series on television or in the newspapers situations in which psychotic patients (frequently described as *disturbed* persons) act aggressively, often have the focus of interest. Headlines such as 'Disturbed man abused bus driver' (Telegraaf, March 17th, 2010), 'Disturbed man stabbed fireman' (AD, September 9th, 2010), and 'Disturbed man created death and ruin with axe' (Telegraaf, June 3th, 2011) are not uncommon.

When reflecting on the nine cases, it remains unclear what exactly pushed these patients to their actions. For example, in vignettes 1, 3, and 6, there does not seem to be a specific trigger such as a preceding mood state or specific symptoms and thus no indication for a common factor that might have caused the violent behavior can be assumed, except for the fact that all individuals were diagnosed with schizophrenia. However, in the remaining cases

somewhat more information on the situation and the patients was provided which gives some insight in the circumstances at the moment of the aggressive outbursts. For vignettes 2, 8, and 9, alcohol and drug use seem to be involved in the aggressive behavior. Persons with drinking problems and/or drug abuse, in particular patients with a diagnosis of schizophrenia, are assumed to engage more often in violent behavior than persons without (comorbid) substance use (Fazel, Langstrom, Hjern, Grann, & Lichtenstein, 2009). On the other hand, in vignettes 4, 5, and 7, psychotic experiences such as feelings of threat and persecution seem to be of great relevance in triggering the aggressive behavior. When a patient thinks that he or she is being followed or that another person wants to hurt or poison him or her, it might be that this triggers an aggressive response as to defend him/herself. In some of the cases, non-adherence to the medication seems to be an important factor underlying aggression. This non-compliance to medication intake might result in decompensation behavior and acute psychosis, which on its turn induces the aggressive behavior. From a scientific point-of-view, it remains largely unclear which components exactly contributes to the aggressive behavior displayed by patients with a psychotic disorder, but the disorder itself seems to account for a substantial proportion of the variance in explaining this phenomenon.

Schizophrenia and related psychoses

Schizophrenia is considered as one of the most complex mental disorders, as not one common factor has been found that characterizes patients with this diagnosis (Walker, Kestler, Bollini, & Hochman, 2004). The concept of schizophrenia is far from homogeneous and unitary. Clinicians consider schizophrenia as one of the most severe psychiatric illnesses and they appear to diagnose it as an illness based on a number of symptoms that occur together in varying constellations. Since the 18th century, scientists such as Emil Kraepelin, Eugene Bleuler, and Kurt Schneider tried to describe schizophrenia in terms of symptoms and behaviors. All these efforts, however, did not lead to a well defined disease as patients presented themselves with so many different, often odd, behaviors and a substantial set of cognitive dysfunctions, that may vary considerably in the course of time, that no clear track of the disease could be established (Blom, 2003). Since the nineteenth century, clinicians and researchers agree on the main symptoms of schizophrenia such as delusions, hallucinations, and chaotic and catatonic behaviors (Birchwood & Jackson, 2001). A set of diagnostic criteria has been formulated in the Diagnostic and Statistical Manual for DSM-IV disorders (APA, 2000), indicating which symptoms should be present for diagnosing schizophrenia. Other related psychotic disorders are for example the delusional

disorder, schizoaffective disorder, or psychotic disorder not otherwise specified, and all these include psychotic symptoms (i.e., delusions and hallucinations) as a prominent aspect of the clinical presentation. That is, delusional thoughts, hallucinatory experiences or disorganized and chaotic behavior are present and hinder the person in his or her daily functioning.

Whereas professionals in psychiatry find schizophrenia, or psychosis, an interesting and important research topic, the association with danger and threat often dominates in the majority of the community. About 60% of the community assumes the mentally ill, and in particular the psychotic patients, to be violent. This so-called dangerousness stereotype (Link, Phelan, Bresnahan, Stueve, & Pescosolido, 1999) might be the result of stigmatization and prejudices to these patients, and is possibly influenced by the media. These conceptions might lead to miscalculations and intensification of the concern of being a victim of violence, with the mentally ill as presumed perpetrators. However, if we examine the evidence for the assumption that persons with schizophrenia display more aggressive behavior, the truth is found to be more complex.

Aggression and violent behavior

When people talk about aggression or violence, it is generally known what is meant by this behavior. Abusive language, fighting behavior, murder, and manslaughter are all examples of aggression. However, when searching for a general definition of aggression, several contrasting formulations have been offered (Baron & Richardson, 1994). Buss (1961) for example stated that aggression is simply any behavior that harms or injures others, whereas Berkowitz (1981) is one of the persons who also emphasized the *intention* of harm or injury to others as being a relevant aspect of aggressive behavior. A more recent definition is proposed by DiGiuseppe and Tafrate (2010) who describe aggression as 'overt motor behavior enacted with the intent to do harm or injury to a person or object, with the expectation that harm will occur' (p. 23), which includes both aforementioned views. Violent behavior, on the other hand, is another often used concept, and refers according to the *Encyclopedia of Psychology* to the more extreme forms of aggression such as murder, rape, and assaultive behaviors (APA, 2000). What exactly triggers aggressive or violent behavior remains unclear, but gender, impulsivity, and drug use are often assumed to be risk factors for this behavior (e.g., Barratt, 1994; Eagly & Steffen, 1986; Fazel et al., 2009b). From another point of view, the experience of emotions such as anger and anxiety might precede the aggressive behavior, as both emotions are negative and activating in behaviors such as defensive and aggressive responses (Posner, Russell, & Peterson, 2005). However, consistent evidence for this assumption is missing.

In clinical as well as in non-clinical populations aggressive and violent behavior is not uncommon. Theorists and researchers assume that the mentally ill are at the highest risk for engaging in violent acts. Although the risk rates in these new studies vary substantially, results have generally confirmed that psychiatric patients indeed tend to display more violent behavior than healthy persons. Since the early 90s several reviews on the relation between violent behavior and mental illness have been published (e.g., Eronen, Angermeyer, & Schulze, 1998; Hodgins, 1996; Krakowski, Volavka, & Brizer, 1986) and these have demonstrated that in particular schizophrenic patients more often display violent and criminal behavior in comparison to healthy people and patients with other mental disorders. Recent meta-analytic studies have confirmed these results (e.g., Douglas, Guy, & Hart, 2009), but the nature of this behavior remains unclear.

The aim and outline of this dissertation

Questions such as 'How common is violent behavior in patients with schizophrenia or a related psychosis?', 'Is this behavior only typical for clinical forms of the disorder or are community samples with mild psychotic experiences also at risk for displaying aggressive behavior?', 'What do clinicians think of the origins of this behavior ?', 'To what extent is their aggressive behavior specifically due to the symptoms of their illness?', and 'Which other intra-individual factors seem to play a role in this relationship?' are often posed but the answers remain unclear. The present thesis will focus on the intra-individual determinants of aggressive behavior in psychosis and has an aim that is twofold. First, information will be provided on the relation between psychotic symptoms and aggressive behavior, in clinical as well as in nonclinical populations. Information on the prevalence of aggressive behavior and the occurrence of psychotic experiences will be provided and the associations between specific psychotic symptoms and aggression will be outlined (Chapters 2, 3, and 4). Second, a special focus is on the emotions of anger and anxiety and their role in explaining aggression (Chapter 5 and 6). In addition, the thesis will have a methodological focus as the psychometric properties of a newly developed self-report questionnaire were examined for measuring specific psychotic symptoms that are thought to be related to aggression (Chapter 7).

The studies

This dissertation describes a series of six studies (Chapters 2 to 7). Chapter 2 is an introductory chapter in which a broad overview will be given of the studies that have been conducted on the relation between mental illness and violence. Chapter 3 presents a cross-sectional survey study and focuses on the views that psychiatrists hold on the nature of aggression in psychosis as they are the most important clinicians in the treatment of these patients. Then, Chapters 4, 5, and 6 will focus on the relation between specific psychotic symptoms, the experience of emotions, and aggressive behavior in healthy (Chapters 4 and 6) and clinical samples (Chapter 5), which is investigated both by means of self-reports and interviews as well as with an experimental design. At the end of the dissertation, a more methodological oriented chapter, Chapter 7, is presented, in which the psychometric properties of a measure that was used in the foregoing studies were investigated. For the clinical studies, patients were recruited at three mental health institutions in the Netherlands. Patients and staff were asked for their help and participation, while anonymity was guaranteed. All studies were approved by official medical ethics committees. The research purposes of each chapter will be outlined below.

Chapter 2 provides a systematic review on the epidemiological studies on the association between schizophrenia and related psychotic disorders and violent behavior. It has been widely acknowledged that persons with a psychotic disorder are more often involved in violent crimes than those without mental problems, which is confirmed by recent review papers and meta-analytic studies (e.g., Douglas et al., 2009; Walsh, Buchanan, & Fahy, 2002). However, the caveats and limitations of these studies have hardly been discussed. In this systematic review study an exhaustive literature search was conducted on all epidemiological studies that were conducted since 1980 on psychosis in relation to violent behavior. Various studies were subdivided into birth-cohort, community, and register studies, briefly summarized, and critically discussed.

In **Chapter 3** a cross-sectional survey study is described that was set up in order to investigate the view of psychiatrists on the relative contributions of various risk factors that might explain aggression in psychosis. It remains largely unclear which specific factors contribute to the heightened risk for aggression in psychotic patient populations, neither what views psychiatrists hold on this issue. For this study, a survey questionnaire was developed to investigate whether psychiatrists distinguish various personal, social, and illness-related factors and which risk factors are considered to be most important in causing aggressive behavior in psychotic patients. In addition, various groups of psychiatrists were identified by latent cluster analysis with regard to their views on the causes of

aggression in psychosis and determined by socio-demographic and work-related factors.

As it remains unclear to what extent the link between psychotic experiences and aggression exists in the general population, **Chapter 4** reports a study on the occurrence of various types of psychotic-like experiences (i.e., schizotypal signs, psychoticism as a personality trait, negative and positive psychotic symptoms in general, hallucinatory behavior, and threat/control-override symptoms) and their relationship with aggressive behavior in a non-clinical student population. In addition, the influence of relevant personality characteristics (e.g., extraversion, neuroticism) and other socio-demographic risk factors (e.g., gender, drug use) of aggression were examined in this study.

To investigate the role of anger and anxiety in predicting aggressive behavior, an experimental study in a non-clinical student population was set up and described in **Chapter 5**. The study contains a combined mood induction procedure, with guided imagery and congruent music plays, that was used to bring participants in an angry, anxious, or neutral emotional state. After the mood induction, participants were asked to complete a word-stem aggression task to examine their state aggression attitudes. In addition, the role of psychotic-like experiences such as feelings of persecution, social reference ideas, and hallucinatory behaviors in explaining aggression was taken into account.

The studies reported in Chapters 4 and 5 only investigated non-clinical student samples. As it is more relevant to know what exactly explains aggression in clinical psychotic populations, **Chapter 6** presents a cross-sectional multicenter patient study in which the prevalence of aggression in a psychotic patient sample and its intra-individual correlates are the central point of interest. That is, psychotic symptoms, in particular threat/control-override symptoms, and the emotional reactions of anger and anxiety to these symptoms were investigated on their association with aggressive behavior. Also the influence of impulsivity and drug use on aggression was examined. For this study, interviews and self-report measures were administered to a sample of acute psychotic inpatients that were recruited at three psychiatric hospitals.

Chapter 7 represents a methodological chapter and reports the findings of a psychometric validation study of the Threat/Control-Override Questionnaire (TCOQ; see appendix A), which is a newly developed questionnaire for measuring threat and control-override symptoms in general and clinical populations. In the study that was described in Chapter 6, threat/control-override symptoms in patients with a psychotic disorder were measured with this self-made questionnaire, but only the internal consistency of this measure was checked. To ensure good reliability and validity of this scale for future research, an elaborate study on the psychometric properties of the measure was reported in the present chapter. One healthy student sample and two clinical psychotic patient samples

(i.e., acute and stabilized psychotic patients) filled out the TCOQ. In addition, other measures on psychotic experiences were administered to the samples.

Finally, in **Chapter 8**, an overview and integration of the main findings that were reported in the studies described in Chapters 2 to 7 is presented. A general discussion is provided, the limitations of the studies are considered, and the directions for future research are described. In following, **Chapter 9** provides a brief summary. Also, the Dutch versions of the newly developed measures that were used in some of the studies are included as appendices.

CHAPTER TWO

The epidemiology of violent behavior in patients with a psychotic disorder: A systematic review of studies since 1980

This chapter has been submitted for publication as: Nederlof, A.F., Muris, P., & Hovens, J.E. The epidemiology of violent behavior in patients with a psychotic disorder: A systematic review of studies since 1980.

Abstract

Since the 19th century it has been widely acknowledged that persons with a psychotic disorder are more often involved in violent crimes than those without mental problems, which is confirmed by several recent review papers and meta-analytic studies. However, the caveats and limitations of these studies have hardly been discussed. In the present systematic review study the epidemiological studies that were conducted since 1980 on the link between psychosis and violent behavior were critically reviewed. The electronic databases of PUBMED/MEDLINE, PsychINFO, and EMBASE were searched. The search was limited to studies on adult populations, which were published between January 1980 and May 2011. Search terms used were ('aggression' OR 'violence') AND ('mental disorders' OR 'schizophrenia' OR 'psychosis'). The literature search initially identified 5756 articles. After carefully reviewing the full texts, 27 articles, based on 21 studies, were ultimately selected as they fully met the selection criteria. Studies were categorized according to their research design (i.e., birth cohort, community, register-based). Although schizophrenia and other related psychotic disorders seem to be undoubtedly associated with violent behavior (OR's between 2 and 28), it should be kept in mind that underlying variables or risk factors (e.g., family history of violence, emotions such as anger and anxiety, impulsivity, childhood problems), study designs and/or conceptual problems (i.e., defining violence/aggression and schizophrenia/psychosis) might be of particular influence on the interpretation of the link between violence and psychosis.

Introduction

As early as 1857, Gray wrote about violent behavior in psychiatric patients "*It is exhibited in every conceivable manner, from harsh words to suicide and the most cruel and brutal murders, and is found in every form of insanity*" (p.1), which clearly reflects the common notion that the constructs of 'violence' and 'insanity' are closely related to each other. Since the 19th century, it has been widely acknowledged that people with a mental illness are more often involved in violent crimes as compared to healthy populations. Nowadays the majority of the community still expects the mentally ill to be at a heightened risk for engaging in violent acts (Link, Phelan, Bresnahan, Stueve, & Pescosolido, 1999). Over 60% of the community assumes patients with schizophrenia to be violent, whereas 33% of the general population thinks that the depressive patients are at risk for displaying violent behavior. This dangerousness stereotype might have been induced by the media, in which psychiatric patients are often stigmatized as aggressive and violent persons. These prejudices might lead to the miscalculation and intensification of the concern of being a victim of violence, with the mentally ill as presumed perpetrators. To get more insight in the relationship between mental disorders and violent behavior, a new line of research was initiated.

The first epidemiological studies did not provide convincing evidence on the link between mental illness and violence (Ashley, 1922; Pollock, 1938; Cohen & Freeman, 1945), which however was mainly due to methodological shortcomings such as the lack of a control group and the relatively small sample size and thus low prevalence rates of crimes. Improved research arose during the second half of the 20th century (e.g., Coid et al., 2006; Hodgins, 1992; Rappaport & Lassen, 1965; Sosowsky, 1980; Tardiff, 1984). Although the risk rates in these new studies varied substantially, results generally confirmed that psychiatric patients tend to display more violent behavior than healthy persons. Since the early 90s several reviews on the link between violent behavior and mental illness have been published (e.g., Eronen, Angermeyer, & Schulze, 1998; Hodgins, Mednick, Brennan, Schulsinger, & Engberg, 1996; Krakowski, Volavka, & Brizer, 1986) and these have clearly demonstrated that in particular schizophrenic patients more often display violent and criminal behavior in comparison to healthy people and patients with other mental disorders.

Recently, Douglas, Guy, and Hart (2009) carried out a meta-analysis on 204 studies that took all psychiatric disorders into account. Again it was found that the psychotic disorders showed the highest risk on aggressive behavior (an increase of 49% to 68% in the risk of violence). Although this analysis was carried out carefully and adequately, information on each individual study was missing. In another meta-analysis by Fazel, Gulati, Linsell, Geddes, and Grann (2009), only studies with schizophrenic patients and healthy controls

were included. The results of this study again confirmed the expected relation between schizophrenia and violence. In addition, these authors pointed at the role of comorbid substance use, which was found to increase the risk of violent behavior in this patient population even further.

Thus, research has consistently shown that people with a mental disorder more often engage in violent behavior, and that is especially true for patients with schizophrenia. Although these findings seem to be indisputable, it has to be kept in mind that these studies vary in methodology and research design. Differences in the definition of 'violence' and variations in diagnoses hinder the comparability of the research. Further, relevant confounding variables such as environmental influences, living circumstances, and social context were not taken into account when interpreting the main findings of various investigations. These shortcomings are hardly acknowledged in previous review studies. As such, conclusions are drawn that facilitate the stigmatization of schizophrenic patients as being dangerous persons, while there might be other factors causing the relation between psychosis and violent behavior.

The aim of the current study is to provide a critical review of the epidemiological research that has been conducted since 1980 (i.e., after the deinstitutionalization of the mentally ill) on the relationship between violent behavior and patients with schizophrenia or a related psychotic disorder. A detailed overview will be provided of all epidemiological studies since 1980 and confounding variables as well as the strengths and shortcomings of this research will be specified. Studies will be categorized according to study design and methodological strategy (i.e., birth cohort, community, and register-based) and a brief outline of the main findings of each study will be provided. In the discussion section the main confounding variables and caveats will be discussed.

Method

Search strategy and criteria

The electronic databases of PUBMED/MEDLINE, PsychINFO, and EMBASE were searched. The search was limited to studies on adult populations, which were published between January 1980 and May 2011. Search terms used were ('aggression' OR 'violence') AND ('mental disorders' OR 'schizophrenia' OR 'psychosis'), mapped to specific database terms when possible (e.g., the MeSh terms in PUBMED/MEDLINE). In addition, manual reference checks on retrieved articles were performed and relevant studies were added. The content of each article was independently reviewed by a psychologist and a psychiatrist to determine whether it was suitable for this review. All disagreements were

discussed and resolved by consensus. The final selection of articles was analyzed according to the criteria as described below.

Selection criteria

The criteria used for the selection of articles were as follows: 1) Studies had to be empirical studies examining the relationship between aggression and psychiatric diagnosis (i.e., schizophrenia and related psychosis, and major mental disorders that include these psychotic disorders) by means of an epidemiological design or by providing at least well-determined prevalence rates or odds/risk ratios; 2) As we were interested in the link between violence and mental disorders in the general population, only community studies, that is studies with large samples, were included; 3) Participants had to be at least 16 years of age, which represents an adequate age on which psychotic disorders can be diagnosed; and 4) Study designs had to be based on the general community and should not include clinical populations or prisoners, as these studies usually concern selective samples.

Results

Search results

The literature search initially identified 5756 articles. The search of PsychINFO, Pubmed/Medline, and EMBASE yielded respectively 2485, 1820, and 1451 articles. Note however that there was considerable overlap across the three databases (≈60%). Only two additional articles were retrieved by manual reference checks. A final number of 92 articles was selected on the basis of their title and abstract. After carefully reviewing the full texts, 27 articles, based on 21 studies, were ultimately selected as they fully met the selection criteria. Studies were categorized according to their research design (i.e., birth cohort, community, register-based) and information on study location, time period, sample size, measurement of the disorder and violence, and diagnostic groups was gathered.

Birth cohort studies

Four studies (described in six articles) were birth cohort studies, in which people born in the same year were followed from their birth on. Details of these studies are presented in Table 1. These prospective studies are of superior quality and provide accurate and meaningful information on the causal relationship between the occurrence of a mental illness and violent behavior. Most of these studies were conducted in the Scandinavian countries, where researchers have created several databases that contain historical sources such as ministerial

records (Thorvaldsen, 1998). In this way, these countries continue a century-long tradition of recordkeeping that provides information on for example the crime records for every citizen. Although some (*N* = 2) studies did not clearly differentiate between schizophrenia, bipolar disorder with psychotic features, and psychotic depression, general rates for these major mental disorders were reported.

The first birth cohort study on the relationship between major mental disorders and crime was conducted by Hodgins (1992) who followed an unselected Swedish birth cohort up to age 30. This researcher found that both men and women with a major mental disorder were more likely to be convicted for a criminal offence than persons with no disorder (ORs for men and women were respectively 2.5 and 5). For violent offences odds ratios were even higher (men and women respectively 4.2 and 27.4). In another study, Hodgins et al. (1996) followed a Danish birth cohort up to age 43 and provided similar results as in the Swedish study. All diagnostic groups were at a higher risk for criminality as compared to the group without mental disorders. That is, relative risk ratios of 4.5 and 8.6 for at least one violent crime were found in men and women respectively. Brennan, Mednick, & Hodgins (2000) examined the Danish birth cohort with a focus on psychotic disorders and found odds ratios for violent arrest rates among hospitalized men and women with schizophrenia of 4.6 and 23.2 respectively, which were remarkably higher than the odds ratios for all other psychotic disorders (except for organic psychosis in men, OR 8.8). Another study was conducted by Tiihonen, Isohanni, Rasanen, Koiranen, & Moring (1997) who focused on several major mental disorders. In this Finnish birth cohort a general odds ratio of 3.1 was found for criminal offences in schizophrenic patients, whereas an odds ratio of 7.2 was obtained for violent offences. However, the odds ratio for mood disorders with psychotic features was even higher (OR = 10.4), which is in contrast with the findings of Brennan et al. (2000). In the same birth cohort, Rasanen et al. (1998) found that men with schizophrenia and comorbid alcohol abuse were 25.2 times more likely to commit violent crimes than men without a mental disorder. A final birth cohort study conducted in New Zealand (Arsenault, 2000) yielded comparable results as in the Scandinavian studies. A strong point of this study was that it controlled for the influence of demographic characteristics and comorbid diagnoses (e.g., substance abuse, mood disorders, and anxiety disorders), and as such, indicated that the link between schizophrenia and violent behavior is quite robust.

In sum, available research indicates that there is a considerable association between violent offences and major mental disorders, with odds ratios between 4 and 27. Although the birth cohort design of these studies is powerful in detecting causal relations, there are several limitations to consider. First, only the New-Zealand study controlled for demographic characteristics and

Table 1
Birth cohort studies since 1980 on the relationship between schizophrenia and related psychotic disorders and violent behavior.

Authors	Location (+ study)	Time period	*N*	Diagnostic criteria	Assessment (instrument) diagnosis	Definition violence	Diagnostic groups	Odds/risk ratio (95% CI) ≥ 1 violent crime [a]
Hodgins (1992)	Sweden	1953-1983	15,117	DSM-III	Discharge diagnosis (records)	Violent offences (criminal records)	All disorders	OR MMD m = 4.2 (2.2-7.8) f = 27.4 (9.8-76.9)
Hodgins et al. (1996) Brennan et al. (2000)	Denmark	1944-1991	358,180	ICD-8	Discharge diagnosis (records)	Violent offenses (criminal index)	All disorders	RR MMD m = 4.5 (3.9-5.1) f = 8.6 (6.0-12.4)
Tiihonen et al. (1997) Rasanen et al. (1998)	Northern Finland	1966-1992	12,058	DSM-III-R	Hospital discharge register + OCCPI	Violent crimes (crime register)	All disorders (mainly psychotic)	OR Schizophrenia m = 7.2 (3.1-16.6)
Arsenault et al. (2000)	New Zealand (The Dunedin Study)	1972-1991	1,037	DSM-III-R	DIS	Court convictions for + self-reports of violence	All disorders	OR Schizophrenia m + f = 5.1 (2.0-13.1) [b]

Note. ICD = International Statistical Classification of Diseases and related Health Problems, DSM = Diagnostic and Statistical Manual of Mental Disorders, OCCPI = Operational Criteria Checklist for Psychotic Illness, DIS = Diagnostic Interview Schedule, MMD = Major Mental Disorder, m = male, f = female. [a] Odds/relative risk ratios in this table are only mentioned for the major mental disorders and/or schizophrenia. [b] Odds ratios of court convictions for violence were reported.

comorbid diagnoses of substance use, mood disorders, and anxiety disorders, while keeping the effect of schizophrenia on committing violent crimes. However, several other important risk factors that may easily trigger violent behavior were not taken into account such as cultural aspects, living circumstances, social context, problems in childhood, and a family history of mental illness and/or violence (DeCoster & Heimer, 2001; Hodgins, Alderton, Cree, & Mak, 2008; Lardinois, Lataster, Mengelers, Van Os, & Myin-Germeys, 2011; Markowitz, 2011; Tengstrom, Hodgins, Grann, Langstrom, & Kullgren, 2004; Spencer & Bryant, 2000). The limited generalizability is another concern that should be noted. There is a lack of large-scale birth cohort studies on the link between mental disorder and violence in countries with less social welfare, poverty, and more substance use problems. Also, findings of these studies might not be generalized to other jurisdictions and countries with other criminal justice systems and mental health care systems.

Cross-sectional community studies

Seven studies (described in 9 articles) that were found were community-based, which refers to studies in which the broad general public is approached, such as national household surveys. These studies typically compare the prevalence of violent behavior across groups of people with no or different types of psychiatric disorders; however, only rates for violent behavior in psychosis will be discussed (for study details see Table 2).

One of the most impressive community-based studies is the Epidemiological Catchment Area study in which over 10,000 respondents participated (Swanson, 1994; Swanson, Holzer, Ganju, & Tsutomu Jono, 1990). In this study, violent behavior as well as the presence of psychiatric disorders was determined by means of self-report instruments. Results indicated that 8% of the schizophrenic patients showed violent behavior compared to 2% of the persons with no mental disorder. Another community study by Stueve and Link (1997), also found that major mental disorders heighten the risk on violent behavior: for example, their data showed that 29% of the psychotic disorders, especially true for fighting behavior during the last five years, as compared to only 8% of persons with no disorder. Further, the link between mental disorder and violence appeared to be stronger among respondents with lower education levels. Corrigan and Watson (2005) found a prevalence rate of 11.5% for violent behavior in persons with a non-affective psychotic disorder, as compared to only 2% for those without a mental disorder. Rates for violence were even higher for those persons who suffer from co-morbid alcohol and drug abuse, respectively 20% and 23%. In addition, Coid et al. (2006) obtained similar results in their study, and after adjusting for sex, age, social class, marital status, and other diagnoses, the initial prevalence rate of 17% increased to 22%, compared to

Table 2
Community-based studies since 1980 on the relationship between schizophrenia and related psychotic disorders and violent behavior.

Authors	Location (+ study)	Time period	*N*	Diagnostic criteria	Assessment (instrument) diagnosis	Definition violence	Diagnostic groups	Prevalence of violent behavior (%)
Swanson et al. (1990) Swanson (1994)	Baltimore, Raleigh-Durham, Los Angeles (NIMH ECA study)	1980-1983	10,059	DSM-III	DIS	Self-report	All disorders	Schizophrenia 8% No disorder 2%
Stueve & Link (1997)	Israel	1982-1983	2,678	DSM-III	PERI/SADS-I	Self-report (5 year prev.)	All disorders	Psychotic disorder 28.9% No disorder 8.1%
Corrigan & Watson (2005)	Unites States (NCS study)	1990-1992	5,865	DSM-III-R	CIDI	Self-report	All Disorders	Non-affective psychosis 11.5% No disorder 1.9%
Coid et al. (2006)	England, Wales, Scotland	2000	8,397	DSM-IV	PSQ, SCID-II-Screening Questions, CIS-R, AUDIT, SADQ	Self-report (5 year prev.)	All disorders	Psychotic disorder (positive) 11% (22% when adjusted) No disorder 7%
Swanson et al. (2006)	United States (CATIE study)	2001-2004	1,410	DSM-IV	SCID	Self-report (6 month prev.)	Schizophrenia	Schizophrenia 19.1% any violence, 3.6% serious violence
Pulay et al. (2008) Elbogen & Johnson (2009)	United States (NESARC study)	2001-2002	43,093	DSM-IV	AUDADIS-IV	Self-report	All disorders	Schizophrenia 6.1% No disorder 2.3%

Note: NIMH ECA = National Institute of Mental Health's Epidemiologic Catchment Area project, NCS = National Comorbidity Survey, CATIE = Clinical Antipsychotic Trials of Intervention Effectiveness, NSDUH = National Survey on Drug Use and Health, NESARC = National Epidemiologic Survey on Alcohol and Related Conditions, DSM = Diagnostic and Statistical Manual of Mental Disorders, DIS = Diagnostic Interview Schedule, PERI = Psychiatric Epidemiology Research Interview, SADS-I = Schedule of Affective Disorder and Schizophrenia, CIDI = Composite International Diagnostic Interview, SCID = Structured Clinical Interview for DSM-IV Disorders, AUDADIS = Alcohol Use Disorder and Associated Disabilities Interview Schedule.

only 7% in the non-disordered group. Swanson et al. (2006) examined a sample of 1,410 schizophrenic patients on minor (i.e., assaults without injury or weapon use) and serious violent acts (i.e., sexual assaults and any threat or assault using lethal weapons, resulting in injury) and reported percentages of 19.1% en 3.6% respectively. They also focused on positive psychotic symptoms in general (OR = 1.81) and substance abuse (OR = 2.77), which were both found to increase the risk for minor violent acts. Positive psychotic symptoms (OR = 3), victimization (OR = 3.84), and childhood conduct problems (OR = 4.81), on the other hand, strongly increased the risk of serious violence. In another study, Swartz and Lurigio (2007) tested a model in which the generality of the mediating effect of substance use on the link between severe mental illness and criminal behavior was assessed. Results indicated that the link between severe mental illness and non-violent arrests was almost completely mediated by substance use, whereas for violent offences this relation was only partially mediated, indicating that the type of offence seems to be of particular influence on the role of substance use. Two final articles were published by Pulay et al. (2008) and Elbogen and Johnson (2009), who both used data from the National Epidemiologic Survey on Alcohol and Related Conditions study and reported comparable findings with the aforementioned studies. The latter study also examined the role of various historical, clinical, dispositional, and contextual influences, and indicated age, education, sex, income, (parental) crime history, perceiving hidden threats in others, victimization and divorce as significant predictors of serious violent behavior (OR's between 0.23 and 4.14).

Altogether, 4% to 30% of the patients with a psychotic disorder report violent behavior, whereas these rates vary between 0% and 8% for the control groups without any psychiatric disorder. Although a large proportion of the general population was investigated in these community studies, several shortcomings of these studies should be mentioned. First, each study made use of different measures for determining diagnoses. In addition, the operationalization and measurement of violent behavior also requires attention. Single item questions such as 'In the past 12 months, did you have serious trouble with the police?' or 'Did you fight or use a weapon in the past 5 years?', or a selection of items from instruments that measure psychopathology (e.g., the DIS) were used to determine violent behavior. These methods only tap a narrow range of violent behavior and mainly rely on self-report, which might be vulnerable to underreporting as the behaviors that were examined (i.e., violence, psychiatric symptoms) can be viewed as socially undesirable and stigmatization (Saunders, 1991). That means that actual aggression rates might be even higher. The underreporting of violent acts might also occur from unconscious self-deception, which eventually results in a recall error (Simon & Vonkorff, 1995). A final note is that, although the most recent studies took some confounding aspects into

account, other important risk factors such as problems in childhood, a history of family violence, and environmental and social conditions were not considered.

Clinical register and criminal records studies

Ten studies (described in 12 articles) were register-based. This research method is retrospective in nature and allows researchers to extract data from readily available information sources such as clinical reports and criminal and police records. In Table 3, the available information per study is given, including odds/ risk ratios or prevalence rates of violent crimes.

Most clinical register and record studies focus on schizophrenic patients specifically. One of the first register studies was conducted by Lindqvist and Allebeck (1990) who used police records to follow up 644 schizophrenic patients for 15 years. Results indicated that these patients were about four times more likely to commit a violent crime than people in the general population. In two studies by Wessely and colleagues (1994, 1998), criminal conviction rates of patients with schizophrenia were compared with a non-psychotic psychiatric patient group. Both men and women with schizophrenia were significantly more likely to be convicted for violent crimes. An independent but modest hazard ratio of 1.4 was found for the effect of schizophrenia. However, the effects of ethnicity, previous convictions, and substance abuse were found to be of more relevance when predicting violent behavior (OR's > 2.0). Belfrage (1998) examined the records of discharged patients with schizophrenia, affective psychosis, or paranoia. An overrepresentation of crime rates in this group was reflected by a base rate of 28%, which was considerably higher than that observed in the general population. Again, violent crimes showed the highest frequency. A case-linkage register study was conducted by Wallace et al. (1998) who found that schizophrenia, in particular in combination with coexisting substance use, is overrepresented in offenders. However, comparable crime rates were obtained for affective and personality disorders. Mullen, Burgess, Wallace, Palmer, & Ruschena (2000) carried out a matched case-control study and examined two independent groups of schizophrenic patients, one group admitted in 1975 and another group admitted in 1985 (respectively before and after the deinstitutionalization of the mentally ill). As compared to healthy controls, both groups showed more criminal offending for all types of crimes, except for sexual offences. Again, substance use was found to increase the level of offending. In a study by Munkner, Hastrup, Joergensen, and Kramp (2003), 37% of the schizophrenic patients in their sample started a criminal career. A substantial proportion of them (13%) even committed the first violent crime before their first contact with the psychiatry health care system. Wallace, Mullen, and Burgess (2004) compared the criminal records over a 25 year period of patients with a first admission for schizophrenia with those of community controls (who

Table 3
Clinical register- and record studies since 1980 on the relationship between schizophrenia and related psychotic disorders and violent behavior.

Authors	Location (+ study)	Time period	*N*	Diagnostic criteria	Assessment diagnosis	Assessment violence	Diagnostic groups	Odds/Risk ratio (95% CI) ≥ 1 violent crime [a]
Lindqvist & Allebeck (1990)	Stockholm, Sweden	1972-1986	644	ICD-8	Inpatient register	Central police register (violent offences)	Schizophrenia	Odds Ratio 3.9
Wessely et al. (1994) Wesseley (1998)	London, UK (Camberwell Study)	1964-1984	538	ICD-9	Psychiatric case register	Central criminal register (convictions)	Schizophrenia	Risk Ratio m = 2.1 f = 3.1
Belfrage (1998)	Stockholm, Sweden	1986-1996	1,056	ICD-9	Inpatient register	Police register + cause of death register	Schizophrenia, affective psychosis, paranoia	Base Rate 28%[b] (total group)
Wallace et al. (1998)	Victoria, Australia	1993-1995	4,156	ICD-9	Psychiatric case register	Higher court records (convictions)	All disorders	Odds Ratio 4.4
Mullen et al. (2000)	Victoria, Australia	1975, 1985			Psychiatric records	Criminal records	Schizophrenia	Risk Ratio 3.5
Munkner et al. (2003)	Denmark	1963-2000	4,619	ICD-8-10	Psychiatric central register	National crime register	Schizophrenia (no controls)	37%[b]
Wallace et al. (2004)	Victoria, Australia	1975-2000	2,861	DSM-IV	Psychiatric case register	Criminal records	Schizophrenia	Odds Ratio 4.8
Soyka et al. (2004) Soyka et al. (2007)	Munich, Germany	1990-1995	1,705	ICD-10	Psychiatric records	National crime register	Schizophrenia (no controls)	2.6% [b]
Cuellar et al. (2007)	Los Angeles, USA	1993-2001	6,624	ICD-9	Public mental health system	Criminal justice records (10 year period)	All disorders (no controls)	24% [b]
Fazel et al. (2009b)	Sweden	1973-2006	88,028	ICD-8-10	Hospital Discharge Register	National crime register	Schizophrenia	Odds Ratio 2.0

Note. ICD = International Statistical Classification of Diseases and related Health Problems, DSM = Diagnostic and Statistical Manual of Mental Disorders.
[b] (base rate) prevalences of violent behavior were given as no odds or risk ratios were reported in the original papers.

were matched for age, gender, and place of residence). A percentage of 8.2 was found for violent offences in the patient group, versus only 1.8% in the control group. For patients and controls who also had substance use problems, the offence rates were respectively 68.1% and 11.7%. Soyka and colleagues (2004, 2007) and Cuellar, Snowden, and Ewing (2007) assessed the criminal history of a group of patients with schizophrenia, without including a healthy control group. Findings were in line with the aforementioned results in that they showed that a substantial proportion of the patients displayed violent behavior. That is, percentages between 27.5 and 41.2 were reported, with the highest percentages found for schizophrenia and other psychotic disorders. Finally, a recent study by Fazel et al. (2009b) also confirmed the findings of foregoing research, but as an extra aspect they also took genetic factors into account. Compared to the general populations, patients with schizophrenia had a heightened risk of 2.0, whereas this odds ratio decreased to 1.6 when unaffected full siblings were used as control group. When taking comorbid substance abuse into account, these odds ratios were 4.4 and 1.8 respectively, suggesting that genetic or early environmental factors are of relevant influence on the association between schizophrenia and violence. Altogether, results were comparable with those obtained in the birth-cohort and community studies. That is, prevalence rates between 2% and 40%, and odds/risk ratios of 2 to 5 were reported for the schizophrenia patient groups. This research method, a clinical record and police register analysis, is also prone to various limitations. First, the concept of criminality in general is substantially different from violent behavior. When committing a crime, it is not per definition violent behavior that is displayed. As such, most studies reported rates for violent and/or non-violent convictions, but others only mentioned the type of crime (e.g., homicide, assault, theft, robbery) which often leads to unjust conclusions about violent behaviors. Another point of interest is the generalizability of the data. Only persons who made use of general health care facilities (hospital/ arrest rates) or who were registered in crime databases were included, which indicates a considerable selection bias with the subtle aggressive incidents and psychopathology excluded. A final limitation of these register studies is that information might be incomplete or less accurate, as data was only reported for clinical use and justice but not for research purposes. Diagnoses are often not confirmed or might have changed in the past years.

Discussion

Since the 19th century it has been widely acknowledged that persons with a psychotic disorder are more often involved in violent crimes than those without mental problems, which is confirmed by several recent review papers and meta-

analytic studies (i.e., Douglas et al., 2009; Eronen et al., 1998; Fazel et al., 2009a; Krakowski et al., 1986). However, the caveats and limitations of these studies have scarcely been discussed. In the present systematic review study the epidemiological studies that were conducted since 1980 on the link between psychosis and violent behavior were critically reviewed. Although schizophrenia and other related psychotic disorders seem to be undoubtedly associated with violent behavior, it should be kept in mind that underlying variables, study designs and conceptual problems might be of particular influence on the interpretation of the link between violence and psychosis.

A first remark that needs to be made is the operationalization of violent behavior. Although 'violence' is a frequently used word in this research field, not yet has there been agreement on a universal definition. A distinction can be made between minor and serious violent acts (Swanson et al., 2006), whereas other researchers might also include non-violent crimes in their demarcation of violence (e.g., Swartz & Lurigio, 2007). Most important is the substantial difference between criminality in general on the one hand and violent behavior on the other. For people who are homeless or live in disadvantaged areas without work or money to spend, burglary, theft, or robbery might represent usual behaviors to survive, whereas homicidal or assaultive behaviors concern the more violent crimes in which this research is actually interested.

Another notion that should be made pertains to the definition of the diagnoses of psychosis and schizophrenia and its measurement. The Diagnostic and Statistical Manual of mental disorders (APA, 2000) has often changed in the past 30 years, and substantial alterations have been made in the criteria for the major mental disorders. The concepts of schizophrenia and psychosis are far from homogeneous, reflected by the different kinds of behaviors that these patients display. As such, diagnosing patients with this disorder remains difficult and arbitrary. In this context, some researchers (e.g., Johns & Van Os, 2001) stand for a continuum approach instead of categorizing only the presence or absence of psychotic disorders. It is preferred to further examine the role of specific psychotic symptoms such as feelings of delusional threat or imperative hallucinations when predicting violence (e.g., Fresán et al., 2005; Nederlof, Hovens, & Muris, 2011b; Swanson et al., 2006) as this might give more insight in the origins of violent behavior.

Although psychosis is a significant risk factor in explaining violent behavior, it only contributes for a relatively small proportion of the variance (between 5% and 40%), indicating that other risk factors and confounding variables also play an important role. However, none of the reviewed studies have taken such factors consistently into account. First to mention are the environmental and living circumstances of these patients. Seriously mentally ill persons are more likely to be homeless or to live in group homes or shelters, located in socially

disorganized neighborhoods with economic disadvantages, fragmented families, and greater racial diversity (Markowitz, 2011). The social disorganization theory states that such living circumstances might lead to a weaker social cohesion, less social control, and therefore an increased risk of criminal behavior. In line with this, frequent address changes are also found to be a significant predictor of criminal charges (Brekke, Prindle, Woo Bae, & Long, 2001). Another important social factor to consider is a family history of violence (Farrington, Barnes, & Lambert, 1996). When first degree relatives (i.e., parents, siblings) show a high rate of violence or when domestic violence is present, the risk on behaving violently in later life is increased, and this might be explained by Bandura's theory on the modeling of aggressive behavior (Rosenthal & Bandura, 1978).

Then, there are a number of intra-individual risk factors to mention that are hardly taken into account when determining the epidemiology of aggression in psychosis. First, also related to domestic violence, are problems in childhood such as deprivation or abuse, which are found to be significantly related to psychosis (Lardinois, Lataster, Mengelers, Van Os, & Krabbendam, 2011). These stressful life events might lead to vulnerability later in life, and poor coping strategies might be developed which finally results in violent behavior as a response to such situations (Markowitz, 2011). The excessive stress sensitivity that patients with schizophrenia experience can also be triggered or intensified by crowded places, demanding situations, or poor communication, which might lead to aggressive behavior (Nijman, Campo, Ravelli, & Merckelbach, 1999). Another intra-personal factor that might increase the risk on violent behavior is the experience of specific emotions such as anger or anxiety, which might precede and trigger the violent behavior in this patient group. For example, in a study by Nederlof et al. (2011b) it was shown that mainly schizophrenic patients with a higher level of anger disposition showed aggressive behavior. Also problems in the emotion regulation, perception, or recognition are not uncommon in schizophrenic patients (e.g., Gur et al., 2002; Kerr & Neale, 1993; Mandal, Pandey, & Prasad, 1998; Mueser et al., 1996), which might increase the risk on violent incidents as they are likely to misinterpret intentions of other people. Then, cognitive distortions such as implicit memory deficits, attentional biases, a lack of insight, and social cognition problems are another common problem seen in schizophrenic patients (e.g., Penn, Corrigan, Bentall, Racenstein, & Newman, 1997; Rund, 1998; Smith, Hull, Israel, & Willson, 2000) and might also interfere and/or act as mediating or moderating factors in the relationship between psychosis and violent behavior.

To conclude, a large amount of research has been conducted on the relationship between mental health and violence, indicating that patients with schizophrenia or related psychotic disorders are at increased risk for engaging in violent acts. A prominent role was found for substance abuse, which might

be explained by the disinhibitory effects that alcohol can have. Normal brain functioning might be disrupted and mechanisms and processes that normally restrain impulsive behavior might be weakened, leading to aggressiveness (Gustafson, 1994). However, as was demonstrated by Fazel et al. (2009b), it should be kept in mind that the increase of violent behavior in patients with comorbid substance use was less pronounced when controlling for unaffected siblings. For future research it is encouraged to further investigate the origins of violent behavior in psychosis by focusing on intra-individual determinants such as specific psychotic symptoms (e.g., TCO symptoms), the experience of emotions (e.g., anger, anxiety), cognitive distortions, and neurobiological issues such as impulsivity for a better understanding of its nature and development.

CHAPTER THREE

Psychiatrists' view on the risk factors for aggressive behavior in psychotic patients

This chapter has been accepted for publication as: Nederlof, A.F., Koppenol-Gonzalez, G.V., Muris, P., & Hovens, J.E. (in press). Psychiatrists' view on the risk factors for aggressive behavior in psychotic patients. *Clinical Schizophrenia and Related Psychoses*.

Abstract

In meta-analytic studies it was found that patients diagnosed with a psychotic disorder are at increased risk for displaying violent behavior. However, it remains largely unclear which specific factors contribute to the heightened risk for aggression in this patient group, neither what the views of psychiatrists are on this issue. A cross-sectional survey study was carried out and a survey questionnaire was developed to investigate the view of 652 psychiatrists on the relative contributions of various factors (e.g., illness-related, personality, social influences) that might explain aggression in psychosis. It was found that psychiatrists generally view illness-related features as the most important determinant of aggression in these patients, followed by impulsivity/lack of insight and social influences, whereas personality characteristics are considered as least relevant. Latent class cluster analysis revealed that there are several subgroups of psychiatrists who attach different levels of importance to various types of risk factors. In these subgroups, two cluster contrasts were found: one representing differences in response style, and one representing differences in the evaluation of personality characteristics. Overall, psychiatrists seem to adopt a medical model when interpreting aggression in psychotic patients, although several subgroups of psychiatrists can be identified who have different opinions of such behavior.

Introduction

Meta-analytic studies have indicated that psychiatric patients, and in particular patients diagnosed with a psychotic disorder, more often engage in violent acts than healthy populations (Douglas, Guy, & Hart, 2009; Fazel, Gulati, Linsell, Geddes, & Grann, 2009). Various risk factors are hypothesized and assumed to be important when explaining this phenomenon (Mullen, 2006). When looking at patients' views concerning the causes of their aggression, social context factors are often mentioned, whereas clinicians tend to be merely focused on the patient himself (Duxbury & Whittington, 2005). However, only a few studies have focused on the view of clinical staff, although it might be of great relevance to gain more insight in what clinicians consider to be the causes of the aggressive behavior in psychotic patients as this could possibly lead to specific treatment and management strategies.

Patients with a psychotic disorder seem to be at increased risk for displaying violent behavior (e.g., Elbogen & Johnson, 2009; Fazel, Langstrom, Hjern, Grann, & Lichtenstein, 2009a). Various factors are thought to be involved in the aggressive behavior of patients with a psychotic disorder, including illness-related factors, personality characteristics, and environmental variables. Mullen (2006), for example, primarily described the developmental difficulties encountered by psychotic patients, which would lead to educational failure and eventually unemployment, and ultimately results in contacts with criminal peer groups that might promote violent behavior. However, most of the empirical research on the increased incidence of aggression in patients with a psychotic disorder has been focused on intra-individual and illness-related factors, such as the type and severity of psychotic symptoms, substance use, and psychopathy, while contextual factors have hardly been investigated (Stompe, Ortwein-Swoboda, & Schanda, 2004; Swanson et al., 2008; Tengstrom, Hodgins, Grann, Langstrom, & Kullgren, 2004).

Patients themselves mainly report environmental conditions and poor communication, thus the more social context factors, as direct triggers of their aggressive behavior. This view, however, is likely to reflect a fundamental attribution error, with patients displaying the tendency to ascribe their violent behavior to external causes (Heider, 1958). Clinicians display a tendency to consider the illness of the patients as the cause of aggression, thereby neglecting other relevant factors that may contribute to this type of behavior (Antonius et al., 2010). For example, Duxbury and Whittington (2005) found that nurses mainly attribute the aggressive behavior of patients to illness-related factors, and tend to ignore environmental or person variables. As it has been suggested that the attitudes and underlying cognitions of the clinical staff towards patient aggression might lead to specific management strategies in the treatment of

such behavior (Jansen, Middel, Dassen, & Reijneveld, 2006), it seems important that such opinions should be accurate and nuanced. Of course, not only the opinion of the nurses is relevant, but the view of other staff members, such as psychiatrists, should also be taken into account. So far, few studies have examined the psychiatrists' point of view on the aggressive behavior of psychotic patients. One exception is a study by Clarke and Rowe (2006) in which it was shown that psychiatrists were more likely to diagnose patients with schizophrenia if they had a history of violence. This seems to suggest that violence was regarded as a main feature of schizophrenia, while other factors accounting for the aggression were largely neglected. Until now, however, it remains unclear what psychiatrists precisely think about the risk factors of aggressive behavior in psychotic patients.

The present study was set up in order to explore the opinions of psychiatrists with regard to the risk factors for aggressive behavior in psychotic patients. The main aim was to investigate whether psychiatrists distinguish various personal, social, and illness-related factors. It was also aimed to determine which risk factor(s) is/are considered as most important in causing aggressive behavior in psychotic patients. Furthermore, an attempt was made (by means of latent cluster analysis) to identify various groups of psychiatrists with regard to their views on the causes of aggression in psychotic patients. In addition, we were interested in to what extent such opinions of psychiatrists are determined by socio-demographic (i.e., gender, age) and work-related factors (i.e., current work situation, years of working experience, experiences with patient violence).

Method

Participants

A sample of registered psychiatrists was recruited. A total of 2802 psychiatrists were approached via the Dutch Association for Psychiatry and received an invitation by email to participate in this study, with a web link to the online survey. In total 652 psychiatrists (23.7%) responded favorably to this request and fully completed the questionnaire. However, not all participants filled out the socio-demographic and work-related questions. If the survey was not filled out within two weeks, a reminder email was sent.

Data collection

First, participants were asked to answer an open-ended question about their ideas of the origins of aggressive behavior in psychotic patients, "*What do you consider to be the main reason(s) for psychotic patients to act aggressively?"*.

Participants were allowed to come up with more than one answer. Then, participants had to fill out a questionnaire, developed for the purpose of the present study, to investigate the view of psychiatrists on the relative contributions of various factors that might explain the aggressive behavior of psychotic patients, including personality characteristics, illness-related features, and social influences. A senior psychiatrist and a psychologist first conducted a literature search on possible causes for aggressive behavior in psychosis. Items covering these risk factors were formed in three domains: illness, personality, and environmental issues. Each statement started with 'Psychotic patients behave aggressively because…', followed by the possible risk factor. Then, experienced researchers and clinicians were asked to evaluate these items on the basis of their expertise. Following their suggestions and comments, a final version of the survey was construed, which consisted of 38 items (see Table 1). Each item had to be rated on a 5-point scale with anchors of 1 = absolutely not true and 5 = absolutely true.

Before analyzing the results that were obtained with this survey, psychometric properties were checked. A principal component analysis was carried out to examine the factor structure of the survey and thus to identify various groups of causes for the aggressive behavior of psychotic patients. The scree plot clearly pointed in the direction of a four-factor solution, instead of the beforehand assumed three factors. The first factor had an eigenvalue of 9.16 and explained 24.09% of the total variance, and clearly seemed to represent an 'illness-related' factor. The second factor had an eigenvalue of 4.70 and explained 12.36% of the variance, and referred to patients' 'personality characteristics'. The third factor had an eigenvalue of 2.48 and explained 6.52% of the variance, and pertained to 'environmental influences'. The final and fourth factor had an eigenvalue of 1.52 and explained 4.0% of the variance, and seemed to be concerned with 'lack of insight and impulsivity'. Factor loadings of all items are displayed in Table 1. These four factors will be employed in the further analyses of this study.

Data analysis

Data were analyzed by means of the Statistical Package for Social Sciences, version 17.0 (Brace, Kemp, & Snelgar, 2006) and Latent Gold 4.5 (Vermunt & Magidson, 2002). Latent class cluster analysis was used to identify various groups of psychiatrists who differ in their responses on the causes of aggression in psychotic patients. Further, it was investigated whether these differences in responses can be interpreted in terms of the factor structure of the survey. To compare the clusters of psychiatrists in terms of socio-demographic and work-related characteristics, a series of ANOVA's and Chi-square tests were carried out after the latent class cluster analysis, using cluster membership as a between-subjects factor.

Table 1

Items of the survey on causes of aggressive behavior in psychotic patients and their factor loadings as obtained with a principal component analysis. All items are prefixed by '*Psychotic patients behave aggressively because…*'

				Factor			
Item	Description	M	SD	1	2	3	4
1.	They do not take their medication	2.53	.89	.21	.18	.03	**.29**
2.	They cannot count on anyone	2.16	.85	.11	.25	**.65**	-.13
3.	They are hallucinating	2.94	.96	**.49**	-.10	.04	.40
4.	They are angry	2.64	.95	.19	**.32**	.20	.30
5.	They got less social support	2.48	.94	.11	.09	**.76**	-.06
6.	They try to protect themselves	3.46	1.02	**.67**	-.10	.25	-.08
7.	They do not get their way	1.95	.84	.01	**.36**	.24	.31
8.	They feel like everyone is against them	3.27	.95	**.70**	.08	.11	.11
9.	Their delusions are bothering them	3.52	.97	**.73**	-.04	-.04	.29
10.	People do not listen to them	2.53	.96	.21	.06	**.67**	.08
11.	Voices bring them to this behavior	2.83	.94	**.48**	.10	-.12	.37
12.	They are anxious	3.97	.92	**.75**	-.05	.21	.01
13.	They are being stigmatized	2.10	.90	.08	.13	**.70**	.11
14.	They feel misunderstood by other people	3.03	1.00	.31	-.03	**.55**	.25
15.	They cannot control their impulses	2.79	1.07	.31	.17	.01	**.51**
16.	They feel threatened	3.82	.92	**.81**	.00	.15	.05
17.	They use drugs	3.20	1.02	.44	**.45**	.08	.04
18.	They learned to behave in that way	1.57	.80	-.04	**.57**	.30	.11
19.	They have a genetic vulnerability	1.62	.77	.04	**.53**	.08	.29
20.	They have a lack of insight in their illness	2.53	1.07	.29	.08	.12	**.56**
21.	They have an antisocial personality	1.40	.73	-.02	**.75**	.01	.04
22.	They cannot set limits	2.42	1.00	.15	.04	.41	**.48**
23.	They do not want to collaborate	1.78	.77	-.02	.30	.23	**.53**
24.	They feel depressed	1.95	.82	.04	.14	**.52**	.40
25.	They have had an insecure attachment style	1.61	.81	-.06	**.48**	.39	.22
26.	They are frustrated	2.45	.94	.21	.25	**.38**	.37
27.	They experience less love from other people	1.73	.79	-.07	.25	**.57**	.41
28.	Negative events have happened in their lives	2.10	.91	.08	.26	**.57**	.30
29.	They have a low IQ	1.30	.59	.02	**.67**	.06	-.03
30.	This fits with their cultural background	1.25	.53	-.04	**.55**	.10	.06
31.	They are suspicious	3.50	.95	**.77**	.03	.05	.25
32.	They interpret situation in a wrong way	3.67	.93	**.72**	-.06	.06	.29
33.	They were aggressive in childhood	1.38	.67	-.05	**.74**	.04	-.01
34.	They come from a broken family	1.27	.53	-.06	**.69**	.20	.10
35.	They feel lonely	1.89	.92	-.03	.11	**.60**	.44
36.	They do not understand other people	2.86	1.00	.33	.03	.27	**.44**
37.	They have been aggressive before	2.13	1.08	.10	**.57**	.04	.22
38.	They feel that they don't have the control	2.76	1.03	.37	.07	.14	**.49**

Note. *N* = 652.

Results

Demographics

Socio-demographic characteristics and work-related information of the psychiatrists are presented in Table 2. The sample consisted of 348 men and 295 women who had a mean age of 47.28 years (*SD* = 10.90, range 25-82 years). About 67% of the participants was currently working in a mental health setting, of which 23.2% was working on an acute ward. Mean working experience was 17.52 years (*SD* = 10.23, range 1-45 years). In the total sample, 55.8% indicated that they had regularly encountered patient aggression, whereas 61.7% had at least once been a victim of aggression on the ward.

Responses to the open-ended question

Responses to the open-ended question "*What do you consider to be the main reason(s) for psychotic patients to act aggressively?*" were qualitatively analyzed. Of the respondents, 46.4% considered anxiety as one of the crucial factors involved in the aggressive behavior of psychotic patients. A second leading cause, mentioned by 43.2% of the psychiatrists, was the experience of delusional or paranoid thoughts. Other answers were imperative hallucinations (13.2%), comorbid substance use (8.4%), disturbed impulse control (7.1%), and environmental factors (4.6%). Only forty-two (6.1%) of the respondents called into question whether psychotic patients do act aggressively.

Survey data

A comparison of weighted subscale scores (total subscale score divided by the number of items) of the four factors indicated that participants rated illness-related features as most important (*M* = 3.44, *SD* = 0.68), whereas personality characteristics were considered as least relevant (*M* = 1.78, *SD* = 0.47). Lack of insight and impulsivity (*M* = 2.52, *SD* = 0.61) and environmental influences (*M* = 2.24, *SD* = 0.60) were scored in between (all between-factor comparisons were significant at $p < .001$).

Latent class cluster analysis

According to the Bayesian Information Criterion (BIC) that weights the fit and parsimony of the latent class cluster models, the model with the lowest value is the one with the best fit (Raftery, 1995). In our analyses, a 7-cluster model displayed the lowest BIC value (i.e., 55749.5 as compared to a BIC value of 55832.4 for the 6-cluster model) and the smallest increase in classification errors[1]. Table 3 shows a summary of the characteristics of each of the seven clusters of psychiatrists and their interpretations with regard to the four factors.

[1] Detailed data can be obtained from the first author.

Table 2
Descriptive statistics on demographic and work-related characteristics of the psychiatrists included in this study (*N* = 652).

	N	%
Gender		
Male	348	53.37
Female	295	45.25
Current work situation		
Clinical health setting	441	67.64
Acute ward	151	23.16
Non-acute ward	290	44.48
Forensic setting	27	4.14
Ambulant setting	72	11.04
Other (e.g., research, crisis)	89	12.73
Not applicable/no answer	29	4.45
Aggression at work		
Yes	364	55.83
No	280	42.94
Victim of aggression		
Yes	402	61.78
No	242	37.12

Note. Due to missing values not all variables sum up to 652.

In general, all clusters rated the illness-related features as most important and the personality characteristics as least relevant. To analyze contrasts between clusters, the responses of each cluster are compared to the average response of the total sample (i.e., grand mean). Differences are tested with Wald tests and the interpretation of the clusters, as displayed in the left panel of Table 3, are based on significant differences between the responses of the clusters and the responses of the total sample ($-1.96 < Z > 1.96$). Two remarkable cluster contrasts were found. First, clusters 1 and 2 seemed to represent two opposite response patterns. When analyzing differences between cluster 1 and 2 on socio-demographic and work-related characteristics with ANOVA's and Chi-squared tests, the results show no significant differences (all *p*'s > .05). Therefore, it seems to be likely that the difference in valuation of the risk factors between these clusters can be mainly attributed to differences in response style (i.e., either extremely low or high responding to all items in the survey). Another contrast was found between clusters 3 and 4: the psychiatrists in cluster 3 overvalued items of the illness-related factor and considered items of the personality factors as less relevant, whereas the opposite was true for the psychiatrists in cluster 4. When analyzing differences on socio-demographic and work-related characteristics with ANOVA's and Chi-squared

Table 3
Summary of the seven estimated clusters and their socio-demographic and work-related characteristics of the psychiatrists sample (N = 652).

Cluster	N	More important factor	Less important factor	Interpretation cluster concerning factors	Gender (% male)	Mean age (SD)	Work situation (% health setting)	Mean years of work experience (SD)	Aggression at work (% yes)	Victim of aggression (% yes)
1	99	none	all	Undervaluation of all factors	51.5 $_{a,b}$	47 $_{a,b,c}$ (11)	67.5	17 $_{a,b}$ (10)	47.5 $_{a}$	67.7
2	56	all	none	Overvaluation of all factors	60.7 $_{b,c}$	49 $_{c}$ (11)	60.0	19 $_{b}$ (11)	57.1 $_{a,b}$	53.6
3	135	1	2	Undervaluation of personality, overvaluation of illness-related	43.0 $_{a}$	46 $_{a,b}$ (10)	70.4	16 $_{a}$ (9)	62.2 $_{b}$	58.5
4	98	2	1	Undervaluation of illness-related, overvaluation of personality	72.4 $_{c}$	49 $_{c}$ (11)	61.4	19 $_{b}$ (11)	49.0 $_{a}$	63.5
5	126	1, 3, and 4	2	Undervaluation of personality, overvaluation of remaining factors	51.2 $_{a,b}$	45 $_{b}$ (12)	62.0	15 $_{a}$ (10)	59.7 $_{a,b}$	64.8
6	102	3	2	Undervaluation of personality, overvaluation of environment	53.6 $_{a,b}$	49 $_{c}$ (11)	64.4	19 $_{b}$ (10)	58.8 $_{a,b}$	63.3
7	36	2	1, 3, and 4	Diverse valuation of personality	54.3 $_{b}$	49 $_{a,b,c}$ (11)	53.3	20 $_{b}$ (10)	62.9 $_{a,b}$	62.9

Note. 1 = illness-related, 2 = personality, 3 = environmental, 4 = lack of insight and impulsivity. Subscripts: Within each column, different letters indicate significant differences at p <.05.

tests, the results show that these clusters differ with respect to gender [$\chi^2(1) = 19.98$, $p < .001$], age [$F(1,230) = 6.45$, $p = .01$], years of work experience [$F(1,232) = 6.20$, $p = .01$], and aggression at work [$\chi^2(1) = 4.06$, $p < .05$]. Specifically, cluster 4 (i.e., psychiatrists who undervalued the illness-related factor, while overvaluing the personality factor) contained more and older men with more years of work experience who encountered less aggression at work, compared to the participants in cluster 3 (i.e., psychiatrists who overvalued the illness-related factor, while undervaluing the personality factor). Therefore, the difference in valuation of the factors between these clusters may be due to characteristics of the psychiatrists.

Discussion

The aim of the current study was to investigate psychiatrists' view on the causes of aggressive behavior in patients with a psychotic disorder. In addition, it was explored whether different groups of psychiatrists could be distinguished with regard to their opinion on the risk factors for aggression in psychosis. A survey was especially developed for investigating these issues. Factor analysis yielded four factors representing distinct types of risk factors, namely illness-related features, personality characteristics, environmental influences, and lack of insight and impulsive behavior.

Based on the answers to the open-ended question, almost half of the psychiatrists appeared to attribute the aggressive behavior of patients with a psychotic disorder to anxiety triggered by psychotic symptoms. This form of anxiety seems to be an obvious risk factor for provoking aggressive behavior in this patient group, but remains an understudied variable. More research needs to be conducted into this to further examine the role of anxiety in the relation between psychosis and aggression. Another frequently mentioned risk factor by these psychiatrists was delusional or paranoid thoughts. A similar pattern was found in the responses on the survey. That is, psychiatrists considered illness-related features as most relevant for explaining aggressive behavior in patients with a psychotic disorder, whereas personality characteristics were seen as the least relevant risk factor. These findings are well in line with the earlier described findings of Duxbury and Whittington (2005), and leads to the conclusion that clinical staff, including psychiatrists, apparently adhere to a medical model when explaining the aggressive behavior of patients diagnosed with a psychotic disorder. However, other determinants, and in particular personality characteristics, are considered as less important. Nonetheless, these variables may account for a substantial proportion of the variance when explaining the aggressive behavior in this population. For instance, research suggests that patients with antisocial

personality features are more likely to engage in violent behavior (Hodgins, 2008). Further, they tend to have an earlier first hospitalization and longer stays in hospitals (Hodgins, Tiihonen, & Ross, 2005), which underlines the clinical relevance of such personality characteristics.

The latent class cluster analysis of the survey data yielded seven different groups of psychiatrists. Two remarkable contrasts between clusters emerged. The first contrast seemed to be concerned with two clusters of psychiatrists who displayed a different response style (i.e., respondents in these clusters responded either extremely low or high to all items in the survey). The second contrast was between two clusters of psychiatrists who showed differences in how important they rated items of the illness-related and personality factor. Interestingly, these clusters also differed in terms of socio-demographic and work-related characteristics. That is, the cluster of psychiatrists who rated the illness-related factor as less important and the personality factor as more important, contained more men, was on average older, had more years of work experience, and encountered less aggression at work. The other cluster of psychiatrists, who emphasized the illness-related factor and undervalued the personality factor, contained more women, was younger, had less years of work experience, and encountered more aggression at work. It is encouraging to note that psychiatrists in general do not consider aggression independent from the psychotic illness, and seem to adopt a medical model. At the same time, there are also subgroups of psychiatrists who have different opinions on this issue. The current data seem to suggest that these diverging views are at least in part dependent on age and working experience of the actual occurrence of aggressive incidents. The psychiatrists who were older and who had encountered less violence in their workplace believe more than others that personality also plays a role in aggression. It is tempting to speculate on these findings. Have older psychiatrists a more personality oriented model of aggression compared to the younger group? Or did they show more understanding of the situation in which aggression might have occurred and thus have prevented it? On the other hand, it might be that younger psychiatrists are taught to focus treatment primarily on the Axis I problem rather than on assaultive personality characteristics. The rationale behind this strategy seems clear: reduction of the psychotic symptoms will ultimately also reduce the aggressive behavior, which obviously is not always that case (see the recent case report by Antonius et al., 2010).

Although the current findings give more insight in the view of psychiatrists concerning the main causes of aggression in psychosis, a number of limitations of this study need to be mentioned. First, it might be that participants who completed the survey found this topic more interesting than others, reflecting a selection bias, which of course questions the generalizability of the results. A second shortcoming concerns the use of a highly structured questionnaire

that might lead the medical professional to highlight the illness-related aspects concerning aggression. Using vignettes with more naturalistic situations incorporating the different aspects of aggression might have been more appropriate to investigate the psychiatrists' views on this topic. However, none of our respondents qualified our survey as inappropriate and unrealistic. A third drawback has to do with the result of the principal components analysis that a number of questionnaire items displayed low or ambiguous loadings, but were nevertheless included in subsequent analysis. The main reason for this is that there are no clear-cut criteria for discarding items. Note also that most of these 'problematic' items loaded on factors that did not significantly differ between the clusters, which means that this essentially had no influence on the further results of this study. A final shortcoming of the study is that we neglected the handling of aggression. The consideration that illness-related features are most important suggests a medical solution, e.g., medication. However, psychiatrists might be more nuanced in their treatment, using more creative environmental solutions, thereby showing that they also take other factors (e.g., environmental and social influences) into account.

The current study yields further evidence for illness-related explanations that clinical staff tend to adhere to when explaining aggressive behavior in patients with a psychotic disorder. Other factors, such as environmental aspects are not fully neglected, but are in danger of being overlooked. Future research should focus on views, attitudes, and management strategies of all clinicians involved in the treatment of psychiatric patients and, in particular patients with a psychotic disorder, in order to provide patients with the most appropriate management strategies.

CHAPTER FOUR

Psychotic-like experiences and aggressive behavior in a non-clinical sample

This chapter has been submitted for publication as: Nederlof, A.F., Muris, P., & Hovens, J.E. Psychotic-like experiences and aggressive behavior in a non-clinical sample.

Abstract

Psychotic experiences and aggressive behavior are consistently found to be associated in clinical samples, and there is emerging evidence that this link also exists in non-clinical populations. The purpose of the present study was to investigate the occurrence of various types of psychotic-like experiences (PLEs) and their relationship with aggressive behavior, while controlling for various personality factors and confounding variables. A total of 759 students were recruited via an online message on the webpage of their school or university and filled out various questionnaires on PLEs, aggressive behavior, and personality characteristics. Results indicated that the majority of the sample showed at least some signs of PLEs, which is in line with other studies in the general population. Most importantly, a clear relationship was found between PLEs and aggressive behavior, with schizotypal traits and hallucinatory behavior emerging as the most robust correlates. These types of PLEs accounted for a significant and unique proportion in the variance of aggressive behavior, even after controlling for the influence of neuroticism, dispositional anger and anxiety, and drug use. These findings provide further evidence for the association between psychosis and aggression in non-clinical samples.

Introduction

Several studies have shown that psychotic-like experiences (PLEs), such as hallucinatory perceptions or suspicious thoughts, are not uncommon in the general population (e.g., Armando et al., 2010; Freeman, 2007; Johns et al., 2004; Ohayon, 2000; Rossler et al., 2007), although prevalence rates may vary considerably as a result of differences in the definition of the construct and measurement procedures (e.g., single-item question versus complete clinical interview). On the basis of these findings, the categorical model of PLEs, which states that psychotic symptoms are either present or absent, has been discarded. Instead, a continuum hypothesis has been formulated, which assumes that mild psychotic experiences are found in the general population, whereas severe psychotic symptoms are mainly present in psychiatric patients suffering from disorders such as schizophrenia and delusional disorder (e.g., Johns & Van Os, 2001; Van Os, Hanssen, Van Bijl, & Ravelli, 2000; Verdoux & Van Os, 2002).

Psychotic disorders in clinical populations are associated with a heightened risk of aggressive behavior (Douglas, Guy, & Hart, 2009; Fazel, Gulati, Linsell, Geddes, & Grann, 2009). In particular threat/control-override (TCO) symptoms (i.e., feelings of being threatened or losing control) seem to account for this effect (Link & Stueve, 1994; Swanson, Borum, Swartz, & Monahan, 1996). In non-clinical community populations, few studies have focused on the relationship between psychotic symptoms and aggression. One exception is an investigation by Mojtabai (2006) who distinguished various types of PLEs, such as hearing voices, visions, thought insertion, and paranoid ideation, to explore their relation with aggression. Results indicated that in particular perceptual experiences (with odds ratios between 3 and 5) and paranoid ideation (with an odds ratio of 7.29) were associated with aggressive behavior. In a similar vein, Kinoshita et al. (in press) demonstrated that in the general population most forms of PLEs were linked to violent behavior towards objects, whereas only specific feelings of persecution and hearing voices were also accompanied by violent behavior towards other people.

Although these two studies yield some insight in the relation between PLEs and aggressive behavior in the general population, it is clear that this issue needs to be further investigated. Moreover, when studying PLEs as a correlate of aggression, other relevant variables should be taken into account. For example, extraversion and neuroticism (e.g., Eysenck & Eysenck, 1970), the emotional dispositions of anxiety and anger (e.g., Posner, Russell, & Peterson, 2005), and drug use (e.g., Allen, Moeler, Rhoades, & Cherek, 1997) are also viewed as important risk factors of aggressive behavior.

The first aim of this study was to investigate the occurrence of various types of PLEs (i.e., schizotypal signs, psychoticism as a personality trait, negative and positive psychotic symptoms in general, hallucinatory behavior, and TCO symptoms) in a non-clinical student sample. Further, the relationship between these PLEs and aggressive behavior was examined, while taking a number of other potential risk factors for aggressive behavior into account. Gender and individual differences in social desirability were also included in the latter analysis, because previous research has shown that a female gender (Eagly & Steffen, 1986) and high social desirability (Saunders, 1991) are associated with lower self-ratings of aggression.

Methods

Participants

Participants were 759 college or university students (258 males, 501 females; the skewed gender distribution was caused by the participation of psychology students in which the female gender is overrepresented) with a mean age of 21.08 years (*SD* = 3.83; range 17-53 years). Most students were of original Dutch descent (89.3%); other participants had roots in the Netherlands Antilles or other Western countries. The majority (70.1%) used alcohol (mean number of glasses per week = 3.70, *SD* = 6.52), whereas 5.5% used drugs.

Instruments

Psychotic-like experiences (PLEs)

The short version of the *Schizotypal Personality Questionnaire* (SPQ; Raine, 1991, 2001) consists of 22 dichotomous (Yes/No) statements and was used to measure schizotypal traits. The measure has three subscales referring to cognitive-perceptual (8 items), interpersonal (8 items), and disorganized (6 items) experiences, which are represented by items such as '*I am an odd, unusual person*', '*I tend to keep my feelings to myself'*, and '*Some people find me a bit vague and elusive during a conversation'*. Reliability and validity of the scale were found to be satisfactory (Raine & Benishay, 1995). In this study, the total score of schizotypal traits was used (α = .82)

The *Community Assessment of Psychic Experiences* (CAPE; Van Os, Verdoux, & Hanssen, 1999) is a 42-item instrument for measuring psychotic experiences in the general population. The CAPE consists of three subscales measuring positive symptoms (20 items), negative symptoms (14 items), and depressive symptoms (8 items). Examples of items are '*Do you ever feel as if things in magazines or on TV were written especially for you?*', '*Do you ever feel that you are not much of a talker when you are conversing with other people?*',

and '*Do you ever feel sad?*'. For all items a frequency score (anchors: 1 = never and 4 = nearly always) and a distress score (anchors: 1 = not distressed and 4 = very distressed) should be given. Reliability and validity of the scales are good as was shown by Konings, Bak, Hanssen, Van Os, and Krabbendam (2006). In the present study, only the frequency scores of the positive (α = .78) and negative (α = .83) symptoms subscales were employed.

The *Threat/Control-Override Questionnaire* (TCOQ; Nederlof, Muris, & Hovens, 2011b, see Appendix A) is a 14-item self-report questionnaire consisting of two subscales in which 'delusional threat' and 'control/override symptoms' are measured with items such as '*Someone has had evil intentions against me*' and '*Other people can insert thoughts into my head*'. Items of the TCOQ have to be rated on a 4-point scale with anchors 1 = Disagree and 4 = Strongly agree. Nederlof, Muris, and Hovens (2011a) have demonstrated good internal consistency and validity for the scale in clinical as well as nonclinical samples. For this study, items were combined to a TCOQ total score (α = .86).

The modified 16-item version of the *Launay-Slade Hallucination Scale* (LSHS; Launay & Slade, 1981; modified version: Laroi & Van der Linden, 2005) is developed to measure hallucinatory experiences in the general population such as seeing visions or hearing voices. This scale consists of 16 items (e.g., '*I often hear a voice speaking my thoughts aloud*', '*Sometimes my thoughts seem as real as actual events in my life*') that have to be rated on a 5-point scale with anchors 1 = Absolutely not applicable to me and 5 = Absolutely applicable to me. Internal consistency of the scale appeared to be satisfactory (Laroi & Van der Linden, 2005), and this was also true in the present study (α = .84).

Personality characteristics

The *Eysenck Personality Questionnaire-Revised, Short Scale* (EPQ-RSS; Eysenck & Eysenck, 1991; Dutch version: Sanderman, Arrindell, Ranchor, Eysenck, & Eysenck, 1995) contains 48 dichotomous (Yes/No) items, equally distributed among the subscales neuroticism (e.g., '*Do you often experience feelings of guilt?*', α = .81), extraversion (e.g., '*Are you a talkative person?*', α = .85), psychoticism (e.g., '*Are you very sensitive for the opinion of other people?*', α = .43), and participants' tendency to give social desirable answers (e.g., '*Are all of your habits good and favorable?*'). Internal consistency and validity of this scale appeared to be satisfactory (Sanderman et al., 1995).

The trait version of the *State-Trait Anxiety Inventory* (STAI; Spielberger, Gorsuch, & Luchene, 1970; Dutch version: Van der Ploeg, Defares, & Spielberger, 1980; α = .91) is a 20-item index of dispositional anxiety. Items such as '*I feel nervous and agitated*' were rated on a 4-point scale with anchors 1 = Almost never and 4 = Almost always. Reliability of the scale appeared to be good and validity has been shown to be satisfactory (Evers, Van Vliet-Mulder, & Groot, 2000).

The short version of the *State-Trait Anger Scale* (STAS; Spielberger, 1980; Dutch version: Van der Ploeg, Defares, & Spielberger, 1982; α = .86) consists of 10 items and was used to measure anger disposition. Items such as '*I become angry when someone criticizes me in front of other people*' and '*I quickly feel irritated*' were rated on a 4-point scale with anchors 1 = Almost never and 4 = Almost always. For the scale, acceptable levels of internal consistency were found (Spielberger, Jacobs, Russell, & Crane, 1983).

Aggression
The *Aggression Questionnaire* (AQ; Buss & Perry, 1992; Dutch version: Meesters, Muris, Bosma, Schouten, & Beuving, 1996) is a self-report scale for measuring external aggressive behavior containing the subscales verbal aggression, physical aggression, anger, and hostility. The AQ consists of 29 items (e.g., '*Given enough provocation, I may hit another person*', '*I often find myself disagreeing with people*', and '*Some of my friends think I am a hothead*') that were rated on a 5-point scale with anchors 1 = Entirely disagree and 5 = Entirely agree. Reliability and validity of the Dutch version of the scale were investigated by Meesters, Muris, Bosma, Schouten, and Beuving (1996) and appeared to be good. In the present study the total aggression score of the measure was used (α = .86).

Procedure
Students were recruited via an online message on the webpage of their school or university. In this message the study was introduced as a survey on emotions, cognitions, and behaviors of people, and a link of the webpage where they could fill out the questionnaires was included. Participation was voluntary and anonymous, and could be interrupted or ended whenever desired. After completely filling out the online questionnaires, participants automatically took part in a lottery in which three participants could win 20 Euros each.

Statistical analyses
Data were analyzed using SPSS 17.0. For determining the prevalence of psychotic experiences, percentages of deviant scores from the minimum score as well as highly deviant scores (i.e., > 2 SD's above normative means) on multiple PLEs questionnaires were calculated. Further, correlations were computed to check which of the PLEs variables were associated with aggression. Finally, PLEs variables that were significantly associated with aggressive behavior were then entered in a hierarchical regression analysis to determine their unique contribution. On step 1 confounding and personality variables were entered, whereas on step 2 the PLEs were added to the regression model.

Table 1
Means (standard deviations), medians, minimum and maximum scores, and percentages of deviant scores on various PLEs scales in the present sample and available mean scores (standard deviations) obtained from manuals or validation studies.

	Present sample (N = 759)					Scores in manual/validation studies	
Variable (range)	M (SD)	Median	Min.	Max.	Deviant from lowest possible score (%)	Normals M (SD, N)	Patients M (SD, N)
SPQ-B Schizotypal traits (0-22)	5.77 (4.29)	5	0	21	91.2	9.6 (5.3, 220) [a]	8.6 (5.5, 237) [a]
EPQ-RSS Psychoticism (0-12)	2.60 (1.69)	2	0	12	90.4	3.1 (1.8, 538) [a]	-
CAPE Negative symptoms (14-56)	24.28 (5.51)	24	14	47	99.0	26.83 (4.49, 552) [b]	34.28 (7.44, 815) [b]
CAPE Positive symptoms (20-80)	27.65 (5.09)	27	20	64	98.0	23.89 (3.60, 537) [b]	33.22 (9.74, 805) [b]
TCOQ Threat/control-override symptoms (14-56)	15.79 (3.81)	14	14	54	41.4	-	27.56 (10.54, 111) [c]
LSHS Hallucinations (16-80)	29.79 (9.89)	28	16	76	95.8	26.7 (9.96, 265)	-

Note. SPQ-B = Schizotypal Personality Questionnaire-Brief, EPQ-RSS = Eysenck personality Questionnaire-Revised Short Scale, CAPE = Community Assessment of Psychic Experiences, TCOQ = Threat/Control-Override Questionnaire, LSHS = Launay Slade Hallucinations Scale. [a] See assessment manual, [b] Scores obtained by personal communication with authors of Konings et al. (2006) and Hanssen et al. (2003), [c] See Nederlof et al. (2011b), [d] See Laroi, Marczewski, and Van der Linden (2004).

Results

Prevalence of PLEs

The occurrence of PLEs in the current sample was first determined by computing percentages of participants who scored above the lowest possible score on each of the PLEs scales. Further, mean scores as obtained in previous non-clinical and clinical studies were reported for qualitative comparisons (see Table 1). As can be seen, on almost all scales over 90% of the sample scored higher than the lowest possible score for each particular scale. This indicates that the vast majority of the participants at least showed some signs of PLEs. The only exception was the TCOQ on which 41.4% of the participants positively endorsed at least one of the items. Further, a comparison with available scores of other non-clinical populations revealed that the present sample generally scored within the normative range on various PLEs scales, and substantially lower than clinical populations. Finally, 11.4% of the total sample showed a highly deviant score (i.e., two *SD*'s above the normative mean score) on only one of the PLEs scales, 2.6% displayed deviant scores on at least two scales, and 1.8% exhibited these deviating scores on three or more scales.

Most correlations among the PLEs scales were positive and significant (see Table 2), indicating that people who experienced one type of PLEs were generally also more likely to report these experiences in other forms. The most substantial correlations were found between positive and negative psychotic symptoms on the one hand, and schizoptypal traits on the other hand (*r*'s being .57 and .59, respectively), whereas the weakest correlations emerged between EPQ psychoticism and other PLEs scales (*r*'s between .04 and .14).

PLEs and aggression

The mean score of the sample on the AQ was 61.74 (*SD* = 15.29), which represents a low to moderate level of aggression. A correlational analysis showed that all PLEs scales were positively related to AQ scores (*r*'s between .23 and .47, *p*'s < .01; Table 2), indicating that various types of psychotic experiences were associated with higher levels of aggression. Note in passing that the personality trait of neuroticism ($r = .44$, $p < .01$), dispositional anger and anxiety (*r*'s respectively .67 and .41, *p*'s < .01), and drug use ($r = .18$, $p < .01$) were also positively linked to AQ scores, whereas (female) gender ($r = -10$, $p < .05$) and social desirability ($r = -.35$, $p < .01$) were negatively associated with self-reported aggression.

To examine the unique contribution of PLEs to aggression, a regression analysis was carried out in which gender, personality characteristics, social desirability, and drug use were entered on Step 1 as control variables. The Variance Inflation Factor (VIF) was 2.67 and Tolerance statistic (TOL) varied between .37 and .95, indicating that there were no problems with multicollinearity (for criteria, see Field, 2009).

Table 2
Correlations among scales for measuring aggression, personality characteristics, demographic risk factors, and various types of PLEs.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. AQ Aggression	-													
2. STAS Trait anger	.67*	-												
3. STAI Trait anxiety	.41*	.40*	-											
4. EPQ-RSS Neuroticism	.44*	.45*	.74*	-										
5. EPQ-RSS Extraversion	-.04	-.00	-.28*	-.22*	-									
6. EPQ-RSS Social Desirability	-.35*	-.25*	-.12*	-.15*	-.13*	-								
7. Gender (1=Men, 2=Women)	-.10*	.02	.21	.27*	-.02	.16*	-							
8. Alcohol use (1=No, 2=Yes)	-.03	-.01	-.15*	-.15*	.26*	-.19*	-.12*	-						
9. Drug use (1=No, 2=Yes)	.18*	-.09	-.03	.02	-.09	-.19*	-.12*	.12*	-					
10. SPQ Schizotypal traits	.47*	.29*	.45*	.48*	-.43*	-.14*	-.02	-.16*	.04	-				
11. EPQ-RSS Psychoticism	.23*	.17*	-.02	-.08	.01	-.13*	-.30*	-.06	.14*	.18*	-			
12. CAPE Negative symptoms	.40*	.33*	.56*	.49*	-.41*	-.20*	.07	-.11*	.00	.59*	.04	-		
13. CAPE Positive symptoms	.43*	.34*	.34*	.34*	-.05	-.16*	.05	-.09*	.06	.57*	.14*	.47*	-	
14. TCOQ TCO symptoms	.27*	.23*	.18*	.21*	-.07	-.06	-.04	-.11*	-.02	.37*	.14*	.23*	.49*	-
15. LSHS Hallucinations	.44*	.28*	.33*	.34*	-.03	-.17*	.11*	-.01	.10*	.50*	.11*	.38*	.56*	.35*

Note. AQ = Aggression Questionnaire, STAS = Spielberger Trait Anger Scale, STAI = State-Trait Anxiety Inventory, EPQ-RSS = Eysenck Personality Questionnaire - Revised Short Scale, SPQ = Schizotypal Personality Questionnaire, CAPE = Community Assessment of Psychic Experiences, TCOQ = Threat/Control-Override Questionnaire, LSHS = Launay Slade Hallucinations Scale. *N*'s vary between 712 and 759 due to missing values. * $p < .01$.

Table 3
Hierarchical regression analysis with Aggression Questionnaire (AQ) scores as the dependent variable (N = 690).

	B	SE B	β
Step 1			
Constant term	28.96	3.52	
Gender	-4.83	.90	-.15**
EPQ-RSS Social desirability	-.85	.17	-.14**
EPQ-RSS Neuroticism	.73	.20	.15**
STAI Trait anxiety	.20	.07	.12*
STAS Trait anger	1.66	.10	.50**
Drug use (No/Yes)	6.94	1.77	.11**
Step 2			
Constant term	22.75	3.96	
SPQ Schizotypal traits	.66	.13	.18**
EPQ-RSS Psychoticism	.56	.24	.06
CAPE Negative symptoms	-.02	.09	-.01
CAPE Positive symptoms	.12	.10	.04
TCOQ Threat/control-override	-.00	.12	.00
LSHS Hallucinatory behavior	.20	.05	.13**

Note. EPQ-RSS = Eysenck Personality Questionnaire - Revised Short Scale, STAI = State-Trait Anxiety Inventory, STAS = Spielberger Trait Anger Scale, SPQ = Schizotypal Personality Questionnaire, CAPE = Community Assessment of Psychic Experiences, TCOQ = Threat/Control-Override Questionnaire, LSHS = Launay Slade Hallucinations Scale. B = Unstandardized coefficient, SE = Standard Error, β = Standardized coefficient. R^2 = .53 for Step 1 (p < .001); ΔR^2 = .07 for Step 2 (p < .001). * p < .01, ** p < .001.

The main results of this analysis are shown in Table 3. As can be seen, the variables that were entered on Step 1, explained 53% of the variance of aggression [$F(6,683) = 128.57$, $p < .001$]. In this model, each of the variables appeared to make a significant contribution, indicating that a male gender, low social desirability, and drug use are associated with higher levels of aggression. Further, higher levels of neuroticism, trait anxiety, and dispositional anger were also linked with increased levels of aggressive behavior. The PLEs variables that were entered into the equation on Step 2 were found to explain an additional 7.4% of the variance in aggressive behavior [$F_{change}(6,677) = 20.98$, $p < .001$]. Of these PLEs variables, only schizotypal traits and hallucinatory behavior appeared to make unique, significant contributions (β's being .18 and .13, respectively).

Discussion

Psychosis and aggressive behavior are often associated (Douglas et al., 2009; Fazel et al., 2009b). However, this relationship has mainly been demonstrated in participants who display clinically significant psychotic symptoms. As it remains

largely unclear whether this link can also be found in the general population, the purpose of the current study was to investigate the prevalence of psychotic-like experiences (PLEs) as well as their relationship with aggressive behavior in a non-clinical student sample. Various types of PLEs were investigated (i.e., schizotypal signs, negative and positive psychotic-like symptoms in general, hallucinatory behavior, and threat/control-override symptoms), while the role of personality characteristics (i.e., neuroticism, extraversion, dispositional anxiety and anger) and drug use was also taken into account.

The first conclusion is that PLEs certainly occurred in this non-clinical population. That is, the vast majority of the students showed at least some signs of PLEs (i.e., scored above the lowest possible score on various PLEs measures). The scores as obtained in the present sample were largely comparable to those documented in other non-clinical populations (e.g., Konings et al., 2006; Laroi et al., 2004), but considerably lower than those reported for clinical samples (e.g., Hanssen et al., 2003; Nederlof et al., 2011b). These findings are well in line with earlier research (e.g., Armando et al., 2010) and yield further support for the continuum hypothesis which states that psychotic-like experiences also occur in non-clinical populations (Van Os et al., 2000). Some indications were found showing that threat/control-override symptoms were less prevalent in the current sample, which seems to point out that this type of experiences is more indicative for clinical psychotic experiences.

Further, it can be concluded that there was a clear relationship between PLEs and aggressive behavior. More precisely, the correlational analysis revealed clear links between scores on various PLEs scales and the AQ as an index of self-reported aggression. In addition, regression analysis indicated that a substantial proportion of the variance of aggressive behavior was explained by PLEs, even when controlling for the influence of personality factors and confounding variables. Note that schizotypal traits and hallucinatory behavior emerged as the most robust correlates of self-reported aggression in this student sample. These results are in keeping with those from research in clinical (e.g., Lindqvist & Allebeck, 1990; Wallace et al., 2004) as well as non-clinical samples (Kinoshita et al., in press; Mojtabai, 2006), and yield support for the notion that PLEs, even in mild forms as was the case in the present student population, are closely linked to aggressive behavior.

As an aside, it should be noted that relations between personality characteristics, demographic variables, and aggressive behavior also showed the expected pattern of results. First, neuroticism was significantly related to aggressive behavior (see Bettencourt, Talley, Benjamin, & Valentine, 2006). Second, dispositional anger and anxiety were also found to be significant correlates of aggression. Whereas the former link has been frequently documented (e.g., Berkowitz, 1988, 1990), the finding of anxiety as a correlate of aggression seems

less plausible. However, it may well be that anxious people are more inclined to display aggressive behavior, possibly as a defensive response. Third, gender was also significantly related to aggression, with data indicating that males reported higher levels of aggression than females. It has been suggested that aggressive behavior manifests itself differently in both genders (DiGiuseppe & Tafrate, 2010), and thus may also show differential links to PLEs. An additional analysis, however, showed that this was not really the case in the present study. That is, in both males and females, schizotypal traits and hallucinatory behavior emerged as the main predictors of AQ scores in the regression analysis. Fourth and finally, drug use also emerged as a significant predictor of aggressive behavior, which is of course in keeping with the notion that substance use has disinhibitory effects (e.g., Allen et al., 1997).

It should be acknowledged that the present study suffers from a number of limitations. First, the current study solely relied on self-report questionnaires, which is a method susceptible to reporter bias. Although we corrected for socially desirable response tendencies, it remains unknown to what extent the results are confounded by this factor. A second and related shortcoming is that the design of this study was cross-sectional in nature, which implies that it is not possible to interpret the association between PLEs and aggression in terms of a cause-effect relationship. Thus, although it may well be that PLEs lead to aggressive behavior, the possibility cannot be ruled out that aggression enhances the proneness to PLEs. Prospective research could provide more insight into the direction of this association in non-clinical as well as clinical samples. A third limitation concerns the representativeness of the sample. Our sample mainly consisted of female students and as such, it remains unclear whether our conclusions hold for the general non-clinical population. It also needs to be noted that the precise link between psychotic-like experiences and psychotic disorders remains unclear. A relatively large proportion of the general population reports psychotic-like experiences, but only a small part actually develops a psychotic disorder. Therefore, one should be cautious to generalize these findings to clinical psychosis. A final limitation that needs to be mentioned pertains to the fact that a number of other relevant risk factors for aggressive behavior, such as impulsivity, mood instability, traumatic experiences, and/or behavioral problems during childhood (Monahan & Steadman, 1994), were not assessed in this study. Besides, it was not checked whether psychotic-like experiences occurred as a product of an affective mood state (e.g., depressive or bipolar disorder). In spite of these shortcomings, the findings in the present study provide further evidence for the association between psychotic-like experiences and aggressive behavior in non-clinical samples.

CHAPTER FIVE

Anger, anxiety, and feelings of delusional threat as predictors of aggressive behavior: An experimental mood induction study in a non-clinical sample

This chapter has been submitted for publication as: Nederlof, A.F., Muris, P., & Hovens, J.E. Anger, anxiety, and feelings of delusional threat as predictors of aggressive behavior: An experimental mood induction study in a non-clinical sample.

Abstract

In the present study the influence of angry and anxious emotional states and various types of psychotic-like experiences on state aggressive behavior was examined in a non-clinical student sample. Participants were asked to fill out several questionnaires on psychotic-like experiences, emotions, and behaviors. Then, a combined mood induction procedure with guided imagery and mood congruent music was started to bring participants into an anxious, angry, or neutral mood. After the mood induction, an aggression word-stem completion task was presented. Results indicated that feelings of persecution were significantly linked to aggression, whereas positive symptoms in general, hallucinatory behavior, and social reference ideas were not. Further, it was found that persons with an angry or anxious mood state also displayed a more aggressive attitude than persons who were in a neutral mood. These findings yield evidence for the role of persecutory thoughts, anger, and anxiety in triggering aggression in non-clinical populations.

Introduction

In psychiatric clinics, patients with a psychotic disorder (e.g., schizophrenia) have been observed to act more often aggressively than patients with other disorders (Douglas, Guy, & Hart, 2009; Fazel, Gulati, Linsell, Geddes, & Grann, 2009). It has been hypothesized that psychotic symptoms, such as delusional thoughts or hallucinatory behaviors, induce or intensify the aggressive behavior of these patients (McNiel, Eisner, & Binder, 2000; Swanson et al., 2006). Specifically, so-called threat/control-override (TCO) symptoms are considered as an important antecedent of aggression in psychotic patients (Link & Stueve, 1996), with the threat component being viewed as the most important trigger of aggressive behavior (Nederlof, Hovens, & Muris, 2011b; Stompe, Ortwein-Swoboda, & Schanda, 2004). Recently, two studies examined the relationship between psychotic-like experiences and aggression in non-clinical populations and obtained evidence for a similar link between such experiences and aggression. In the first study by Kinoshita et al. (in press), it was found that in particular the psychotic-like experiences types of 'being spied upon' and 'hearing voices' are related to aggression, even after controlling for other factors such as substance use and victimization. Another investigation by Mojtabai (2006) obtained similar results, with perceptual experiences and paranoid ideation being most consistently associated with aggression. Further, this research also showed that higher levels of non-specific psychological distress are linked to aggressive acts such as attacking other people.

Although there is some evidence that in particular emotional distress is associated with aggression (e.g., Blair, 2001; Tschann, Flores, Pasch, & VanOss Marin, 2005), it remains unclear which facet of this negative emotional reaction is specifically involved in this relationship. It seems plausible to assume that feelings of anger are an important trigger of aggressive behavior (e.g., Berkowitz, 1990), although the precise link between anger and aggression has been rarely investigated (DiGiuseppe & Tafrate, 2010). Meanwhile, there may be other negative emotional states that fuel aggressive behavior. A good example is anxiety, which is most often linked with flight behavior, but sometimes also appears to be associated with fight behavior (Cannon, 1915). Again only a few studies can be found that have examined the relationship between anxiety and aggression (e.g., Kashani, Deuser, & Reid, 1990). Posner, Russell, and Peterson (2005) have proposed that emotions can be understood along two dimensions: a pleasure-displeasure dimension and an activation-deactivation dimension. According to their theory, anger and anxiety can both be described as unpleasant, negative emotions with an activating effect on behavior. Thus, both emotions seem to reflect a similar process as they may both induce aggressive-like responses as a defensive strategy to eliminate the presumed perpetrator.

However, the link between angry or anxious feelings and aggressive behavior has never been experimentally investigated or manipulated, and thus the causal relationship between these constructs remains unclear.

The aim of the present research was to examine the influence of the emotional states of anger and anxiety on state aggressive behavior in a non-clinical student sample in an experimental mood induction study. In addition, the influence of psychotic-like experiences (i.e., positive psychotic symptoms in general, hallucinatory behavior, social reference ideas, and persecutory thoughts) on aggressive behavior was investigated. Further, the confounding influences of gender and social desirability were taken into account. As we were interested in state emotions and behaviors (i.e., anger, anxiety, and aggression), it seemed also logical to control for dispositional forms of anger and anxiety, and trait aggression.

Method

Participants

Participants were 120 university students (90 women and 30 men) who had a mean age of 20.29 years (*SD* = 2.60, range 18-36 years). Students were recruited via a message on the online channel of the university. Most students were from original Dutch descent (95%); other participants had roots in countries such as Greece, Poland, Suriname, and Malaysia. Participation was voluntary and anonymous.

Instruments

Questionnaires

The *Aggression Questionnaire* (AQ; Buss & Perry, 1992; Dutch version: Meesters, Muris, Bosma, Schouten, & Beuving, 1996) is a self-report scale for measuring aggressive behavior (verbal, physical, anger, and hostility). The AQ consists of 29 items that have to be rated on a 5-point scale with anchors 1 = Entirely disagree and 5 = Entirely agree. In this study the total score of the measure was used (α = .83).

The *Provocation Inventory* (PI; Novaco, 2003; Dutch version: Hornsveld, Muris, & Kraaimaat, in press) consists of 25 items that describe situations in which feelings of anger are induced. Participants have to rate for each situation how angry they will become, with anchors 1 = Not angry at all and 4 = Very angry. In the present study, good reliability of the scale was demonstrated (α = .89).

The trait version of the *State-Trait Anxiety Inventory* (STAI; Spielberger, Gorsuch, & Luchene, 1970; Dutch version: Van der Ploeg, Defares, & Spielberger,

1980) is a 20-item measure of dispositional anxiety. Items were rated on a 4-point scale with anchors 1 = Almost never and 4 = Almost always, and reliability of the scale was found to be good (α = .89)

The *Community Assessment of Psychic Experiences* (CAPE; Van Os, Verdoux, & Hanssen, 1999) is a 42-item instrument for measuring psychotic experiences (i.e., positive symptoms, negative symptoms, and depressive symptoms) in the general population. For all items a frequency score (anchors 1 = never and 4 = nearly always) as well as a distress score (anchors 1 = not distressed and 4 = very distressed) should be given. In this study, only the frequency score of the positive symptoms subscale was used (α = .73).

The *Green Paranoid Thoughts Scales* (GPTS; Green et al., 2008; Dutch translation by Van der Gaag & Ferwerda, 2008) is a 32-item self-report instrument that intends to assess paranoid thoughts. The GTPS consists of two subscales, one measuring ideas of social reference (α = .86) and another focusing on persecutory thoughts (α = .87). Participants have to rate each item on a 5-point scale on 'how often that thought was present in the last month', with anchors 1 = Never and 4 = Very often.

The 16-item version of the *Launay-Slade Hallucination Scale* (LSHS; Launay & Slade, 1981; modified version by Laroi & Van der Linden, 2005) has been developed to measure hallucinatory experiences in the general population. This measure consists of 16 items rated on a 5-point scale with anchors 1 = Not applicable to me at all and 5 = Very much applicable to me. Reliability of the scale in the present study was satisfactory with an alpha of .77.

The *Marlowe-Crowne Social Desirability Scale* (MCSDS; Crowne & Marlowe, 1964; Dutch version: Hermans, 1967) is a 33-item index of participants' tendency to give socially desirable answers. Items have to be rated on a dichotomous scale ('Agree' or 'Not agree'). A higher score represents a higher level of social desirability. Reliability of the scale was satisfactory (α = .73).

Mood induction

To induce an angry or anxious mood in the participants, a combined mood induction procedure of guided imagery and mood-congruent music was employed, following the method as described by Mayer, Allen, and Beauregard (1995). This combination of guided imagery and music is supposed to be more specific and effective in inducing the appropriate mood (e.g., Mayer, Gayle, Meehan, & Haarman, 1990). Mayer et al. (1995) developed this mood induction procedure for four specific moods (i.e., anger, anxiety, sadness, and happiness). However, in this study only the anger and anxiety inductions were used. A neutral condition was also added as a reference condition (for vignettes and music see Table 1). Participants were randomly assigned to one of the three conditions.

Table 1
Examples of music and vignettes for each emotional state to be induced.

Emotional state	Music	Vignettes
Anger	Mussorgsky – 'Night on bald mountain'	'Someone files a false legal claim against you', 'A friend of yours was sexually assaulted by a convicted rapist just released on parole'
Anxiety	Herrmann – 'Psycho'	'You are driving down an unfamiliar road on a stormy night when your car skids out of control', 'You are having a nightmare about someone chasing you and you fall into a bottomless pit. You start to scream in your sleep'
Neutral	Chopin – 'Waltz 12'	'It is late at night, you are tired. You take a long shower, wash yourself, and watch some television', 'You go for a walk and met someone you know. You talk about the weather and your plans for the weekend'
Happy (debriefing condition)	Delibes – 'Coppelia' (Mazurka)	'It's your birthday and friends throw you a terrific surprise party', 'You buy a lottery ticket and you win $100 instantly'

The mood induction task was designed with 'E-Prime, version 2.0' software (Psychology Software Tools, Inc.) and presented on a computer. Verbal as well as written information about the task was provided to the participants before the experiment proper. Note, however, that participants were blind to the condition they were assigned to, which is in contrast with most previous studies which informed participants on forehand about the mood manipulation they would undergo (e.g., Marzillier & Davey, 2005; Mayer, Muris, Busser, & Bergamin, 2009). When the procedure started, music was played for about 60 seconds. Then, eight different vignettes were presented at 45 seconds intervals. To check the change in emotional mood state levels, participants completed Visual Analog Scales (VASs) prior to (baseline) and after the mood induction. For all conditions, there was a separate line for anger, anxiety, and happiness, ranging from 0 (not at all) to 100 (extremely).

Aggression word-stem completion task

A word-stem completion task was used to measure participants' level of state aggression. This task consisted of word-stems that could be completed in either an aggressive or non-aggressive way (e.g., 'ANG…' can be completed as ANGER or ANGEL, and DEA… can be completed as DEATH or DEAR; see Appendix C for all word-stems). To develop this task, about 45 aggressive words were selected by a senior psychiatrist and a psychologist, mainly based on the word-stem completion task as developed by Anderson, Carnagey, and Eubanks (2003)

and the Affective Norms for English Words database (ANEW; Bradley & Lang, 1999). Selected words were checked on their Dutch celex frequency (Max Planck Institute for Psycholinguistics, 2001) and words with a celex frequency lower than 5 or higher than 260 were excluded. The word-stems were presented to the participants in a random order, introduced by the following text 'Several word-stems will now be presented to you, one by one. Please complete these stems by typing the whole word that comes up in mind first'. After this instruction, an example followed for illustration. The word-stem task was also conducted on the computer and run by means of E-Prime software. Scoring of the completed word-stems, i.e., judgment whether the completions represented aggressive or non-aggressive words, was conducted by three independent raters. The inter-rater reliability *r*'s were between .95 and .98, *p*'s < .001; ICC = .96 (CI between .93 and .97). The number of aggressive completions was supposed to reflect the aggressive attitude of the participant at that moment. That is, the more aggressive completions, the higher the level of state aggression. Inconsistencies or disagreements in ratings were discussed and resolved by consensus.

Procedure

Participants were asked to fill out the questionnaires, which were offered to them in a random order. Then, the mood induction procedure started, followed by the aggression word-stem completion task, both briefly introduced by the researcher. Participants received course credits for participation and afterwards, a brief explanation about the aim of the study was given. As a part of the debriefing procedure, a happy mood induction was offered in case participants felt uncomfortable as a result of the negative (i.e., anger or anxiety) mood induction. However, none of the participants made use of this additional happy mood induction.

Statistical analyses

Data were analyzed using SPSS 17.0. First, a manipulation check was conducted by means of paired sample *t*-tests on the pre- and post scores on the visual analogue scales for each of the mood conditions. Then correlations were calculated between self-report indexes of psychotic-like experiences and the score on the aggression word-stem task. The variables that correlated significantly were selected and used as covariates in the analysis of variance (ANCOVA) with the word-stem completion task score as the dependent variable and the mood induction condition as the independent variable. Confounding variables such as trait aggression, anxiety, and anger, as well as social desirability were also added as covariates.

Results

Mood induction manipulation check

To investigate whether the induction was successful, a 3 Groups (Anger vs. Anxiety vs. Neutral) x 3 Mood VASs (Anger vs. Anxiety vs. Happiness) x 2 Time (Pre vs. Post induction) ANOVA with repeated measures on the last two factors was carried out. As can be seen in Table 2, a differential pattern for each group in the mean scores on various mood ratings over time was found, which was confirmed by a significant three-way interaction of Groups x Mood VASs x Time [$F_{Greenhouse\text{-}Geisser}$ (3.30,193.09) = 5.89, $p < .001$]. One-way analyses of variance showed that all three mood induction groups scored equally high on anger [$F(2,117) = 2.59$, $p = .08$], anxiety [$F(2,117) = 1.41$, $p = .25$], and happiness [$F(2,117) = 1.28$, $p = .28$] prior to the mood induction. However, after the induction, significant group differences were found in levels of anger [$F(2,117) = 5.92$, $p < .01$], anxiety [$F(2,117) = 6.82$, $p < .01$], and happiness [$F(2,117) = 5.55$, $p < .01$]. Post-hoc comparisons revealed the expected results. That is, the anger group experienced higher levels of anger than the other two groups (t's > 2.64, p's < .05), while the anxiety group showed higher levels of anxiety than the other groups (t's > 3.01, p's < .01). Paired sample t-tests were conducted comparing the pre- and post-emotional state scores within each condition. Results indicated significant increases of the induced emotion in the anger as well as the anxiety groups (t's being -5.68 and -4.89 respectively, p's < .001), whereas the levels of happiness significantly decreased in these groups (t's being 5.27 and 4.72 respectively, p's < .001). In the neutral condition none of the emotions (i.e., anger, anxiety, and happiness) significantly changed during the experiment (t's < .56, p's > .58).

Table 2

Mean scores (standard deviations) for the three experimental groups before and after the mood induction on the Visual Analogue Scales for the emotions of anger, anxiety, and happiness.

Mood state	Time	Anger (N = 40)	Anxiety (N = 40)	Neutral (N = 40)
Anger	Pre	3.70 (6.64) $_{a}$	6.23 (10.29) $_{a}$	9.18 (14.05) $_{a}$
	Post	23.85 (23.48) $_{b}$	11.75 (17.10) $_{c}$	9.45 (19.22) $_{a\,c}$
Anxiety	Pre	6.83 (10.11) $_{a}$	11.50 (16.73) $_{a}$	11.53 (15.32) $_{a}$
	Post	10.73 (15.32) $_{b}$	23.98 (22.56) $_{c}$	10.18 (18.17) $_{a\,b}$
Happiness	Pre	63.48 (13.09) $_{a}$	58.23 (15.93) $_{a}$	60.33 (15.24) $_{a}$
	Post	49.10 (20.93) $_{b}$	44.78 (23.84) $_{b}$	60.43 (20.18) $_{a}$

Note. For each mood state, means not sharing similar subscripts within row and column differ at $p < .05$.

Psychotic-like experiences as correlates of state aggression

Pearson correlation coefficients were computed among psychotic-like experiences measures and state aggression as indexed by the word-stem completion task. Of the psychotic-like experiences scales, only the GPTS subscale measuring persecutory thoughts was associated with the aggression score of the word-stem completion task (r = .21, p < .05). This indicates that feelings of persecution are associated with higher levels of state aggression. Other psychotic-like experiences scores (i.e., positive symptoms, social reference ideas, and hallucinations) were not associated with state aggression (r's between -.03 and .13, all p's > .10).

Psychotic-like experiences and induced mood as predictors of state aggression

The mean number of aggressive word-stem completions in the total sample was 16.63 (SD = 5.49). The highest aggression score was found in the anger condition (M = 18.93, SD = 6.25), followed by the anxiety condition (M = 17.05, SD = 4.34) and the neutral condition (M = 13.93, SD = 4.59) (see Figure 1).

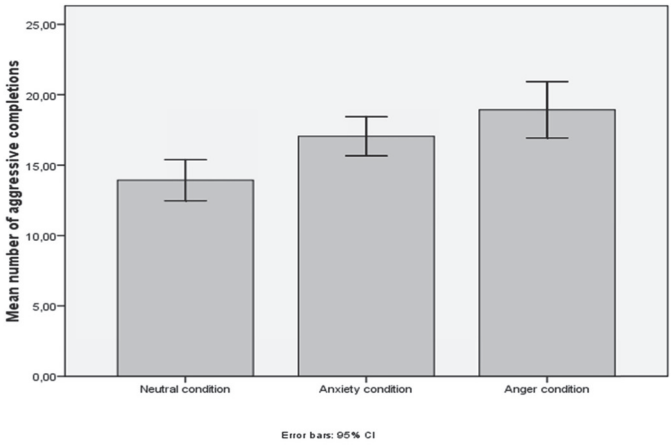


Figure 1. Mean number of aggressive word-stem completions on the word-stem task (with error bars) in the neutral (N = 40), anxiety (N = 40), and anger (N = 40) mood induction conditions.

An analysis of covariance (ANCOVA) was conducted to examine the effects of induced mood and feelings of persecution on state aggression scores while also controlling for a number of confounding variables (i.e., trait aggression, anger, and anxiety, gender, and social desirability). As can be seen in Table 3, results

yielded a significant effect for the total model [$F(8,111) = 3.19$, $p < .01$, partial eta^2 = .19]. Significant main effects on state aggression were for the mood induction condition [$F(2,111) = 7.86$, $p = .001$, partial eta^2 = .12] and GPTS persecutory thoughts [$F(1,111) = 4.51$, $p < .01$, partial eta^2 = .04]. None of the presumed confounding variables had a significant effect on the aggressive word-stem completion test score. Additional contrast analyses revealed significant differences between the neutral and anger condition ($p < .001$) as well as between the neutral and anxiety condition ($p < .05$). No significant difference was found between the anger and anxiety condition ($p > .10$).

Table 3
Main effects for the mood induction condition, GPTS B scores, and confounding variables on aggressive word-stem completions ($N = 120$).

	Sum of Squares (SS)	Mean Square (MS)	*F* value	Partial eta^2
Total Model	671.26	83.91	3.19**	.19
Gender	20.77	20.77	.79	.00
MCSDS social desirability	16.39	16.39	.62	.01
AQ Trait aggression	3.50	3.50	.13	.01
PI Trait anger	2.88	2.88	.11	.00
STAI Trait anxiety	1.39	1.39	.05	.00
GPTS B persecutory thoughts	118.54	118.54	4.51*	.04
Conditions (i.e., neutral, anger, anxiety)	413.52	206.76	7.86**	.12

Note. MCSDS = Marlowe-Crowne Social Desirability Scale, AQ = Aggression Questionnaire, PI = Provocation Inventory, STAI = Spielberger Trait Anxiety Inventory, GPTS B = Green Persecutory Thoughts Scale, part B. * $p < .05$, ** $p < .01$.

Discussion

Psychosis and psychotic-like experiences are consistently associated with aggressive behavior (e.g., Douglas et al., 2009; Mojtabai, 2006). Further, it can be assumed that emotional distress, and in particular feelings of anger and anxiety, might trigger aggression as a form of defensive strategy. In the present study the influence of angry and anxious emotional states and various types of psychotic-like experiences on aggressive behavior was examined in a non-clinical student sample by means of an experimental between-subjects design. Relevant confounding variables such as gender, social desirability, and trait anger, anxiety, and aggression were also taken into account.

First, the relation between psychotic-like experiences and aggressive behavior was explored. It was found that only feelings of persecution were significantly linked to aggression, whereas positive symptoms in general, hallucinatory behavior, and social reference ideas were not. The association between persecutory thoughts and aggressive behavior is relatively new in healthy populations, but in line with the findings from clinical studies. That is, threat-control/override (TCO) symptoms (Link & Stueve, 1994) are often found to be associated with aggressive behavior (e.g., Link, Phelan, & Stueve, 1998; Swanson, Borum, Swartz, & Monahan, 1996) and bear strong resemblance to persecutory experiences which can be perceived as threatening (e.g., Nederlof et al., 2011b; Stompe et al., 2004).

When looking at the role of negative emotional feelings in the formation of aggression, it was found that persons who were brought into an angry or anxious mood state also displayed a more aggressive attitude than persons who were in a neutral mood. The strongest effect was observed for anger, which is well in line with the original idea that feelings of pure anger will undoubtedly lead to aggressive behavior (Berkowitz, 1990). A smaller but also note worthy effect on triggering aggressive behavior was obtained for feelings of anxiety, which supports the fight part of the fight-flight hypothesis, thereby providing evidence for the old notion of Cannon (1915). This finding is relatively new, and breaks with the assumption that feeling anxious always co-occurs with avoidance behavior. Although it makes sense to run away or escape from frightening situations, the current results show that a defensive aggressive response may sometimes also be appropriate. Further, the finding that both anger and anxiety may function as triggers for aggression, also yields support for the theory as formulated by Posner et al. (2005) in which these emotions both are supposed to have an activating effect on human behavior.

Although the current study yields several interesting findings which are relatively new, there are also a number of limitations to mention. First, the use of Visual Analog Scales for checking the successfulness of the mood manipulation remains subjective. Although the participants were not told in which emotional state they would be brought it might be fair to acknowledge the transparency of the vignettes. On the other hand, we corrected for social desirability in the main analysis, which rules out the influence of social desirable answers. Another shortcoming that should be mentioned is the general negativity-effect that both induced emotions (i.e., anger and anxiety) might have. As anxiety and anger are both negative emotions, it may well be that the aggressive responses during the task were just a product of this general negative mood state rather than of anxiety or anger specifically. In spite of these shortcomings, the findings in this study provide evidence for the link between persecutory thoughts, anger, and anxiety on the one hand, and aggressive behavior on the other hand in a non-

clinical sample. These findings should also initiate future research on the nature of aggressive behavior and its relation with psychotic experiences in clinical and non-clinical populations.

CHAPTER SIX

Threat/control-override symptoms and emotional reactions to positive symptoms as correlates of aggressive behavior in psychotic patients

This chapter has been published as: Nederlof, A.F., Muris, P., & Hovens, J.E. (2011). Threat/control-override symptoms and emotional reactions to positive symptoms as correlates of aggressive behavior in psychotic patients. *Journal of Nervous and Mental Disease, 199,* 342-347.

Abstract

This cross-sectional multicenter study was carried out to examine whether the experience of threat/control-override symptoms and emotional reactions to positive symptoms (e.g., anger, anxiety) are related to aggressive behavior. Patients diagnosed with schizophrenia, delusional disorder, psychotic disorder not otherwise specified, or a schizoaffective disorder (N = 124) were interviewed and filled out self-report questionnaires. Results indicated that in particular threat/control-override symptoms were significantly related to aggressive behavior in psychotic patients. Further analysis revealed that especially the threat symptoms, but not the control-override symptoms, carried this effect. Anger disposition also accounted for a significant and unique proportion of the variance in the aggressive behavior of psychotic patients, whereas state anger and anxiety in reaction to positive symptoms did not. These results seem to suggest that feeling threatened by positive psychotic symptoms and anger disposition play a role in the origins of aggressive behavior of psychotic patients.

Introduction

Over 60% of the general population believes that psychotic patients are dangerous and violent, which reflects the dangerousness stereotype held for this patient group (Link, Phelan, Bresnahan, Stueve, & Pescosolido, 1999). Indeed, this commonly held belief is supported by epidemiological research which has shown that there seems to be a positive association between the occurrence of mental health problems and aggression, and that this is especially true for psychotic disorders. Recent meta-analytic studies further underline that psychosis should be regarded as a risk factor for violent behavior. For example, Douglas, Guy, & Hart (2009) analyzed a total of 204 studies on the relation between psychopathology and aggressive behavior, and noted that psychosis was the most important predictor variable of violent behavior. Similar results were obtained in another meta-analysis performed by Fazel, Gulati, Linsell, Geddes, & Grann (2009), who focused on studies examining the direct relation between schizophrenia and violence. Twenty studies were included and again the results indicated that people with schizophrenia or other psychotic disorders are at increased risk for displaying violent behavior. The high prevalence of violent behavior in psychotic patients is thus well supported by empirical research. However, fairly little is known about the specific risk factors and intra-individual determinants that might contribute to the heightened risk for violent behavior in this patient group.

As violent behavior frequently occurs during an acute psychotic decompensation episode, it has been proposed that specific psychotic symptoms may trigger aggressive behavior in this patient population. Although there is some evidence indicating that the negative symptoms are also important when explaining aggressive behavior in psychotic patients, most studies have demonstrated that mainly positive symptoms are relevant in this context (e.g., Hodgins, 2008). For instance, in a sample of patients with schizophrenia, Swanson et al. (2006) have found that positive psychotic symptoms such as suspiciousness, hallucinations, and feelings of grandiosity increase the risk of minor as well as serious violent acts (for similar results see Nolan et al., 2005). Meanwhile, more than 15 years ago Link and Stueve (1994) have argued that not positive symptoms per se, but rather the patient's feeling that he/she is threatened by or losing control to an external force should be considered as the main cause of aggressive behavior in psychotic patients. Their study demonstrated that these specific threat/control-override (TCO) symptoms are more important than positive symptoms such as hallucinations or delusions in general. Research has yielded some support for this hypothesis (e.g., Link, Stueve, & Phelan, 1998; Stompe, Ortwein-Swoboda, & Schanda, 2004; Swanson, Borum, Swartz, & Monahan, 1996), although it should also be noted that various

studies could not demonstrate the link between TCO symptoms and aggressive behavior in psychotic patients (e.g., Applebaum, Robbins, & Monahan, 2000; Skeem et al., 2006). Thus, it remains unclear to what extent TCO symptoms make a significant contribution to violent behavior in patients with psychotic disorders.

Junginger (1996) described the aggressive behavior of these patients as *psychotic action*, which means that he considers this behavior as consistent with the content of the delusions or hallucinations. For example, a patient may think that he is followed and threatened and therefore starts a fight with the presumed perpetrator in order to defend him/herself. In an attempt to explain psychotic action, Junginger (1996) focused on the role of a disturbed mood and the experience of specific emotions in this context. To illustrate this notion, he refers to a study by Kennedy, Kemp, and Dyer (1992), who found that fear and anger were precursors for the assaultive behavior of patients with a delusional disorder. In a similar vein, Buchanon et al. (1993) noted that psychotic action was related to feelings of fear and anxiety. Thus, it may well be the case that affective reactions to positive symptoms contribute to the phenomenon of aggressive behavior in psychotic patients. In other words, anger and anxiety, triggered by suspiciousness or threat, could lead to a defensive, aggressive response towards others. Although there is some tentative evidence indicating that anger and anxiety are associated with the aggressive behavior of psychotic patients (e.g., Freeman, Garety, & Kuipers, 2001; Novaco, 1994), no research can be found that actually investigated the relation between these emotional reactions in response to positive symptoms and aggressive behavior.

With these issues in mind, the present study was conducted to further examine the links between positive, and in particular TCO, symptoms and the emotional reactions of anger and anxiety to such symptoms and aggressive behavior in psychotic patients. For this purpose, a cross-sectional multicenter study was carried out on the acute wards in three psychiatric hospitals in the Netherlands. Besides the key constructs, a number of control variables were assessed in this study. First of all, well-known risk factors for aggressive behavior such as impulsivity (e.g., Barratt, 1994) and drug use (e.g., Fazel et al., 2009a,b) were taken into account. Further, because anger and anxiety reactions to psychotic symptoms were an important focus of this study, it seemed logical to include measures of dispositional anger and anxiety. Finally, as this research relied on a self-report index of aggression, we also included a scale for measuring social desirability (Fisher & Katz, 2000).

Method

Participants

Between April 2008 and December 2009 data were gathered at three psychiatric hospitals in the Netherlands. Two hundred inpatients, all in their first two weeks of admission due to an acute exacerbation of their disorder and diagnosed with a psychotic disorder (i.e., schizophrenia, delusional disorder, psychotic disorder not otherwise specified, or schizoaffective disorder), were approached and invited to participate in the current study. Patients were excluded when they had comorbid axis I or II diagnoses, severe cognitive distortions, and/or when they were tranquilized by medication that significantly distorted their alertness. Participants were asked for participation on a voluntary basis and gave verbal as well as written informed consent. Of the 200 eligible patients, 145 were willing to volunteer (see Table 1 for details), which boils down to a response rate of 72.5%. However, 21 of them had to be excluded by the experimenter, because they appeared to be untestable, which resulted in a final sample of 124 patients (109 males, 15 females; ages 19-51 years; M = 32.73 years, SD = 8.26). Of the sample, 57.3% was Caucasian, 79.8% was unmarried, 55.6% was living alone, and 67.7% had finished their secondary education.

As to the clinical features of the sample, 70.2% was diagnosed with paranoid schizophrenia. Remaining diagnoses were other forms of schizophrenia (16.1%), schizoaffective disorder (3.2%), delusional disorder (0.8%), and psychosis NOS (9.7%). The mean Positive And Negative Syndrome Scale (PANSS; Kay, Fishbein, & Opler, 1987) score of the sample was 78.2 (SD = 12.69), indicating moderately severe levels of psychotic symptomatology. Of the sample, 76.6% was involuntary admitted to the psychiatric hospital and thus had a judicial enactment. The mean time of the current hospitalization on the moment of participation in the current study was 5.87 days (SD = 2.68), and for 21% of the sample this was their first admission. The vast majority of the patients (92.7%) received medication, mainly antipsychotics (87.9%). Half of the sample reported to use drugs (54.8%). Urine drug screening data (26.6% was not tested) indicated that most patients used cannabis (57.3%), whereas hard drugs were only sporadically used (4.03%). The current study was approved by an official medical ethics committee.

Assessment

The measures that were used in this study were a structured interview and self-report questionnaires. Information on demographic and clinical characteristics was collected by checking the psychiatric files. The patients' diagnosis was based on the psychiatric records and confirmed with the *Structured Clinical Interview for DSM-IV disorders* (SCID; First, Spitzer, Gibbon, & Williams,

2002). Disagreement in diagnosis (3 cases, 2.42%) was discussed with a senior psychiatrist and resolved by consensus.

Table 1

Sociodemographic and clinical characteristics of the patient sample.

	Number of cases	%
Sociodemographic characteristics		
Gender		
Male	109	87.9
Female	15	12.1
Race		
Caucasian	71	57.3
Suriname	17	13.7
Antilles	14	11.3
Other (e.g., Moroccan, Turkish)	22	17.7
Marital status		
Unmarried	99	79.8
Married/living together	11	11.3
Separated	14	8.9
Education		
Low (no/primary)	33	26.6
Moderate (secondary/vocational)	84	67.7
High (tertiary/college, university)	7	5.6
Living situation		
Alone	69	55.6
Resident/attended	42	33.8
Homeless	13	10.5
Clinical characteristics		
Diagnosis conform SCID		
Schizophrenia	106	84.7
Schizoaffective disorder	4	3.2
Delusional disorder	1	0.8
Psychotic disorder Not Otherwise Specified	13	10.5
Admission type		
Voluntary	29	23.4
Involuntary	95	76.6
First admission		
Yes	26	20.2
No	98	79.8
Medication*		
Antipsychotics	109	87.9
Anxiolytics	57	46.0
Antidepressants/mood stabilizers	9	7.2

Note. *N* = 124. * Some of the patients used more than one type of medication.

Psychotic symptoms

The *Positive and Negative Syndrome Scale* (PANSS; Kay et al., 1987; α = .76) is a semi-structured clinical interview that can be employed to investigate the symptomatology of schizophrenia. The PANSS consists of 30 items that have to be rated by the interviewer on a 7-point rating scale with anchors 1 = Absent and 7 = Extremely present. There are three subscales, one representing the positive psychotic symptoms (e.g., delusions, hallucinations; 7 items; α = .62), another referring to negative psychotic symptoms (e.g., social and emotional withdrawal; 7 items; α = .70), while the last scale assesses associated symptoms (e.g., somatization, lack of insight, preoccupation; 16 items; α = .60).

The *Threat/Control-Override Questionnaire* (TCOQ; see Appendix A) that was developed for the purpose of this study is a 14-item self-report scale for measuring delusional threat and control-override symptoms. Items (see Table 4) were based on the questions that were used in other studies to investigate TCO symptoms (e.g., Link & Stueve, 1994) as well as on the persecutory subscale of the Delusions Symptoms States Inventory (DSSI; Bedford & Deary, 1999). Items of the TCOQ have to be rated on a 4-points scale with anchors 1 = Disagree and 4 = Strongly agree, and can be combined to yield a TCO total score (α = .90) or two subscales: one referring to threat (6 items; α = .83) and another referring to control-override symptoms (8 items; α = .88).

Aggression

The *Aggression Questionnaire* (AQ; Buss & Perry, 1992; Dutch version: Meesters, Muris, Bosma, Schouten, & Beuving, 1996) is a self-report scale for measuring aggressive behavior. The AQ consists of 29 items that are rated on a 5-point scale with anchors 1 = Entirely disagree and 5 = Entirely agree. The AQ assesses four types of aggression: Physical aggression (9 items), Verbal aggression (5 items), Anger (7 items), and Hostility (8 items), which for this study were summed to yield a total score of aggressive behavior (α = .87).

Emotions: Anxiety and Anger

The *Affective Responses to Delusions Scale* (ARDS; Nederlof, Hovens, & Muris, 2007; α = .79, see Appendix B) was also construed for this study, and measures anger and anxiety reactions to psychotic symptoms. Participants first identified their most prominent delusion (with the help of the researcher), after which they had to answer questions concerning feelings of anger and anxiety in relation to these positive symptoms. The measure contains 24 items including 8 filler items referring to happy feelings) that had to be rated on a 4-point scale with anchors 1 = Disagree and 4 = Strongly agree. For example, patients had to answer items such as *'My belief makes me nervous'* (anxiety) or *'My belief irritates me'* (anger), in which 'belief' referred to their most prominent delusional thought.

Total anxiety and anger scores can be computed by summing across relevant items (α's respectively .93 and .90).

The trait version of the *State-Trait Anxiety Inventory* (STAI; Spielberger, Gorsuch, & Lushene, 1970; Dutch version: Van der Ploeg, Defares, & Spielberger, 1980; α = .87) is a 20-item measure of dispositional anxiety. Items are rated on a 4-point scale with anchors 1 = Almost never and 4 = Almost always.

The *Dimensions of Anger Reactions* (DAR; Novaco, 1975; Dutch version: Nederlof Hovens, Muris, & Novaco, 2009; α = .74) is a 7-item self-report measure to assess anger disposition. Items have to be rated on a 5-point scale with anchors 0 = Not at all and 4 = Very much.

Impulsivity and Social desirability

The *Barratt's Impulsivity Scale, Version 11* (Patton, Stanford, & Barrat, 1995; Dutch version: Lijffijt & Barratt, 2005; α = .71) is a 30-item self-report questionnaire of impulsive behavior for which items are rated on a 4-point scale with anchors 1 = Rarely/never and 4 = Almost always/always.

The *Social Desirability Scale of the Eysenck Personality Questionnaire-Revised, Short Scale* (EPQ-RSS-Lie; Eysenck & Eysenck, 1991; Dutch version: Sanderman, Arrindell, Ranchor, Eysenck, & Eysenck, 1995; α = .77) was used to measure the tendency of patients to give social desirable answers. The scale consists of 12 statements which were answered with Yes or No.

Drug use information

Participants with a diagnosis of substance abuse disorder were excluded in this study. Further information about drug use was collected by checking the psychiatric files on urine drugs screening (UDS) data and by means of self-report questions during the interview.

Procedure

Patients were selected on the basis of their psychiatric records and/or information provided by their treating psychiatrist. Whenever patients fulfilled the selection criteria, they were asked to participate. After patients had provided oral and written informed consent, interviews were carried out by trained interviewers to confirm the diagnosis and to investigate the presence and severity of psychotic symptoms. Then, patients completed self-report questionnaires. If necessary, patients were given short breaks in order to keep them motivated and concentrated to complete the full session. No reward was given in return for participation. All patients were tested within the first two weeks of their admission.

Statistical analyses

Data were analyzed using SPSS 17.0. First, correlations were calculated to check which of the assumed variables were associated with aggressive behavior. Variables that were significantly associated with aggression were entered in a hierarchical regression analysis to determine their unique contribution. On step 1, possible confounding and control variables were included. On step 2, positive psychotic symptoms, as indexed by the PANSS and the TCO symptoms, and anxiety and anger reactions to psychotic symptoms were entered into the equation.

Results

Prevalence of aggressive behavior

Of the patients who participated in the current study, 22.6% was convicted for criminal behavior only once, 37.1% two times or more, and 12.9% was convicted more than five times[1]. Furthermore, a substantial proportion of the psychotic patient sample clearly displayed aggressive behavior when admitted to the psychiatric hospital. More precisely, 50% (N = 62) of the 124 participants was aggressive towards others, 9.7% (N = 12) was aggressive towards the self, while 38.7% (N = 48) was non-aggressive at admission. On the self-report measure of aggression, the AQ, the mean score was 78.99 (SD = 19.04, range 36-117), which represents an above average score on this measure (Meesters et al., 1996).

Correlates of aggressive behavior: psychotic symptoms, emotions, and confounders

First of all, correlations were calculated between aggressive behavior and psychotic (positive and negative) and TCO symptoms, anger and anxiety reactions to such symptoms as well as with various confounding variables. Self-reported aggressive behavior, as measured with the AQ, showed the hypothesized relations with other indices. As can be seen in Table 2, impulsivity was positively related to aggression (r = .39, p < .01), indicating that higher levels of impulsivity were associated with heightened levels ofaggressive behavior. Social desirability was negatively associated with aggression (r = -29, p < .01), which indicates that lower levels of aggression were linked to a tendency to give more favorable answers. Further, anger disposition (r = .62, p < .01) and anxiety disposition (r = .49, p < .01) were also significantly related to aggression, which justifies the notion that

[1] In most cases, crime rates reflected violent convictions, but for some patients the description of the committed crime was rather ambiguous so that non-violent crimes cannot be fully excluded.

Table 2
Means, standard deviations, and correlations among indexes of aggression, psychotic (TCO) symptoms, emotional reactions, and confounding variables in this sample of psychotic patients.

	M	SD	1	2	3	4	5	6	7	8
1. AQ Total aggression	78.99	19.04	-							
2. PANSS Positive symptoms	21.76	5.13	.24**	-						
3. TCOQ Threat/control-override symptoms	27.86	10.54	.43**	.43**	-					
4. STAI Anxiety disposition	41.39	10.33	.49**	.18	.53**	-				
5. DAR Anger disposition	7.02	5.11	.62**	.16	.32**	.44**	-			
6. BIS-11 Impulsivity	64.59	9.60	.39**	.15	.41**	.57**	.30**	-		
7. EPQ-RSS Social desirability	5.60	3.01	-.29**	-.07	-.18	-.20*	-.26**	-.16	-	
8. ARDS Anger reaction	15.65	7.87	.27**	-.04	.28**	.18	.42**	.28*	-.08	-
9. ARDS Anxiety reaction	15.50	6.84	.32**	-.12	.29**	.44**	.35**	.17	-.12	.67**

Note. AQ = Aggression Questionnaire, PANSS = Positive and Negative Syndrome Scale, TCOQ = Threat/Control-Override Questionnaire, STAI = State-Trait Anxiety Inventory, DAR = Dimensions of Anger Reactions, BIS-11 = Barrett's Impulsivity Scale, version 11, EPQ-RSS = Eysenck Personality Questionnaire – Revised Short Scale, ARDS = Affective Reactions to Delusions Scale. *N*s vary between 98 and 123 due to missing values. * $p < .05$, ** $p < .01$.

these variables should be regarded as confounding variables. Positive psychotic symptoms and TCO symptoms were also significantly related to aggression (*r*'s being .24 and .43 respectively, $p < .01$). The emotional reactions of anger and anxiety to these symptoms also showed a positive significant association with aggressive behavior (*r*'s being .27 and .32 respectively, $p < .01$). Negative symptoms and alcohol/drug use were not significantly connected to aggressive behavior (all *r*'s between -.05 and .09).

On the basis of the correlational pattern as described above, variables that appeared to be of relevance for explaining aggressive behavior in our sample were further examined by means of hierarchical multiple regression analysis (see Table 3). The confounding variables of impulsivity, social desirability, trait anxiety, and dispositional anger were entered on Step 1, and were found to explain 37.9% of the variance in aggressive behavior of psychotic patients [$F(4,70) = 10.68$, $p < .001$]. Only anger disposition was found to make a unique, significant contribution to this model (ß = .45, $p < .001$). On step 2, positive psychotic symptoms, TCO symptoms and affective reactions to positive symptoms explained an additional 7% of the variance in aggressive behavior, [$F_{change}(2,68) = 4.05$, $p < .05$]. In this second model, the contribution of anger disposition remained statistically significant (ß = .47, $p < .001$), whereas TCO symptoms

Table 3

Hierarchical regression analysis with self-reported aggressive behavior in psychotic patients as the dependent variable ($N = 75$).

	B	SE B	ß *(standardized)*	R^2	ΔR^2
Step 1				.38**	
BIS-11 Impulsivity	.30	.23	.15		
EPQ-RSS Social desirability	-.72	.59	-.12		
STAI Anxiety disposition	.23	.22	.13		
DAR Anger disposition	1.75	.39	.45**		
Step 2				.45**	.07*
PANSS Positive symptoms	.18	.41	.05		
TCOQ Threat/control-override symptoms	.53	.21	.28*		
ARDS Anxiety reaction	.35	.46	.13		
ARDS Anger reaction	-.26	.35	-.11		

Note. AQ = Aggression Questionnaire, PANSS = Positive and Negative Syndrome Scale, TCOQ = Threat/Control-Override Questionnaire, STAI = State-Trait Anxiety Inventory, DAR = Dimensions of Anger Reactions, BIS-11 = Barrett's Impulsivity Scale, version 11, EPQ-RSS = Eysenck Personality Questionnaire-Revised Short Scale, ARDS = Affective Reactions to Delusions Scale. * $p < .05$, ** $p < .01$.

also had a significant effect (ß = .28, p = .01), indicating that anger disposition as well as TCO symptoms both explained a unique proportion of the variance in aggressive behavior. As the beta values were positive, results indicated that higher levels of anger disposition and TCO symptoms were accompanied by higher levels of aggression. Note however that anxiety and anger reactions to psychotic symptoms did not make a significant contribution to this model (β's being .13 and -.11 respectively).

In addition, this analysis was also repeated with only the PANSS as predictor on step 2 (without the TCOQ and ARDS variables) in order to examine the unique contribution of positive psychotic symptoms in general. This model explained only an additional 1.4% of the variance [$F_{change}(1,90) = 2.38$, $p > .10$] and further underlined the specificity of TCO symptoms as a correlate of aggressive behavior rather than positive symptoms in general.

TCO symptoms and aggressive behavior

Additional analyses were carried out to explore the single items of the TCOQ as well as the two subscales of this measure (i.e., threat and control-override) in relation to self-reported aggression. First, when looking at the individual items, it should be noted that one third to two third of the patients (between 34.2% and 60.4%) did not report various TCO thoughts at all (see Table 4). However, the data also indicated that a substantial proportion positively endorsed items referring to TCO symptoms (between 18.9% and 45.0%, when combining the 'partly agree' and 'strongly agree' response options).

Spearman correlations between individual items and self-reported aggressive behavior as indexed by the AQ, were between .14 and .41 (see also Table 4). The items '*Someone has had evil intentions against me*', '*I have the thought that I was being followed for a special reason*', and '*People have tried to drive me insane*' showed the strongest link with aggressive behavior (r's being .41, .38, and .41 respectively, all p's < .01). The threat scale correlated of .42 (p < .01) and the control-override scale .34 (p < .01) with self-reported aggression. When entering these separate components in a regression analysis, (while controlling for confounding variables), it was found that only TCO threat symptoms (ß = .26, p < .05) made a unique contribution to aggressive behavior, whereas control-override symptoms did not (ß = .05).

Table 4
Items of the Threat/Control-Override symptoms Questionnaire (TCOQ) and the percentages of endorsing various response categories for each item, along with the relationship between each item and self-reported aggression (Spearman's rho).

Item	Description	Disagree	Not sure	Partly agree	Strongly agree	*r* AQ
1.	I am under the control of an external force which determines my actions	49.5	23.4	12.6	14.4	.23*
2.	Other people control my way of movements	60.4	16.2	11.7	11.7	.27**
3.	Other people have tried to poison me or to do me harm	45.9	19.8	13.5	20.7	.14
4.	Other people can insert thoughts into my head	55.9	15.3	17.1	11.7	.14
5.	Someone has deliberately tried to make me ill	42.3	19.8	16.2	21.6	.17
6.	My thoughts are dominated by an external force	56.8	13.5	12.6	17.1	.26**
7.	Other people have been secretly plotting to ruin me	46.8	18.9	11.7	22.5	.35**
8.	I have the feeling that other people can determine my thoughts	59.5	21.6	9.0	9.9	.22*
9.	Someone has had evil intentions against me	34.2	20.7	15.3	29.7	.41**
10.	Other people can insert thoughts into my mind	50.5	20.7	14.4	14.4	.25**
11.	I have the thought that I was being followed for a special reason	51.4	17.1	13.5	18.0	.38**
12.	In have the feeling that other people have the control over me	58.6	13.5	14.4	13.5	.25**
13.	People have tried to drive me insane	42.3	13.5	19.8	24.3	.41**
14.	My life is being determined by something or someone except for myself	50.5	20.7	9.0	19.8	.36**

Note: Items 1, 2, 4, 6, 8, 10, 12 and 14 represent the 'Control-Override' subscale; other items represent the 'Threat' subscale. $N = 111$, due to some missing values. AQ = Aggression Questionnaire. * $p < .05$, ** $p < .01$.

Discussion

In this cross-sectional multicenter study, positive symptoms, TCO symptoms, and emotional reactions in response to such symptoms were investigated as correlates of aggressive behavior in psychotic patients. Half of the patients who were admitted to the acute ward of psychiatric hospitals because of an exacerbation of their disorder indeed displayed clear-cut aggressive behavior,

which provides further evidence for the idea that aggression is a common phenomenon in psychotic patient samples (Link et al., 1999). Further, data indicated that, after controlling for the influence of confounding variables, there is indeed a relationship between positive psychotic symptoms and aggressive behavior. In particular threat/control-override (TCO) symptoms emerged as a significant correlate of aggression in these patients. This is in keeping with previous findings of Link et al. (1994, 1998) and Swanson et al. (1996), but in contrast with the results reported by Applebaum et al. (2000) and Skeem et al. (2006). The inconsistent findings are likely to be due to the fact that TCO symptoms were most times measured by means of scales containing only two or three questions, which may result in an unreliable assessment of the TCO construct.

When the two domains of TCO symptoms were examined separately, it was found that only threat symptoms made a significant contribution to aggressive behavior. This corroborates the findings of Stompe et al. (2004), but is not in agreement with Link et al. (1998) who proposed that both factors make a unique contribution to aggressive behavior in psychotic patients. It may well be that, as mentioned before, the method of measuring these symptoms underlie these inconsistencies. In the study of Stompe et al. (2004) as well as in the current study, a more elaborated instrument was used to check the presence and intensity of these symptoms thereby possibly yielding more accurate data and findings. Further, from a theoretical point-of-view, the current data and those obtained by Stompe et al. (2004) also make sense. That is, it seems plausible that threat feelings lead to a defensive response, which is then expressed by aggression. In contrast, feelings of losing control may just lead to helplessness and no aggressive behavior as nothing can be done about it.

Apart from the TCO symptoms, anger disposition also emerged as a significant correlate of aggressive behavior in psychotic patients. This fits nicely with theories hypothesizing that anger is a precursor of aggression (e.g., Berkowitz, 1988). However, few studies have demonstrated this link in psychotic populations. So far, research by Skeem et al. (2006) has also shown that anger is an important antecedent of aggressive behavior in psychotic patients. This pleads for a more prominent focus on dispositional anger in research on aggression in psychotic subjects. The current study obtained no evidence for a relation between anger or anxiety reactions to psychotic symptoms and aggressive behavior. This finding does not fit well with Junginger's (1996) *psychotic action* theory which assumes that disturbed affect plays a role in the development of violent behavior. One reason for this null finding might be that the current study mainly relied on self-report data. It may well be that these patients had difficulties with expressing the type and intensity of their feelings, which is consistent with the early notion of Bleuler (1911) that schizophrenia seems to be a disorder in which

patients have difficulties in expressing their emotions. In a similar vein, Van der Meer, Van't Wout, & Aleman (2009) have argued that schizophrenic patients appear to suppress their emotions. Another possibility is that the delusion as reported by the patients during the interview was not present at the time of their aggressive episode. A final explanation for this non-significant finding might be that the measures of dispositional anger and anxiety soaked up the variance of the state measures of these emotions.

In this study, drug use was not related to aggressive behavior, which is in contrast with most other findings in studies on aggression in psychotic disorders (see Fazel et al., 2009b). This result might be due to the fact that patients with comorbid substance abuse were excluded from this study, and that as a result the frequency of drug use might have been relatively low to show its relation with aggression.

Although the current findings are interesting in that they offer further information on the link between psychosis and aggression, a number of limitations of this research need to be mentioned. First, as mentioned earlier, this study predominantly relied on self-report scales. It is possible that in particular psychotic patients have difficulties with reflecting on their thoughts, feelings, and behaviors. A second and related shortcoming pertains to the cross-sectional design of the study. As a consequence, no causal interpretations can be made on the basis of these data, and so it remains unclear whether variables such as TCO symptoms and dispositional anger indeed precede aggressive behavior. Experimental research could provide more insight into the direction of the presumed relationship between aggression and these variables. A third shortcoming is concerned with the issue of selection bias. That is, only patients who were willing to participate and who were able to complete the assessment battery were included in the study, which perhaps means that the most aggressive patients did not take part in the study. A fourth limitation has to do with the use of two newly developed measures: the TCOQ and the ARDS. As these self-report questionnaires have not been fully validated, the use of these instruments might weaken the study. Although these questionnaires were construed on theoretical grounds and internal consistency coefficients were satisfactory, it is clear that these scales need further psychometric evaluation in independent samples. A final shortcoming that should be mentioned is that violent behavior and other conduct problems during childhood were not included as confounding variables, as previous research has demonstrated that this might have a significant impact on violent behavior in psychotic patients (e.g., Hodgins et al., 2005, 2008).

Despite these limitations, the current study provides support for the hypothesis that TCO symptoms, and especially the threat symptoms and anger disposition are significant correlates of aggressive behavior in psychotic patients. It is clear that research on this issue is extremely difficult in this population,

partly because of assessment problems. As such, future studies might preferably use experimental designs including physiological indices. This could provide more insight in the cause-effect relations and get around some problems with self-reports measures. Further, other factors such emotional states and conduct problems during childhood should be taken into account in future research as these might also be significantly associated with aggression in psychotic patients.

CHAPTER SEVEN

Psychometric properties of an instrument for measuring threat/control-override symptoms

This chapter has been published as: Nederlof, A.F., Muris, P., & Hovens, J.E. (2011). Psychometric properties of an instrument for measuring threat/control-override symptoms. *Journal of Nervous and Mental Disease, 199,* 790-793.

Abstract

Threat/control-override symptoms refer to delusional persecutory thoughts and feelings of losing control over mind and body. The Threat/Control-Override Questionnaire (TCOQ) was developed to assess such symptoms, and the purpose of the present study was to examine the psychometric properties of this measure in non-clinical students (*N* = 759) and acute and stabilized psychotic patients (*N*'s respectively 111 and 33). Factor analysis of TCOQ data in students and acute psychotic patients yielded a two-factor solution, with components referring to 'threat' and 'control-override' symptoms. Internal consistency and test-retest reliability were satisfactory and concurrent and discriminant validity were shown by a meaningful pattern of correlations with other self-report and interview measures. Group comparisons showed that patients displayed significantly higher scores on the TCOQ than the non-clinical students. Altogether, it can be concluded that the TCOQ is a reliable and valid index for assessing feelings of persecution and losing control.

Introduction

Some psychotic patients feel strongly threatened by incorrect assumptions that they are being followed, spied on, tricked, humiliated, and tormented, or false beliefs of losing control over mind and body such as thoughts that are being inserted or organs that are being removed (APA, 2000). It is generally thought that these so-called threat/control-override (TCO) symptoms play an important role in the aggressive behaviors as displayed by this patient group (Link & Stueve, 1994). A number of studies has focused on TCO symptoms in psychotic patients, and in most of this research the construct has been assessed by asking patients a number of simple questions such as 'How often do you feel your mind being dominated by forces beyond your control', 'How often do you feel that thoughts are put into your head that are not your own', and 'How often do you feel that there are people that wish to harm you' (e.g., Link & Stueve, 1994; Link, Stueve, & Phelan, 1998; Swanson, Borum, Swartz, & Monahan, 1996). Although these questions certainly seem to tap TCO symptomatology, this method is less satisfactory from a psychometric point-of-view as certain qualities of the assessment (e.g., reliability) cannot be established. Interestingly, Nederlof, Muris, and Hovens (2011b) recently developed the Threat/Control-Override Questionnaire (TCOQ), a 14-item self-report scale for measuring delusional thoughts of feeling threatened or losing control, but unfortunately the reliability and validity have not been properly investigated. The main purpose of the present investigation was to explore the psychometric properties of the TCOQ. More precisely, the reliability, validity, and factor structure of the self-report measure were examined in non-clinical participants as well as clinical patients suffering from a psychotic disorder.

Method

Procedures

Data were collected from three independent samples, one non-clinical student sample and two patient samples (i.e., acute and stabilized psychotic patients). The student sample filled out the TCOQ and various other self-report questionnaires for estimating the internal consistency, factor structure, and concurrent validity of the scale. Data of the clinical samples included, besides the TCOQ, two interviews to diagnose and measure the presence and severity of psychotic symptoms. The first clinical sample of acute psychotic patients was used to determine internal reliability, factor structure, and concurrent validity of the scale in a clinical setting. In the second patient sample, TCOQ data were obtained twice, some 3 to 6 weeks apart so that the test-retest reliability of the

scale could be established. In an overall analysis employing the data of all three samples, comparisons were made to examine the discriminant validity of the TCOQ.

Participants

Non-clinical student sample. The TCOQ and various self-report questionnaires on psychotic-like experiences were filled out by 759 Dutch undergraduate students (258 men and 501 women). Their mean age was 21.08 years (*SD* = 3.83, range 17-53) and 89.3% of the sample was Caucasian. The students were asked to complete the set of questionnaires in return for course credits or a small financial remuneration.

Patient sample 1. Data from 111 psychiatric inpatients (99 men, 12 women) were extracted from an existing database. All patients were diagnosed with schizophrenia or a related psychotic disorder, which was confirmed by the *Structured Clinical Interview for DSM-IV Disorders* (SCID; First, Spitzer, Gibbon, & Williams, 2002), and were assessed during their first two weeks of admission due to an acute exacerbation of their symptoms and. The mean age of this patient sample was 32.41 years (*SD* = 8.19, range 19-51) and 59.5% was of Dutch origin; other participants had roots in for example the Netherlands Antilles or Suriname.

As to the clinical features of this clinical patient sample, 69.4% was diagnosed with paranoid schizophrenia. Remaining diagnoses were other forms of schizophrenia (15.3%), schizoaffective disorder (3.6%), delusional disorder (0.9%), and psychosis not otherwise specified (10.8%). The mean Global Assessment of Functioning (GAF) score of these inpatients was 39.6 (*SD* = 8.27) and the mean time of hospitalization on the moment of participation was 5.8 days (*SD* = 2.57). For 22.5% of the sample this was their first admission and 77.5% was involuntary admitted to the psychiatric hospital with a judicial enactment. Besides the TCOQ data, interview data on the Positive And Negative Syndrome Scale (PANSS; Kay, Fishbein, & Opler, 1987) were also used in this study.

Patient sample 2. This patient sample consisted of 33 stabilized male patients with schizophrenia or a related psychotic disorder (again confirmed by means of the SCID, First et al., 2002). Patients completed the TCOQ twice within an interval of 3 to 6 weeks (mean number of days = 31.88, *SD* = 5.14). The mean age of the patients in this sample was 32.61 years (*SD* = 10.03, range 20-60 years). The mean GAF score of these patients was 46.72.

Measures

The *Threat/Control-Override Questionnaire* (TCOQ; Nederlof et al., 2011b) is a self-report measure for examining delusional threat and control-override thoughts. The scale contains 14 items (8 threat-related items and 6 control-

override-related items; see Table 1) that were partly based on subscale items of the Delusions Symptoms States Inventory (DSSI; Bedford & Deary, 1999) and on questions that were used in previous studies investigating TCO symptoms (e.g., link et al., 1994). All items have to be rated on a 4-point scale with anchors 1 = Disagree and 4 = Strongly agree, which indicates how much each statement applies to the respondent. The total score ranges between 14 and 56, with higher scores reflecting higher levels of TCO symptoms.

Psychotic-like experiences in the non-clinical sample were measured with two questionnaires. The *Community Assessment of Psychic Experiences* (CAPE; Van Os, Verdoux, & Hanssen, 1999) is a 42-item instrument that was used to measure the frequency of positive (e.g., "Do you ever feel as if you are being persecuted in some way?") and negative (e.g., "Do you ever feel that you have no interest to be with other people?") psychotic symptoms. Further, the short, 22-item version of the *Schizotypal Personality Questionnaire* (SPQ; Raine, 1991, 2001) was employed to assess schizotypal traits, of which only the cognitive/perceptual (e.g., "Have you ever had the sense that some person or force is around you, even though you cannot see anyone?") and interpersonal (e.g., "People sometimes find me aloof and distant") subscales were used, representing respectively positive and negative symptomatology.

The Positive And Negative Syndrome Scale (PANSS; Kay et al., 1987) is a semi-structured clinical interview for patients diagnosed with a psychotic disorder, which consists of 30 items that have to be rated by the interviewer on a 7-point scale with anchors 1 = Absent and 7 = Extremely present. In the present study, we were particularly interested in the two subscales of the PANSS measuring positive (e.g., persecution, hallucinations) and negative psychotic symptoms (e.g., blunted affect, anhedonia). Further, based on PANSS and SCID data, interviewers (who were blind to patients' TCOQ scores) identified acute psychotic patients (i.e., patient sample 1) who were suffering from persecutory (i.e., threat) and/or control-override delusions.

Results

Factor structure

A principal component analysis with direct oblimin rotation (as threat and control-override were hypothesized to be correlated TCO factors) was carried out to examine the factor structure of the TCOQ. In the student sample, an inspection of the scree plot clearly pointed in the direction of a two-factor solution. The first factor had an eigenvalue of 5.39, which explained 38.51% of the variance and mainly consisted of control-override items. The second factor had an eigenvalue

of 1.70 and explained 12.12% of the variance and only contained items referring to the threat component of TCO (see Table 1).

Table 1
Threat/Control-Override Questionnaire items and their factor loadings after oblimin rotation in the non-clinical student population (*N* = 759) and in the clinical psychotic patients sample (*N* = 111).

	Non-clinical students		Acute psychotic patients	
Item description (item number)	1	2	1	2
I am under the control of an external force which determines my actions (1)	.60		.60	
Other people control my way of movements (2)	.64		.73	
Other people can insert thoughts into my head (4)	.66		.77	
My thoughts are dominated by an external force (6)	.75		.84	
I have the feeling that other people can determine my thoughts (8)	.75		.80	
Other people can insert thoughts into my mind (10)	.61		.72	
In have the feeling that other people have the control over me (12)	.66		.63	
My life is being determined by something or someone except for myself (14)	.59		.78	
Other people have tried to poison me or to do me harm (3)		-.82		.74
Someone has deliberately tried to make me ill (5)		-.84		.77
Other people have been secretly plotting to ruin me (7)		-.78		.80
Someone has had evil intentions against me (9)		-.72		.80
I have the thought that I was being followed for a special reason (11)		-.61	.51	.47
People have tried to drive me insane (13)		-.80		.70

Note: The first factor represents the 'Control-Override' subscale, whereas factor 2 represents the 'Threat' subscale.

A similar analysis in the acute patient sample yielded highly consistent results. Again a two factor solution emerged with the first factor predominantly containing control-override items, and the second factor mainly consisting of threat items. Only item 11, which was intended to tap threat, displayed a somewhat higher loading on the control-override factor (Table 1). Both factors had eigenvalues of 6.10 and 1.66, and explained respectively 43.55 and 11.88% of the variance. All in all, the TCOQ appears to consist of two well-defined factors, which are robustly correlated (r = .50, p < .001), indicating that they represent distinct, but related, aspects of TCO.

Internal consistency

Internal consistency coefficients (Cronbach's alphas) for the total scale were .86 in the student sample, .90 in the sample of acute psychotic patients, and .91 (time 1) and .94 (time 2) in the group of stabilized psychotic patients, which indicates that this aspect of reliability of the scale is satisfactory. For the threat- and control-override subscales respectively, coefficients were .84 and .79 in the student sample, .83 and .88 in the acute patient sample, and .90 and .88 (time 1) and .91 and .94 (time 2) in the stabilized psychotic patient sample.

Test-retest reliability

Mean scores on the TCOQ in the group of stabilized psychotic patients were 24.36 (*SD* = 8.86) at time 1 and 24.45 (*SD* = 11.45) at time 2. A paired-samples *t*-test indicated that TCO symptoms did not significantly change over the 3-6 week period ($t < 1$). Intraclass correlation coefficients computed between TCOQ scores of both occasions were .82 ($p < .01$) for the total scale, and respectively .80 and .72 for the threat and control-override subscales (both *p*'s < .01).

Concurrent validity

The concurrent validity of the TCOQ in the student sample was estimated by calculating Pearson correlations with two self-report questionnaires measuring psychotic-like experiences, that is, the CAPE and the SPQ. The TCOQ total score was found to be robustly associated with the positive symptoms subscale of the CAPE and the cognitive/perceptual subscale of the SPQ (*r*'s being .49 and .39 respectively, *p*'s < .01). These robust correlations were as expected because both scales represent the typical positive symptoms of psychosis, such as persecutory thoughts and paranoia, which are closely allied to TCO symptoms. Correlations between the TCOQ total score and the negative symptoms subscale of the CAPE as well as the interpersonal subscale of the SPQ (*r*'s being .23 and .25 respectively, *p*'s < .01) were also significant but remarkably smaller. Additional analyses using the subscales of the TCOQ (i.e., threat and control-override) revealed slightly lower but comparable correlation coefficients. Tests comparing the correlation coefficients between TCOQ and subscales representing positive symptoms with those between TCOQ and scales of negative symptoms indicated that the newly developed TCO scale was more convincingly related to positive psychotic symptoms than to negative psychotic symptoms (all Zs ≥ 5.99, $p < .001$). In the sample of psychotic patients, the concurrent validity of the TCOQ was examined by computing correlations with the positive and negative symptoms subscales of the PANSS. The TCOQ total score correlated .44 ($p < .001$) with the PANSS total score, reflecting that higher levels of TCO symptoms were accompanied by higher levels of psychotic symptoms. As expected, the TCOQ total score correlated more strongly with the positive symptoms subscale of the PANSS

(r = .43, p < .001) than with the negative symptoms subscale (r = .11, p = .24; Z = 2.60, p < .01). For the threat and control-override subscales, comparable correlations were found. That is, significant correlations were found with the positive subscale (r's being .32 and .43, respectively, both p's < .01), whereas no substantial correlations were found with the negative subscale of the PANSS (r's being .01 and .17).

Within the sample of acute psychotic patients, an additional analysis was performed to investigate the concurrent validity of the TCOQ. Based on the data as obtained with the SCID and PANSS interviews, patients were categorized according to the presence or absence of persecutory (threat) and control-override delusions. Independent-samples t-tests revealed that patients who, according to the interviewers, suffered from these two types of delusions clearly displayed higher total TCOQ scores than those who did not have such delusions (t = 3.24, p < .01). Interestingly, patients with persecutory delusions scored significantly higher on the TCOQ threat subscale (t = 4.49, p < .001), but not on the control-override subscale as compared to patients without such delusions. In contrast, patients with control-override delusions differed significantly from those without these delusions on the control-override subscale of the TCOQ (t = 5.07, p < .001), but not on the threat subscale (see Table 2).

Table 2
Mean TCOQ scores (standard deviations) for patients with and without persecutory delusions and control-override delusions according to the diagnostic interviews.

	Persecutory delusion			Control-override delusion		
	Yes (N = 75)	No (N = 35)		Yes (N = 16)	No (N = 94)	
TCOQ total	29.91 (10.82)	23.20 (8.42)	t = 3.24*	37.00 (10.68)	26.20 (9.75)	t = 4.04**
TCOQ threat	14.37 (5.27)	9.89 (3.93)	t = 4.49**	15.25 (5.16)	12.55 (5.25)	t = 1.91
TCOQ control-override	15.53 (6.85)	13.31 (5.65)	t = 1.67	21.75 (6.29)	13.65 (5.85)	t = 5.07**

Note. TCOQ = Threat/Control-Override Questionnaire; * p < .01, ** p < .001.

Discriminant validity

Mean total scores on the TCOQ were 15.79 (SD = 3.81) in the sample of students, 27.56 (SD = 10.54) in acute psychotic patients, and 24.36 (SD = 8.86) in stabilized psychotic patients. An ANOVA followed by post-hoc tests revealed that there were significant differences in levels of TCO symptoms across all three groups [F(2,900) = 273.84, p < .001] (see Figure 1).

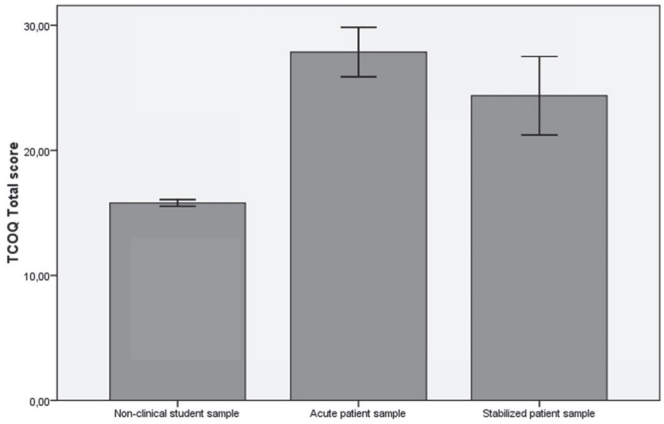


Figure 1. Mean total TCOQ scores (with error bars) in the non-clinical student sample (*N* = 759), acute psychotic patients (*N* = 111), and stabilized psychotic patients (*N* = 33). TCOQ = Threat/Control-Override Questionnaire

Discussion

The aim of the present study was to investigate the psychometric properties of the TCOQ (Nederlof et al., 2011b), a brief scale for measuring specific delusional thoughts about feelings of threat and losing control. Three samples were included in this research: one non-clinical student sample and two clinical samples of acute and stabilized psychotic patients. Factor analysis performed on the TCOQ data of the non-clinical students as well as the acute psychiatric inpatients yielded a clear two-factor structure with a 'threat' factor reflecting feelings of threat and persecution, and a 'control-override' factor pertaining to feelings of losing control. Both factors seem to represent different but related aspects of the TCO construct.

The internal consistency coefficients of the new scale were fairly high. Cronbach's alpha values were between .86 and .94 in various clinical and non-clinical samples, indicating good reliability of the scale. The test-retest stability, as measured in a sample of stabilized psychotic patients over a 3-6 week period, was also satisfactory. The concurrent validity of the scale in the student sample was investigated by computing Pearson correlations between the TCOQ and two other self-report scales measuring conceptually related constructs (i.e., CAPE, SPQ). As expected, substantial positive correlations were found between the TCOQ and subscales that also tap positive psychotic-like experiences, whereas

in general weaker associations were found with scales representing negative psychotic symptoms. In the patient sample, similar results were documented when correlating TCOQ scores to scores obtained by means of an interview to assess positive and negative psychotic symptoms (i.e., PANSS). Furthermore, it was found that the threat subscale appropriately discriminated between patients with and without persecutory delusions, whereas the control-override subscale satisfactorily differentiated between patients with and without delusions of losing control. Finally, the discriminant validity of the measure was shown by group comparisons showing that patients displayed significantly higher scores on the TCOQ than the non-clinical students, with acute psychotic patients scoring even significantly higher than stabilized psychotic patients.

Several shortcomings of this study need to be mentioned. First, although the study included two samples of psychotic patients, which is appropriate as the TCO phenomenon is highly relevant for this population, one could question whether the student sample was the most suitable non-clinical control group. The students differed in many respects from the clinical psychotic patients (i.e., age, educational level), and so it would have been preferable if we had included a non-clinical control group taken from the general population. Also it would have been interesting to compare TCOQ scores of psychotic patients with those obtained in other clinical patient groups (e.g., patients with personality disorders, patients with bipolar disorder). Second, the incremental validity of the TCOQ was not explored. As scores on the TCOQ are strongly associated with other measures assessing positive psychotic symptoms, it seems important to demonstrate that the scale has unique predictive value for relevant criterion variables (e.g., aggressive behavior, relapse) beyond these other questionnaires. Despite these limitations, the TCOQ appears to possess good assessment qualities and as such seems to provide a reliable and valid index for measuring delusionary feelings of threat and losing control in clinical as well as in non-clinical samples. Previous research on TCO symptoms (e.g., Link et al., 1994, 1998; Swanson et al., 1996) has confined the measurement of this construct to a limited set of simple questions, which might be informative but of course less optimal from a psychometric point-of-view. With the TCOQ, a reliable and valid index for measuring TCO symptoms is developed, which is encouraged to use in clinical and non-clinical studies on psychosis. More research on psychotic symptoms, in particular TCO symptoms, might give insight into the nature of psychotic experiences and extends knowledge on symptoms that are related to aggressive behavior.

CHAPTER EIGHT

General discussion

The studies described in this dissertation were set up to examine the intra-individual determinants of aggressive behavior in psychosis in clinical as well as in non-clinical samples, with a special focus on the content and severity of psychotic symptoms and the emotions of anger and anxiety. When combining the results of the studies, several conclusions can be drawn and these will be discussed according to the purposes of the dissertation and in the light of previous research that has been conducted in this field. First, the prevalence of violent behavior in psychotic patients and the association between aggression and psychosis will be outlined. Then, specific psychotic symptoms and other intra-individual determinants (e.g., anger, anxiety) will be reviewed to explore their role in the relationship between aggression and psychosis.

The occurrence of aggression in psychosis

Based on several independent studies (e.g., Arsenault, Moffit, Caspi, Taylor, & Silva, 2000; Elbogen & Johnson, 2009; Fazel, langstrom, Hjern, Grann, & Lichtenstein, 2009), it has been widely suggested that persons with a psychotic disorder are more often involved in violent crimes than those without mental problems. In Chapter 2, the literature was carefully reviewed and the assumption that patients who were diagnosed with schizophrenia or a related psychotic disorder display more often aggressive behavior than healthy persons was confirmed. Odds ratios between 2 and 28 were found for this association, indicating a fairly strong link between psychosis and aggression. The results of the inpatient study which was presented in Chapter 6 of this thesis were in line with these findings. Twenty-three percent of the acute psychotic patient sample was convicted for criminal behavior only once, whereas almost 13% was convicted more than five times. Herewith, the dangerousness stereotype held by the general population (Link, Phelan, Bresnahan, Stueve, & Pescosolido, 1999) seems to be confirmed. However, the reported rates vary substantially between studies, depending on research method and study design, but also due to other risk factors and confounding variables that were not taken into account. Furthermore, for the general community, the relative risk and the attributable risk should be clearly distinguished (Angermeyer, 2000), i.e., although the odds ratios indicate that persons with schizophrenia act more aggressively than persons without this disorder, the chance that you will be confronted with someone diagnosed with schizophrenia acting aggressively is still relatively small. Thus, patients with a psychotic disorder are only responsible for a small proportion of the violent incidents in society. The findings in the non-clinical samples (Chapters 4 and 5) also showed an association between psychotic-like experiences and aggressive behavior, indicating that it is not purely the clinical diagnosis that is associated

with aggression. In these studies we found that general non-clinical student populations also experience psychotic-like symptoms, which corresponds with previous research (e.g., Johns & Van Os, 2001; Rossler et al., 2007). When considering the relation between these symptoms and aggression in general, a robust association emerged which is in agreement with the findings in clinical populations. Even after controlling for the influences of personality factors and other confounding variables, such as gender and social desirability, some of these psychotic-like symptoms (i.e., schizotypy and hallucinatory behavior) still explained a substantial proportion of the variance in aggression.

Although schizophrenia and/or psychosis are found to be associated with aggression, it remains unclear which aspect of this mental illness, and which other risk factors, account for this relationship. When asking clinicians about their opinion, nursing staff were found to report mainly clinical variables (e.g., symptoms, diagnosis), instead of person-related features (Duxbury & Whittington, 2005). In Chapter 3 of this thesis, a study was reported on the view of psychiatrists, and results indicated that these clinicians also generally adhere to the medical model. That is, psychiatrists considered the illness-related features as most important, whereas the personality factors were seen as least relevant. Specifically, psychotic symptoms, in particular delusions and paranoid thoughts, and anxiety triggered by these symptoms were mentioned as most important. However, this has not been consistently shown by empirical research.

Psychotic symptoms and aggression

Several conclusions can be drawn on the role of specific symptoms in causing the aggressive behavior of patients with a psyschotic disorder. First, the patient study presented in Chapter 6 found that positive symptoms in general were strongly associated with aggressive behavior. In particular threat/control-override (TCO) symptoms (Link & Stueve, 1994), referring to feelings of persecution and thoughts of losing control, emerged as the most robust correlate of aggressive behavior in the acute psychotic patient sample. This is well in line with the original idea and findings of Link and colleagues (1994, 1998) and Swanson et al. (1996), but, in contrast with the results reported by Applebaum, Robbins, and Monahan (2000) and Skeem et al. (2006). When separating the two domains of TCO symptoms (i.e., threat versus control-override), only threat symptoms appeared to be associated with aggression, which corroborates the findings of Stompe, Ortwein-Swoboda, and Schanda (2004) but is, again, not in agreement with the original assumption of Link and Stueve (1994). This might be explained by the fact that the study of Stompe et al. (2004) and the study described in Chapter 6 are more recent studies in which more elaborated instruments were used to

assess the TCO construct, instead of the two or three item scales as employed in the earlier study by Link and colleagues (1994, 1998). For example, the study in Chapter 6 used the Threat/Control Override Questionnaire (TCOQ), which is a newly developed self-report measure consisting of 14 questions (6 representing the threat and 8 representing the control-override). The psychometric properties of this instrument were further examined in the study presented in Chapter 7. Results indicated that the TCOQ was of good quality in terms of reliability and validity, and thus seems to provide useful and accurate information on the presence and intensity of the TCO symptoms in psychotic patients.

From a theoretical point-of-view, these findings make sense as threat feelings might lead to a defensive reaction expressed by means of aggression. Feelings of losing control on the other hand may lead to helplessness behavior and inhibition as nothing can be done about it. When focusing on the non-clinical populations (Chapters 4 and 5), the findings were comparable with the aforementioned results, albeit somewhat less powerful, which was probably due to the low intensity of these symptoms in these samples. Again, feelings of persecution (i.e., threat) emerged as the most important predictor of aggression, even after controlling for other variables.

Other positive psychotic symptoms that were investigated on their relation with aggressive behavior in non-clinical populations were hallucinatory experiences, mainly auditory and visual hallucinations, and negative psychotic symptoms (e.g., anhedonia, blunted affect). The assumption that hallucinatory behavior would be related to aggression originates from the idea that patients with a psychotic disorder hear voices that command them to hit or kill someone and finally comply with these imperative hallucinations (Bjorkly, 2002). Until now, little evidence has been found to confirm this assumption. In the current thesis, the findings with regard to the link between hallucinations and aggression however, were inconsistent. In Chapter 4, hallucinations emerged as a significant but modest correlate of aggression, whereas in Chapter 5 no substantial association between hallucinatory behavior and aggression was found. While one could argue that such types of command hallucinations are hardly experienced by non-clinical individuals, even our clinical sample did not yield positive evidence on this relationship.

Finally, the role of negative psychotic symptoms was examined in Chapters 4 and 6 of this dissertation. Although some theorists assume that these symptoms are associated with aggressive behavior (e.g., Bowie et al., 2001), our data indicated that such negative symptomatology was not related to aggressive behavior. This is in keeping with the findings of other studies (e.g., Arango, Calcedo Barba, González-Salvador, & Calcedo Ordóñez 1999; Swanson et al., 2006) and can be explained by the fact that apathy, a state of indifference,

is part of this negative symptomatology and more or less refers to impassive (i.e., non-aggressive) behavior.

Anger, anxiety, and drug use in relation to aggression in psychosis

Besides the psychotic symptoms, other risk factors might play a role in the aggressive behavior of patients with schizophrenia or other psychotic disorders. In Chapter 4, 5 and 6 of this thesis, a main focus was on negative emotions such as anger and anxiety, because it can be assumed that such emotional states are often associated with aggressive behavior (e.g., Blair, 2001; Tschann, Flores, Pasch, & VanOss Marin, 2005). However, it remains largely unclear which type of emotion is important for our understanding of aggression in psychotic patients. The psychiatrists in Chapter 3 attributed the aggressive behavior, apart from the psychotic symptoms, to anxiety triggered by these symptoms. It seems plausible to assume that fear and anxiety might induce aggressive behavior in specific situations. Such aggression then might function as a defense mechanism (i.e., flight response). In a similar vein, anger also represents a negative emotional state and is often seen as a precursor of aggression. According to the theory of Posner, Russell, and Peterson (2005), both negative emotions can have an activating effect on behavior which in turn might lead to aggressive behavior. In the cross-sectional survey studies described in Chapters 4 and 6, dispositional anger and anxiety were investigated and both were found to be significantly associated with aggression in healthy and psychotic samples, with a more prominent role for anger than for anxiety. In Chapter 6, state anger and anxiety experiences by patients with a psychotic disorder in response to the primary delusion were examined with a newly developed self-report questionnaire. However, no effect of these state emotions on patients' level of aggression was found. One reason for this null finding might be the self-report method that was employed in this study. It may well be that patients had difficulties in expressing the type and intensity of their feelings at that moment, which is in agreement with the early notion of Bleuler (1911) that schizophrenia seems to be a disorder in which patients have difficulties in expressing their emotions. On the other hand, this non-significant finding might be caused by the fact that the included scales of dispositional anger and anxiety soaked up the variance of the state measures. In Chapter 5, an experimental study in a healthy student sample was conducted in which a combined mood induction procedure was employed with guided imagery and mood-congruent music to induce angry or anxious mood states. After the mood-manipulation, a word-stem aggression task was presented to the participants, in order to examine their aggressive attitude. Results indicated that both anger and anxiety states increase the aggressive

attitude in healthy samples, which corresponds with the hypothesis that anger and anxiety both lead to aggression.

Altogether, the results of this dissertation only obtained evidence for the direct effect of anger and anxiety on aggressive behavior. The strongest effect was observed for anger, which is in line with the original idea that this emotional state undoubtedly leads to aggressive behavior (Berkowitz, 1990). The effects of anxiety were smaller, but also worth mentioning, as it is a relatively new finding which breaks with the assumption that anxiety always co-occurs with avoiding behaviors. Although the present findings provide some insight on the role of negative emotions in the link between aggression and psychosis in clinical and non-clinical populations, further research should focus on the discrimination between dispositional and state forms of these emotions. Are dispositional characteristics of anger and anxiety more important for inducing aggression in psychosis or is such behavior more situation-dependent? And if the latter is the case, do these emotions act as mediating or moderating variables in the link between the psychosis and aggression, or do they trigger aggressive behavior independently of the psychosis? It seems logical to assume that feelings of threat lead to anxious and/or angry mood states which in turn induce aggressive behavior (cf. Junginger, 2006).

As alcohol and drug use are often associated with a higher risk on engaging in aggressive behavior, and especially in patients with a psychotic disorder (see Chapter 2), Chapters 4 and 6 examined the influence of these variables in respectively non-clinical and clinical samples. In both studies, alcohol use was not associated with aggressive behavior. Drug use showed a moderate relationship in the student sample, but no significant association was obtained in the patient sample. Altogether, no convincing evidence was found for the link between drug and alcohol use and aggressive behavior, which is in contrast with most other studies (see Fazel et al., 2009a,b). This discrepancy might be explained by the fact that people displaying extreme forms of drug and alcohol use were not included in these studies. As a result, the frequency of drug use might have been too low to show its relation with aggression.

Methodological issues

Although the studies that were presented in this dissertation provide evidence for the involvement of anger, anxiety, and feelings of threat when explaining aggressive behavior in psychotic persons, there are a number of important limitations to consider. First, most studies predominantly relied on self-report scales, which is a method susceptible to reporter bias. Although we corrected for social desirability, the use of multi-method and/or experimental designs

would have been preferable as this probably eliminates unwanted favorable opinions by the participant. Besides, it is possible that in particular psychotic patients, who were included in two of the studies, have difficulties in reflecting on their thoughts, feelings, and behaviors. A second and related shortcoming pertains to the cross-sectional design of the studies, which implies that no causal inferences can be made about these data. As such, it remains unclear whether variables such as feelings of threat and negative emotions (i.e., anger, anxiety) actually precede the aggressive behavior. Prospective and experimental research could provide more insight into the direction of the relationship between anger, anxiety, threat, and aggression. A third limitation concerns the newly developed questionnaires that were used in these studies: the 'psychiatrists' survey', the Affective Responses to Delusions Scale (ARDS), and the Threat/Control-Override Questionnaire (TCOQ). Important conclusions were based on these scales, which, although shown to have good internal consistencies, have not been used widely. More research is needed to confirm the reliability and validity of these measures. A fourth shortcoming has to do with the conceptual problems in this field of research. One major issue concerns the operationalization of aggression and/or violent behavior. Although it seems obvious for most people what is meant with this kind of behavior, no consistency has been reached by theorists on a universal definition of this concept (e.g., Berkowitz, 1990; DiGiuseppe & Tafrate, 2010). For this thesis, aggressive behavior was defined as 'verbal and physical aggression', thereby excluding more extreme forms of violence such as rape, murder, or manslaughter. A fifth and final limitation that needs to be mentioned is that not all variables that might influence aggressive behavior were taken into account. For example, conduct problems during childhood were not included as a confounding variable, although previous research had considerably demonstrated that this factor might be significantly associated with aggressive behavior in psychosis (e.g., Hodgins, Cree, Alderton, & Mak, 2008; Tengstrom, Hodgins, Grann, Langstrom, & Kullgren, 2001). Further, mood instability, traumatic incidents, and cognitive distortions are other common problems seen in psychosis that might heighten the risk for acting violently. Finally, although this dissertation was restricted to the intra-individual determinants of psychotic symptoms and negative emotions, environmental factors and living circumstances may also play an important role in the development of aggressive behavior (Markowitz, 2011).

Clinical implications

As most studies that were presented in this dissertation mainly focused on the fundamental processes in the etiology of aggressive behavior, conclusions are primarily of theoretical relevance. However, the clinical importance still needs to be underlined. Whereas the findings in this thesis point at the considerable risk on aggression for patients with a psychotic disorder, not all of these patients actually behave aggressively. To understand these individual differences, more insight into the prevalence, severity, and risk factors for aggressive behavior and its link with psychosis is necessary. Based on the findings of this thesis, clinicians and researchers should be alert for patients that report feelings of threat and signs of anger and anxiety during their clinical evaluation with them. Also the use of multi-informant methods and diagnostic instruments might be helpful to examine the feelings and cognitions of patients that may be vulnerable to such feelings and cognitions.

Further, psychological models can be developed that may serve as useful theoretical frameworks upon which therapeutic interventions can be based. In this context this means that the cognitions that reflect the feelings of threat and persecution as well as the emotions of anger and anxiety need to be addressed in interventions. Although pharmacological treatment remains the main intervention for psychotic disorders, patients may also benefit from psychotherapy (Lion, 2008). For example, Cognitive Behavioral Therapy is currently recommended in the Netherlands, as described in the Multidisciplinary Guidelines for the Treatment of Schizophrenia (Brandt-Dominicus, 2005). The paranoid and suspicious thoughts that these patients might display can be effectively modified by means of cognitive techniques, which in turn, also might lower the intensity of anger and/or anxiety. As a result, aggression may be reduced or even prevented. In addition, Anger Management Strategies based on CBT (Howells & Day, 2003) and Emotion Regulation Therapy techniques (Mennin, 2006) could complement the treatment of patients with a psychotic disorder to control emotional (i.e., aggressive) outbursts.

Directions for further research

Several recommendations for future research can be provided. First, it is essential that the concepts that were examined in this thesis will be further investigated in order to make more definitive conclusions about their role in the formation of aggression in psychosis. That is, the methods of measurement and research populations could be further expanded. The present thesis mainly relied on self-report questionnaires, and the emotions of anger and anxiety were

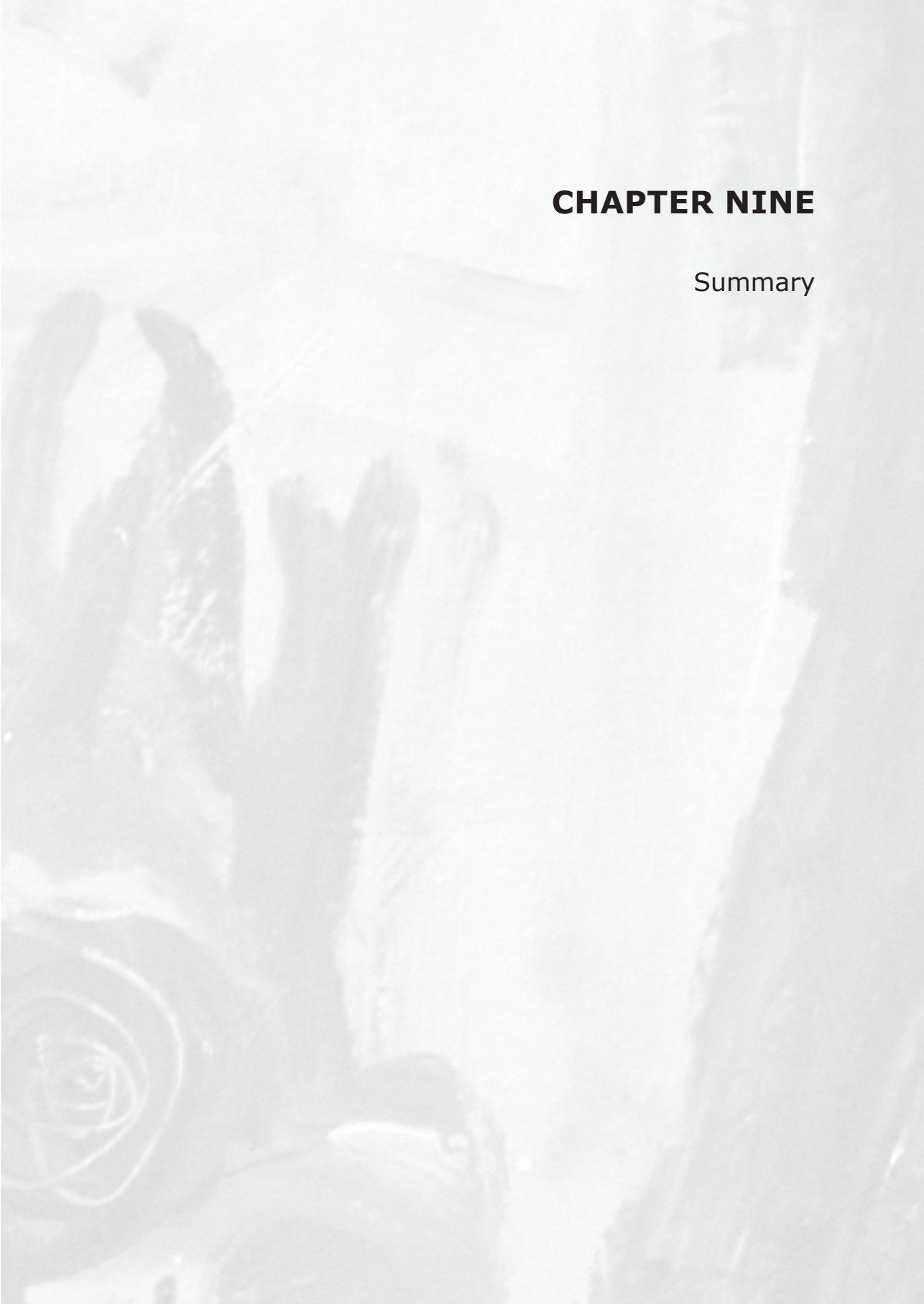
only induced in one of the studies. To gain more insight in the role of feelings of persecution, an experimental exploration of this facet is warranted (e.g., making someone suspicious by providing ambiguous or inconsistent stories). Further, new experimental aggression paradigms for measuring aggression more directly might be helpful. The task used in this thesis (i.e., word-stem completion task) only focused on an implicit form of aggression. Instead, field research could be carried out in which verbal and physical aggressive behavior can be induced and observed. It is a challenge, however, to design studies which are still in keeping with current ethical standards. Also, physiological measures (e.g., heart rate, skin conductance) might be used in addition to such experiments as they reflect the indications of physical arousal for an individual. Second, it is encouraged to focus explicitly on clinical populations in order to facilitate the implications for clinical practice. For example, our mood induction experiment was conducted in a general student sample (see Chapter 5), and therefore results of this study, although interesting, cannot be generalized to psychotic patient samples. Therefore, the design is currently replicated in a clinical sample of 62 stabilized male patients with schizophrenia.

Another suggestion for future research concerns the increasing knowledge on the (neuro-) biological processes of aggression and violence (e.g., Siever, 2008). Therefore it would be beneficial to further specify the biological dysfunctions in psychotic patients who behave aggressively, i.e. abnormalities in brain structures, neural circuitry, and neurotransmitter receptors that may underlie violent behavior. It is well known that among neurotransmitters, serotonin plays a major inhibitory role in aggressive behavior, whereas dopamine and norepinephrine may heighten the vulnerability of a person behaving violently (Hughes, 1999). Therefore, atypical antipsychotics, affecting both serotonin and dopamine levels, might have anti-aggressive properties. Also, anticonvulsants, sometimes used as antipsychotic medication, and mood-stabilizers, might reduce impulsivity and irritability as they alter the glutamatergic/gabaminergic balance (Hollander, Swann, Coccaro, Jiang, & Smith, 2005). By means of ElectroEnceophaloGram (EEG) and functional Magnetic Resonance Imaging (fMRI), specific brain processes can be further investigated and information on biological dysfunctions can be provided, which might contribute meaningfully to the assessment and (pharmacological) treatment of patients displaying pathological aggressive behavior and/or for those with a predisposition to behave violently.

Third, although the research presented in this thesis yields more evidence for the role of psychotic symptoms and negative emotions in explaining aggression, it is also clear that there are other factors (e.g., personality characteristics, social and environmental factors) involved in the origins of aggressive behavior in psychotic patients. For example, stress sensitivity, a family history of violence,

childhood deprivation, and living in socially disorganized neighborhoods are found to be important risk factors for aggressive behavior (e.g., Farrington, Barnes, & Lambert, 1996; Markowitz, 2011). For a better understanding of the causal influences and advances in predictive accuracy the interaction among a substantial number of risk factors of aggressive behavior, prospective research with larger samples and complex assessment techniques is preferred.

Finally, following research on the etiology of aggression, it is suggested to support research on intervention and management strategies to handle aggressive behavior in psychiatry, and particularly in psychosis. The consideration that clinicians assume illness-related features to be most important suggests a medical solution, but clinicians should additionally use a more creative environmental-based approach so that in which other factors are also taken into account (see Chapter 3). Research on how aggressive behavior is managed nowadays would provide more insight on the current status of health care facilities for such patient groups. Adapting these treatments by implementing the findings of relevant research on the etiology of aggressive behavior in psychosis or other patient groups would facilitate better health care opportunities for patients and clinicians.



CHAPTER NINE

Summary

The present dissertation focused on the prevalence and intra-individual determinants of aggressive behavior in psychosis, with a special focus on the content and severity of psychotic symptoms and the emotions anger and anxiety. First, a literature search on epidemiological studies on the link between schizophrenia and aggression was conducted in order to provide a broad overview of this research field, including the problems with and limitations of these studies. Then, a study on the views that psychiatrists hold on the risk factors for psychosis-related aggressive behavior was presented to find out their opinion on the most important predictors, followed by three empirical studies that investigated the associations between psychotic symptoms, emotional reactions, and aggressive behavior. Two of these studies were carried out in non-clinical student samples, and one study in a clinical sample of acute psychotic patients. The final research chapter concerned a methodological study in which the psychometric properties of a newly developed self-report questionnaire for measuring aggression inducing cognition in psychotic patients were examined. In this section, a brief summary of the main results of the studies that were presented in Chapter 2 to 7 will be provided, followed by a brief general conclusion.

Overview of the main findings

In **Chapter 2** a systematic review was presented on the relationship between mental disorders, and in particular schizophrenia and related psychoses, and violent behavior. An exhaustive database search was conducted and all epidemiological studies that were conducted since 1980 were selected. A final sample of 27 articles, based on 21 independent studies, that met the selection criteria were included in the review. Studies were categorized on the basis of their study design and briefly outlined. That is, birth cohort, community, and register studies were summarized and led to the conclusion that schizophrenia and other related psychotic disorders seem to be undoubtedly associated with violent behavior (OR's between 2 and 28). However, it should be kept in mind that underlying variables or risk factors such as the environment, drug/alcohol abuse, a family history of violence, the experience of negative emotions, impulsivity, and childhood problems might be of particular relevance when interpreting the link between violence and psychosis. Further, problems with study designs and/or conceptual difficulties should also be taken into account when discussing the heightened risk for aggressive behavior in patients with a psychotic disorder. For example, the operationalization of aggression and violent behavior, but also the demarcation of schizophrenia and related psychoses and their measurement is problematic when comparing and discussing the research findings in this field.

To examine which potential risk factors might play a role in the aggressive behavior of patients with a psychotic disorder, psychiatrists were questioned about their opinion on the most important antecedents of aggression in this patient sample, a study which is described in **Chapter 3**. First a literature study was conducted to select factors that are often assumed to be related to aggression and a survey questionnaire was developed, roughly consisting of three domains, i.e., personal, social, and illness-related factors. A total of 659 psychiatrists have filled out this questionnaire and results indicated that psychiatrists generally viewed illness-related features and anxiety triggered by the psychosis, as the most important determinants of aggression in patients with a psychotic disorder, followed by impulsivity/lack of insight and social influences, whereas personality characteristics were considered as least relevant. Further, latent class cluster analysis revealed that there are several subgroups of psychiatrists who attach different levels of importance to various types of risk factors. In these subgroups, two clear cluster contrasts were found: one representing differences in response style, and one representing differences in the evaluation of personality characteristics. Based on these findings, it can be concluded that psychiatrists generally seem to adopt a medical model when interpreting aggression in psychotic patients.

To further investigate the association between aggression and psychosis and the role of intra-individual and illness-related risk factors in this relationship, the studies that were reported in the Chapters 4, 5, and 6 were carried out. First, in **Chapter 4**, a study was described in which a non-clinical student sample was examined on the occurrence of psychotic-like experiences such as schizotypal signs, psychoticism, hallucinatory behavior, and threat/control-override symptoms, to explore their relationship with aggressive behavior. Relevant personality characteristics and socio-demographic factors (e.g., gender, drug use) were taken into account. In this study it was found that the majority of the sample showed at least some signs of psychotic-like experiences, which is in line with other studies in the general population. A clear relationship was found between psychotic-like experiences and aggressive behavior, with schizotypal traits and hallucinatory behavior emerging as the most robust correlates. These types of psychotic-like experiences accounted for a significant and unique proportion in the variance of aggressive behavior, even after controlling for the influence of neuroticism, dispositional anger and anxiety, and drug use. These results provide further evidence for the association between psychosis and aggression in non-clinical samples.

Chapter 5 reported on an experimental study in a non-clinical student sample in which the role of dispositional anger and anxiety on aggressive state behavior was examined, while taking psychotic-like experiences into account. By means of a combined guided imagery procedure with vignettes and mood-

congruent music, participants were brought into an angry, anxious, or neutral mood, after which they were asked to complete a word-stem task in which words could be completed in either an aggressive or non-aggressive way. Psychotic-like experiences were examined with self-report questionnaires. Results showed that persons with an angry or anxious mood state also displayed a more aggressive attitude than persons who were in a neutral mood. Further, it was also found that persecutory thoughts were significantly associated with aggressive behavior, whereas positive symptoms in general, hallucinatory behavior, and social reference ideas were not. In addition to the previous chapter, these findings yield evidence for the role of persecutory thoughts and state anger and anxiety in triggering aggression in non-clinical populations

To also find evidence for the role of specific psychotic symptoms and emotional reactions to these symptoms in clinical populations, a multicenter study in a sample of inpatients with a psychotic disorder was conducted, which is presented in **Chapter 6**. Specifically, threat/control-override symptoms had the focus of attention and were measured with a newly developed questionnaire, the Threat/Control-Override Questionnaire (TCOQ; see Appendix A). Furthermore, the emotional reactions of anger and anxiety to such symptoms were measured by means of other self-report measures. Also anger disposition, trait anxiety, impulsivity, and drug use were taken into account as these might also increase the risk on aggressive behavior. Results indicated that in particular the threat/control-override symptoms were strongly related to aggressive behavior in these psychotic patients. Further analysis revealed that especially threat symptoms, but not control-override symptoms, carried this effect. When looking at the emotions, it was found that anger disposition accounted for a significant and unique proportion of the variance in the aggressive behavior of psychotic patients, whereas state anger and anxiety in reaction to positive symptoms did not. These findings suggest that feeling threatened as part of the psychosis and anger disposition play a role in the origins of aggressive behavior of patients with a psychotic disorder.

In the final study, presented in **Chapter 7**, the reliability and validity of the TCOQ were examined in a non-clinical population and a clinical sample (including stabilized and acute psychotic patients). The questionnaire measuring threat/control-override symptoms consisted of two subscales, one for measuring feelings of persecution and another for measuring feelings of losing control. Factor analysis indeed yielded this expected two-factor structure. Internal consistency and test-retest reliability were found to be satisfactory, and the concurrent validity was demonstrated by a meaningful pattern of correlations with other self-report and interview measures of psychotic symptomatology. Group comparisons showed that the patient samples displayed significantly higher scores on the scale than the student sample. Altogether, it can be concluded

that the TCOQ is a reliable and valid index for assessing feelings of persecution and losing control in both clinical and non-clinical samples.

Conclusion

Psychotic disorders are considered as the most complex clinical disorders, and although professionals in psychiatry find this an interesting and important research topic, the association between this mental illness and danger and threat often dominates in the majority of the community. The various studies that are presented in this dissertation focus on the occurrence of aggressive behavior in psychosis, with special attention for the intra-individual determinants that play a role in this relationship. A literature review was conducted and a series of empirical studies in clinical and non-clinical populations was set up. The main findings of these studies were as follows: Generally, evidence was found for the assumption that psychosis and aggression are strongly related in clinical as well as in non-clinical populations. When concentrating on the psychotic symptoms specifically, positive symptoms, and in particular feelings of threat and persecution, emerged as the most important correlate of aggressive behavior. With regards to the emotional aspects, it was found that anger and anxiety both were significantly related to aggressive behavior, with anger having the strongest influence. In this thesis, no evidence was found for drug use or negative psychotic symptomatology as relevant correlates of aggression. Although these findings contribute to a fuller understanding of the link between psychosis and aggression, this issue is still the subject of an ongoing debate. More research is needed to provide more and definitive conclusions on the risk factors that are of importance in understanding the etiology of aggressive behavior so that handling and management strategies can be developed in order to provide more adequate health care facilities.

SAMENVATTING

(Summary in Dutch)

De huidige dissertatie richtte zich op de prevalentie en intra-individuele determinanten van agressief gedrag bij psychose, waarbij de focus voornamelijk lag op de inhoud en de ernst van de psychotische symptomen alsmede op de emoties woede en angst. Ten eerste werd een literatuuronderzoek uitgevoerd naar de epidemiologische studies over de relatie tussen schizofrenie en agressie om zo een breed overzicht te geven van dit onderzoeksgebied, inclusief de problemen met en beperkingen van deze studies. Vervolgens werd een studie beschreven naar de visie die psychiaters hebben over de risicofactoren voor psychose-gerelateerd agressief gedrag om hun opinie over de meest belangrijke predictoren te onderzoeken, gevolgd door drie empirische studies waarin de associatie tussen psychotische symptomen, emotionele reacties en agressief gedrag werd onderzocht. Twee van deze studies zijn uitgevoerd in niet-klinische studenten populaties, één studie is gedaan in een klinische steekproef van psychotische patiënten met een acute exacerbatie. Het laatste onderzoekshoofdstuk betreft een methodologische studie waarin de psychometrische eigenschappen werden onderzocht van een nieuw ontwikkelde zelfrapportage lijst om agressie, geïnduceerd door cognities, te meten. In de huidige sectie wordt een samenvatting gegeven van de voornaamste resultaten van de studies die in de hoofdstukken 2 tot 7 werden gepresenteerd, gevolgd door een korte algemene conclusie.

Overzicht van de voornaamste bevindingen

In **Hoofdstuk 2** werd een systematisch overzichtsartikel gepresenteerd naar de relatie tussen mentale stoornissen, in het bijzonder schizofrenie en daaraan gerelateerde psychosen, en gewelddadig gedrag. Databases werden uitputtend doorzocht en alle epidemiologische studies die sinds 1980 zijn uitgevoerd werden geselecteerd. Uiteindelijk resteerde een steekproef van 27 artikelen, gebaseerd op 21 onafhankelijke studies, die voldeden aan de selectiecritera. Studies werden gecategoriseerd op basis van hun design en kort uiteengezet. Dit wil zeggen dat de artikelen werden onderverdeeld in geboortecohort studies, gemeenschapstudies en registerstudies, en vervolgens kort werden samengevat. De beoordeling leidde tot de conclusie dat schizofrenie en daaraan gerelateerde psychotische stoornissen zonder twijfel zijn geassocieerd met gewelddadig gedrag (Odds ratios tussen 2 en 28). Daarbij dient echter in gedachten te worden gehouden dat andere risicofactoren zoals milieu, drugs- en alcoholgebruik, een familiegeschiedenis met geweld, negatieve emoties, impulsiviteit en problemen in de kindertijd, van bijzonder belang kunnen zijn bij de interpretatie van deze relatie. Verder dienen problemen met studiedesigns en/of conceptuele moeilijkheden ook in acht te worden genomen wanneer de

hoogte van risico op agressief gedrag door patiënten met een psychotische stoornis wordt bediscussieerd. Bijvoorbeeld, de operationalisatie van agressie en geweld, maar ook de demarcatie van schizofrenie en daaraan gerelateerde psychosen en hoe deze worden gemeten kunnen problematisch zijn wanneer de onderzoeksbevindingen in dit veld met elkaar worden vergeleken.

Om te onderzoeken welke potentiële risicofactoren een rol zouden kunnen spelen in het agressieve gedrag van patiënten met een psychotische stoornis, zijn psychiaters gevraagd naar hun opinie over de meest belangrijke antecedenten van agressie in deze patiëntengroep, een studie die is beschreven in **Hoofdstuk 3**. Eerst werd een literatuurstudie gedaan om factoren te selecteren die vaak beschouwd worden alszijnde gerelateerd aan agressie; vervolgens werd een survey vragenlijst ontwikkeld. Een totaal van 659 psychiaters heeft deze vragenlijst ingevuld en resultaten suggereerden dat psychiaters in het algemeen de ziektegerelateerde factoren en angst getriggered door de psychose als meest belangrijke determinanten van agressie zien bij patiënten met een psychotische stoornis. Dit werd gevolgd door impulsiviteit/gebrek aan inzicht en sociale invloeden, terwijl persoonlijkheidskenmerken werden beschouwd als minst relevant. Verder toonde een latente klasse cluster analyse aan dat er verscheidene subgroepen van psychiaters bestaan die een andere mate van belang toeschrijven aan de verschillende typen risicofactoren. In deze subgroepen werden twee duidelijke cluster contrasten gevonden, waarvan één de verschillen in responsestijlen representeerde en één de verschillen in de evaluatie van persoonlijkheidskenmerken. Gebaseerd op deze bevindingen kan worden geconcludeerd dat psychiaters in het algemeen vasthouden aan een medisch-ziekte model wanneer agressie bij psychotische patiënten wordt geïnterpreteerd.

Om de associatie tussen agressie en psychose, en de rol van intra-individuele en ziektegerelateerde factoren in deze relatie, verder te onderzoeken, zijn de studies, zoals gerapporteerd in de hoofdstukken 4, 5 en 6, uitgevoerd. In **Hoofdstuk 4** werd een studie beschreven waarin een niet-klinische studentenpopulatie werd onderzocht op het voorkomen van psychotisch aandoende klachten zoals schizotypische symptomen, psychoticisme, hallucinatoir gedrag en threat/control-override symptomen. Hierbij werd ook de relatie tussen deze belevingen en agressie onderzocht. Voor relevante persoonlijkheidskenmerken en socio-demografische factoren (o.m. geslacht, drugsgebruik) werd gecontroleerd. In deze studie werd gevonden dat de meerderheid van de steekproef ten minste enkele tekenen van psychotisch aandoende klachten vertoonde, hetgeen overeen komt met andere studies die zijn uitgevoerd in de algemene populatie. Er werd een duidelijke relatie gevonden tussen psychotisch aandoende klachten en agressie, waarbij schizotypische trekken en hallucinatoir gedrag de meest robuste correlaties vormden. Deze

vormen van 'psychose' waren verantwoordelijk voor een significant en uniek deel van de variantie van agressief gedrag, zelfs na het controleren voor de invloeden van neuroticisme, dispositionele woede, angst en drugsgebruik. Deze resultaten leveren verder bewijs voor de associatie tussen psychose en agressie in niet-klinische populaties.

In **Hoofdstuk 5** werd een een experimentele studie in een niet-klinische studentenpopulatie gerapporteerd, waarin de invloed van situatie-afhankelijke woede en angst op agressief gedrag werd onderzocht, terwijl voor de invloed van psychotisch aandoende klachten werd gecorrigeerd. Door middel van een gecombineerde en geleidde inbeeldingsprocedure met vignetten en stemmingscongruente muziek, werden de participanten in een boze, bange of neutrale stemming gebracht waarna hen werd gevraagd om een woord-stam taak te maken waarbij woorden op een agressieve of niet-agressieve manier konden worden afgemaakt. Psychotisch aandoende klachten werden onderzocht met behulp van zelfrapportage vragenlijsten. Resultaten toonden aan dat personen met een boze of bange stemming een meer agressive attitude hanteerden dan personen met een neutrale stemming. Verder werd gevonden dat gedachten met een bedreigende inhoud duidelijk geassocieerd waren met agressief gedrag, terwijl positieve psychotische symptomen in het algemeen, hallucinaties en betrekkingsideeën dit verband niet lieten zien. In aanvulling op het voorgaande hoofdstuk geven deze resultaten eveneens ondersteuning aan de rol van bedreigende gedachten, situatie-afhankelijke woede en angst voor het opwekken van agressie bij niet-klinische populaties.

Om de rol van specifieke psychotische symptomen en emotionele reacties in relatie tot agressie in de kliniek te onderzoeken, is een multicenter onderzoek uitgevoerd bij klinisch opgenomen patiënten met een psychotische stoornis. Deze studie werd gepresenteerd in **Hoofdstuk 6** van de huidige dissertatie. Specifiek lag de aandacht op 'threat/control-override' symptomen welke werden gemeten met een nieuw ontwikkelde vragenlijst, de Threat/Control-Override Questionnaire (TCOQ; zie bijlage A). Verder werden de emotionele reacties van woede en angst op deze symptomen gemeten door middel van andere zelfrapportage instrumenten. Ook voor dispositionele woede, angst, impulsiviteit en drugsgebruik werd gecorrigeerd, aangezien deze factoren het risico op agressief gedrag kunnen vergroten. Resultaten duidden er op dat in het bijzonder de 'threat/control-override' symptomen sterk gerelateerd waren aan agressief gedrag bij deze patiënten. Verdere analyse toonde aan dat vooral 'threat' symptomen, maar niet 'control-override' symptomen, dit effect veroorzaakten. Wanneer gekeken werd naar de emoties, bleek woede dispositie verantwoordelijk voor een significant en uniek deel van de variantie in het agressieve gedrag van psychotische patiënten, terwijl dit niet gold voor situatie-afhankelijke woede en angst in reactie op positieve symptomen. Deze

bevindingen suggereren dat 'je bedreigd voelen', als onderdeel van de psychose, en dispositionele woede een rol spelen in het ontstaan van agressief gedrag van patiënten met een psychotische stoornis.

In de laatste studie, **Hoofdstuk 7**, werden de betrouwbaarheid en validiteit van de TCOQ onderzocht in zowel een klinische (inclusief stabiele en acuut psychotische patiënten) als in een niet-klinische populatie. De vragenlijst die 'threat/control-override' symptomen meet bestaat uit twee subschalen, één voor het meten van gedachten met een bedreigende inhoud en één voor het meten van het gevoel van controleverlies. Factoranalyse bevestigde deze twee-factor structuur. De interne consistentie en test-hertest betrouwbaarheid werden voldoende bevonden en de concurrente validiteit werd aangetoond door middel van een betekenisvol patroon van correlaties met andere zelfrapportage schalen en interviews die zijn gericht op de aanwezigheid en ernst van psychotische symptomatologie. Groepsvergelijkingen toonden aan dat beide patiëntengroepen significant hogere scores behaalden op de schaal dan de studentensteekproef. Samengevat kan worden gesteld dat de TCOQ een betrouwbare en valide index is voor het onderzoeken van gevoelens van bedreiging en verlies van controle in zowel klinische als in niet-klinische populaties.

Conclusie

Psychotische stoornissen worden vaak gezien als de meest complexe klinische stoornissen. Hoewel professionals in de psychiatrie dit een interessant en belangrijk topic van onderzoek vinden, domineert in de samenleving juist de associatie tussen deze ziekten en gevaar en dreiging. De verschillende studies die zijn opgenomen in deze dissertatie richtten zich op het voorkomen van agressief gedrag tijdens een psychose, waarbij speciale aandacht uitging naar de intra-individuele determinanten die hierbij een rol spelen. Een literatuur onderzoek en enkele empirische studies in zowel klinische als in niet-klinische populaties toonden dat de relatie tussen psychose, of psychotisch aandoende klachten, en agressie duidelijk aanwezig is in beide groepen. Wanneer meer specifiek gekeken werd naar de psychotische of psychose-achtige symptomen, bleken de positieve symptomen, en in het bijzonder de gevoelens van bedreiging, de meest sterke correlaties te vertonen met agressief gedrag. Van de emotionele aspecten bleken woede en angst beide significant gerelateerd te zijn aan agressief gedrag, waarbij woede de sterkste invloed leek te hebben. In deze dissertatie is geen bewijs gevonden voor de aanname dat drugsgebruik en negatieve psychotische symptomatologie gecorreleerd zijn met agressie. Hoewel deze bevindingen bijdragen aan een vollediger begrip van de relatie tussen psychose en agressie, blijft onduidelijk hoe deze factoren samenhangen

en wat de rol van andere invloeden (o.m. omgeving, ervaringen in de kindertijd) in deze relatie is. Verder onderzoek is nodig om de etiologie van agressief gedrag bij schizofrenie en daaraan gerelateerde psychosen beter te begrijpen, zodat de juiste behandelstrategieën kunnen worden gehanteerd en adequate gezondheidszorgfaciliteiten kunnen worden aangeboden.

REFERENCES

Allen, T. J., Moeler, G., Rhoades, H. M., & Cherek, D. R. (1997). Subjects with a history of drug dependence are more aggressive than subjects with no drug use history. *Drug and Alcohol Dependence, 46,* 95-103.

American Psychiatric Association (2000). *Diagnostic and Statistical Manual of Mental Disorders (4th ed. Text Revision)*. Washington: American Psychiatric Association.

Anderson, C. A., Carnagey, N. L., & Eubanks, J. (2003). Exposure to violent media: The effects of song with violent lyrics on aggressive thoughts and feelings. *Journal of Personality and Social Psychology, 84,* 960-971.

Angermeyer, M. C. (2000). Schizophrenia and violence. *Acta Psychiatrica Sandinavica, 102,* 63-67.

Antonius, D., Fuchs, L., Herbert, F., Kwon, J., Fried, J. L., Burton, P. R. S., Straka, T., Levin, Z., Caligor, E., & Malaspina, D. (2010). Psychiatric assessment of aggressive patients: A violent attack on a resident. *American Journal of Psychiatry, 167,* 253-259.

Applebaum, P. S., Robbins, P. C., & Monahan, J. (2000). Violence and delusions: Data from the MacArthur violence risk assessment study. *American Journal of Psychiatry, 157,* 566-572.

Arango, C., Calcedo Barba, A., González-Salvador, T., & Calcedo Ordóñez, A. (1999). Violence in inpatients with schizophrenia: A prospective study. *Schizophrenia Bulletin, 25,* 493-503.

Armando, M., Nelson, B., Yung, A. R., Ross, M., Birchwood, M., Girardi, P., & Fiori Nastro, P. (in press). Psychotic-like experiences and correlation with distress and depressive symptoms in a community sample of adolescents and young adults. *Schizophrenia Research.*

Arsenault, L., Cannon, M., Murray, R., Poulton, R., Caspa, A., & Moffit, T. E. (2003). Childhood origins of violent behaviour in adults with schizophreniform disorder. *British Journal of Psychiatry, 183,* 520-525.

Arsenault, L., Moffit, T. E., Caspi, A., Taylor, P. J., & Silva, P. A. (2000). Mental disorders and violence in a total birth cohort. *Archives of General Psychiatry, 57,* 979-986.

Ashley, M. (1922). Outcome of 1,000 cases paroled from the Middletown State Hospital. *State Hospital Quarterly, 8,* 64-70.

Baron, R. A., & Richardson, D. R. (1994). *Human aggression (2nd ed.)*. New York: Plenum.

Barratt, E. S. (1994). Impulsiveness and Aggression. In Monahan, J., & Steadman, H. (Eds), *Violence and Mental Disorder: Development in Risk Assessment* (pp 61-79). Chicago: University of Chicago Press.

Bedford, A. &, Deary, I. J. (1999). The Delusions-Symptoms-States Inventory. Construction, applications and structural analyses. *Personality and Individual Differences 26,* 397-424.

Belfrage, H. (1998). A ten-year follow-up of criminality in Stockholm mental patients. New evidence for a relation between mental disorder and crime. *British Journal of Criminology, 38,* 145-155.

Berkowitz, L. (1981). The concept of aggression. In Brain, P. E., & Benton, D. (Eds.), *Multidisciplinary approaches to aggression research* (pp. 3-15). Amsterdam/New York: Elsevier/North-Holland.

Berkowitz, L. (1988). Frustrations, appraisals, and aversively stimulated aggression. *Aggressive Behavior, 14,* 3-11.

Berkowitz, L. (1990). On the formation and regulation of anger and aggression: A cognitive-neoassociationistic analysis. *American Psychologist, 45,* 494-503.

Bettencourt, B. A., Talley, A., Benjamin, A. J., & Valentine, J. (2006). Personality and aggressive behavior under provoking and neutral conditions: A Meta-analytic review. *Psychological Bulletin, 132,* 751-777.

Birchwood, M., & Jackson, C. (2001). *Schizophrenia*. UK Psychology press Ltd.

Bjorkly, S. (2002). Psychotic symptoms and violence towards other – A literature review of some preliminary findings. Part 2: Hallucinations. *Aggression and Violent Behavior. A Review Journal, 7,* 617-631.

Blair, R. J. R. (2001). Neurocognitive models of aggression, the antisocial personality disorders, and psychopathy. *Advances in Neuropsychiatry, 71,* 727-731.

Bleuler, E. (1911). *Dementia Praecox or the group of Schizophrenias* (translation 1950 by J. Zinken). New York: International Universities Press.

Blom, J. D. (2003). *Deconstructing schizophrenia. An analysis of the epistemic and nonepistemic values that govern the biomedical schizophrenia concept.* Amsterdam: Boom.

Bowie, C. R., Moriarty, M. A., Harvey, P. D., Parrella, M., White, L., & Davis, K. L. (2001). Aggression in elderly schizophrenia patients: A comparison of nursing home and state hospital residents. *Journal of Neuropsychiatry and Clinical Neuroscience, 13,* 357-366.

Brace, N., Kemp, R., & Snelgar, R. (2006). *SPSS for psychologists: A guide to data analysis using SPSS for windows.* Basingstoke: Palgrave Macmillan.

Bradley, M. M., & Lang, P. J. (1999). *Affective norms for English Words: ANEW*. Gainesville, FL: University of Florida Press.

Brandt-Dominicus, J. C. (2005). *Multidisciplinaire richtlijn schizofrenie: Richtlijn voor de diagnostiek, zorgorganisatie en behandeling van volwassen cliënten met schizofrenie.* Utrecht: trimbos Instituut.

Brekke, J. S., Prindle, C., Woo Bae, S. M. S. W., & Long, J. D. (2001). Risks for individuals with schizophrenia who are living in the community. *Psychiatric Services, 52,* 1358-1366.

Brennan, P. A., Mednick, S. A., & Hodgins, S. (2000). Major mental disorders and criminal violence in a Danish birth cohort. *Archives of General Psychiatry, 57,* 494-500.

Buchanon, A., Reed, A., Wessely, S., Garety, P., Taylor, P., Grubin, D., & Dunn, G. (1993). Acting on delusions: II. The phenomenological correlates of acting on delusions. *British Journal of Psychiatry, 163,* 77-81.

Buss, A. H. (1961). *The psychology of aggression.* New York: Wiley.

Buss, A. H., & Perry, M. (1992). The Aggression Questionnaire. *Journal of Personality and Social Psychology, 63,* 452-459.

Cannon, W. B. (1915). *Bodily changes in pain, hunger, and rage: an account of recent researches into the function of emotional excitement*. New York: Appleton.

Clarke, T., & Rowe, E. (2006). Violence, stigma, and psychiatric diagnosis: the effects of a history on psychiatric diagnosis. *Psychiatric Bulletin, 30,* 254-256.

Cohen, L., & Freeman, H. (1945). How dangerous to the community are state hospital patients? *Connecticut State Medical Journal, 9,* 697-700.

Coid J., Yang, M., Roberts, A., Ullrich, S., Moran, P., Bebbington, P., Burgha, T., Jenkins, R., Farrell, M., Lewis, G., & Singleton, N. (2006). Violence and psychiatric morbidity in a national household population. A report from the British household survey. *American Journal of Epidemiology, 164,* 1199-1208.

Corrigan, P. W., & Watson, A. C. (2005). Findings from the national comorbidity survey on the frequency of violent behavior in individuals with psychiatric disorders. *Psychiatric Research, 136,* 153-162.

Crowne, D. P., & Marlowe, D. (1964). *The approval motive: Studies in evaluative dependence*. New York: Dryden Press.

Cuellar, A. E., Snowden, L. M., & Ewing T. (2007). Criminal records of persons served in the public mental health system. *Psychiatric Services, 58,* 114-120.

DeCoster, S., & Heimer, K. (2001). The relationship between law violation and depression: An interactionist analysis. *Criminology, 39,* 799-836.

DiGiuseppe, R., & Tafrate, R. C. (2010). *Understanding anger disorders.* New York: Oxford University Press.

Douglas, K. S., Guy, L. S., & Hart, S. D. (2009). Psychosis as a risk factor for violence to others: A meta-analysis. *Psychological Bulletin, 135,* 679-706.

Duxbury, J. & Whittington, R. (2005). Causes and management of patient aggression and violence: staff and patient perspectives. *Journal of Advanced Nursing, 50,* 496-478.

Eagly, A. H., & Steffen, V. J. (1986). Gender and aggressive behavior: A meta-analytic review of the social psychological literature. *Psychological Bulletin, 100,* 309- 330.

Easterbrook, P. J., Gopalan, R., Berlin, J. A., & Matthews, D. R. (1991). Publication bias in clinical research. *Lancet, 337,* 867-872.

Elbogen, E. B., & Johnson, S. C. (2009) The intricate link between violence and mental disorder. Results from the national epidemiologic survey on alcohol and related conditions. *Archives of General Psychiatry, 66,* 152-161.

Eronen, M., Angermeyer, M. C., & Schulze, B. (1998). The psychiatric epidemiology of violent behaviour. *Social Psychiatry Psychiatric Epidemiology*, *33,* S13-23

Eronen, M., Hakola, P., & Tiihonen, J. (1996). Mental disorders and homicidal behavior in Finland. *Archives of General Psychiatry, 53,* 497-501.

Evers, A., Van Vliet-Mulder, J. C., & Groot, C. J. (2000). *Documentatie van tests en testresearch in Nederland (COTAN), deel I en II.* Assen, NL: Van Gorcum.

Eysenck, H. J., & Eysenck, S. B. G. (1970). Crime and personality: An empirical study of the three-factor theory. *British Journal of Criminology, 10,* 225-239.

Eysenck, H. J., & Eysenck, S. B. G. (1991). *Manual of the Eysenck personality scales (EPS adult).* London: Hodder and Stoughton.

Farrington, D. P., Barnes, C. G., & Lambert, S. (1996). The concentration of offending in families. *Legal Criminological Psychology, 1,* 47-63.

Fazel, S., Gulati, G., Linsell, L., Geddes, J. R., & Grann, M. (2009a). Schizophrenia and violence: Systematic review and meta-analysis. *PLOS Medicine, 6,* 1-15.

Fazel, S., Langstrom, N., Hjern, A., Grann, M., & Lichtenstein, P. (2009b). Schizophrenia, substance abuse, and violent crime. *Journal of the American Medical Association, 301,* 2016-2023.

Field, A. P. (2009). *Discovering statistics using SPSS.* London: Sage.

First, M. B., Spitzer, R. L., Gibbon, M., & Williams, J. B. W. (2002). *Structured Clinical Interview for DSM-IV-TR Axis I Disorder, Research Version, Patient Edition (SCID-I/P).* New York: New York State Psychiatric Institute.

Fisher, R. J., & Katz, J. E. (2000). Social desirability and the validity of self-reported values. *Psychology and Marketing, 17,* 105-120.

Freeman, D. (2007). Suspicious minds: The psychology of persecutory delusions. *Clinical Psychology Review, 27,* 425-457.

Freeman, D., Garety, P. A., & Kuipers, E. (2001). Persecutory delusions: Developing the understanding of belief maintenance and emotional distress. *Psychological Medicine, 31,* 1293-1306.

Fresán, A., Apiquian, R., De la Fuente-Sandoval, C., Loyzaga, C., Garcia-Anaya, M., Meyenberg, N., & Nicolini, H. (2005). Violent behavior in schizophrenic patients: Relationship with clinical symptoms. *Aggressive behavior, 31,* 511-520.

Gray, J. P. (1857). Homicide in insanity. *American Journal of Insanity, 14,* 119-143.

Green, C. E. L., Freeman, D., Kuipers, E., Bebbington, P., Fowler, D., Dunn, G., & Garety, P. A. (2008). Measuring ideas of persecution and social reference: The Green Paranoid Thoughts Scales (GPTS). *Psychological Medicine, 38,* 101-111.

Gur, R. E., McGrath, C., Chan, R. M., Schroeder, L., Turner, T., Turetsky, B. I., Kohler, C., Alsop, D., Maldjian, J., Ragland, J. D., & Gur, R. C. (2002). An fMRI study of facial emotion processing in patients with schizophrenia. *American Journal of Psychiatry, 159,* 1992-1999.

Gustafson, R. (1994). Alcohol and aggression. In Hillbrand, M. & Palone, N. J., (Eds.), *The psychobiology of aggression: Engines, measurement, control* (pp. 41-80). Binghamton: The Haworth Press, Inc.

Hanssen, M., Peeters, F., Krabbendam, L., Radstake, S., Verdoux, H., & Van Os, J. (2003). How psychotic are individuals with non-psychotic disorders? *Social Psychiatry and Psychiatric Epidemiology, 38,* 149-154.

Heider, F. (1958). *The psychology of interpersonal relation.* New York: Wiley.

Hermans, H. (1967). *Sociale Wenselijkheids Schaal (Social Desirability Scale).* Nijmegen: Catholic University of Nijmegen.

Hodgins, S. (1992). Mental disorder, intellectual deficiency, and crime. *Archives of General Psychiatry, 49,* 476-483.

Hodgins, S. (2008). Violent behavior among people with schizophrenia: a framework for investigations of causes, and effective treatment, and prevention. *Philosophical Transactions of the Royal Society B, 363,* 2505-2518.

Hodgins, S., Cree, A., Alderton, J., & Mak, T. (2008). From conduct disorder to severe mental illness: Associations with aggressive behavior, crime, and victimization. *Psychological Medicine, 38,* 975-987.

Hodgins, S., Mednick, S. A., Brennan, P. A., Schulsinger, F., & Engberg, M. (1996). Mental disorder and crime. *Archives of General Psychiatry, 53,* 489-496.

Hodgins, S., Tiihonen, J., & Ross, D. (2005). The consequences of conduct disorder for males who develop schizophrenia: Associations with criminality, aggressive behavior, substance use, and psychiatric services. *Schizophrenia Research, 78,* 323-335.

Hollander, E. A., Swann, A. C., Coccaro, E. F., Jiang, P., & Smith,T. B. (2005). Impact of trait impulsivity and state aggression on divalproex versus placebo response in borderline personality disorder. *American Journal of Psychiatry, 162,* 621-624.

Hornsveld, R. H. J., Muris, P., & Kraaimaat, F.W. (in press). The Novaco Anger Scale - Provocation Inventory (1994 version) in Dutch forensic psychiatric patients. *Psychological Assessment.*

Howells, K., & Day, A. (2003). Readiness for anger management: clinical and theoretical issues. *Clinical Psychology Review, 23,* 319-337.

Hughes, D. H. (1999). Acute psychopharmacological management of the aggressive psychotic patient. *Psychiatric Services, 50,* 1135-1137.

Jansen, G. J., Middel, B., Dassen, T. W. N., & Reijneveld, M. S. A. (2006). Cross-cultural differences in psychiatric nurses' attitudes to inpatient aggression. *Archives of Psychiatric Nursing, 20,* 82-93.

Johns, L. C., Cannon, M., Singleton, N., Murray, R. M., Farrell, M., Brugha, T., Bebbington, P., Jenkins, R., & Meltzer, H. (2004). Prevalence and correlates of self- reported psychotic symptoms in the British population. *British Journal of Psychiatry, 185,* 298-305.

Johns, L. C., & Van Os, J. (2001). The continuity of psychotic experiences in the general population. *Clinical Psychology Review, 21,* 1125-1141.

Junginger, J. (1996). Psychosis and Violence: The case for a content analysis of psychotic experience. *Schizophrenia Bulletin, 22,* 91-103.

Kashani, J. H., Deuser, W., & Reid, J. C. (1990). Aggression and anxiety: A new look at an old notion. *Journal of American Academic Child and Adolescent Psychiatry, 30,* 218-223.

Kay, S. R., Fishbein, & A., Opler, L. A. (1987). The positive and negative syndrome scale (PANSS) for schizophrenia. *Schizophrenia Bulletin, 13,* 261-276.

Kennedy, H., Kemp, L., & Dyer, D. (1992). Fear and anger in delusional (paranoid) disorder: The association with violence. *British Journal of Psychiatry, 160,* 488-192.

Ker, S. L., & Neale, J. M. (1993). Emotion perception in schizophrenia: Specific deficit or further evidence of generalized poor performance? *Journal of Abnormal Psychology, 102,* 312-318.

Kinoshita, Y., Shimodera, S., Nishida, A., Kinoshita, K., Watanabe, N., Oshima, N., Akechi, T., Sasaki, T., Inoue, S., Furukawa, T. A., & Okazaki, Y. (in press). Psychotic-like experiences are associated with violent behavior in adolescents. *Schizophrenia Research.*

Konings, M., Bak, M., Hanssen, M., Van Os, J., & Krabbendam, L. (2006). Validity and reliability of the CAPE: a self-report instrument for the measurement of psychotic experiences in the general population. *Acta Psychiatrica Scandinavica, 114,* 55- 61.

Krakowski, M., Volavka, J., & Brizer D. (1986). Psychopathology and violence: A review of the literature. *Comprehensive Psychology, 27,* 131-148.

Lardinois, M, Lataster, T, Mengelers, R, Van Os, J, & Myin-Germeys, I. (2011). Childhood trauma and increased stress sensitivity in psychosis. *Acta Psychiatrica Scandinavica, 123,* 28- 35.

Laroi, F., Marczewski, P., & Van der Linden, M. (2004). Further evidence for the multidimensionality of hallucinatory predisposition: factor structure of a modified version of the Launay-Slade Hallucinations Scale in a normal sample. *European Psychiatry, 19,* 15-20.

Laroi, F., & Van der Linden, M. (2005). Nonclinical participants' reports of hallucinatory experiences. *Canadian Journal of Behavioral Science, 37,* 33-43.

Launay, G., & Slade, P. D. (1981). The measurement of hallucinatory predisposition in male and female prisoners. *Personality and Individual Differences, 2,* 221-234.

Lijffijt, M., & Barratt, E. S. (2005). *BIS11, Dutch Version.* Retrieved March 1, 2008, from http://www.impulsivity.org.

Lindqvist, P., & Allebeck, P. (1990). Schizophrenia and crime. *British Journal of Psychiatry, 157,* 345-350.

Link, B. G., Phelan, J. C., Bresnahan, M., Stueve, A., & Pescosolido, B. A. (1999). Public conceptions of mental illness: labels, causes, dangerousness and social distance. *American Journal of Public Health, 89,* 1328-1333.

Link, B., & Stueve, A. (1994). Psychotic symptoms and the violent/illegal behavior of mental patients compared to the community. In Monahan, J., & Steadman, H. (Eds.), *Violence and Mental Disorder: Development in Risk Assessment* (pp. 137- 158). Chicago: University of Chicago Press.

Link, B. G., Stueve, A. S., & Phelan, J. (1998). Psychotic symptoms and violent behaviors: Probing the components of "threat/control-override" symptoms. *Social Psychiatry and Psychiatric Epidemiology, 33,* S55-S60.

Lion, J. R. (2008). Psychotherapeutic interventions. In Simon, R. I., & Tardiff, K. (Eds.), *Textbook of violence assessment and management* (pp. 325-338). Arlington, VA: American Psychiatric Publishing

Mandal, M. K., Pandey, R., & Prasad, A. B. (1998). Facial expressions of emotions and Schizophrenia: *A review. Schizophrenia Bulletin, 24,* 399-412.

Markowitz, F. E. (2011). Mental illness, crime, and violence: Risk, context, and social control. *Aggression and Violent Behavior, 16,* 36-44.

Marzillier, S. L., & Davey, G. C. L. (2005). Anxiety and disgust: Evidence for a unidirectional relationship. *Cognition and Emotion, 19,* 729-750.

Max Planck Institute for Psycholinguistics, Nijmegen. 2001. *WebCelex.* Website http://celex.mpi.nl/, retrieved May 2010.

Mayer, B., Muris, P., Busser, K., & Bergamin, J. (2009). A disgust mood state causes a negative interpretation bias, but not in the specific domain of body-related concerns. *Behavioral Research and Therapy, 47,* 876-881.

Mayer, J. D., Allen, J. P., & Beauregard, K. (1995). Mood inductions for four specificmoods: A procedure employing guided imagery vignettes with music. *Journal of Mental Imagery, 19,* 133-150.

Mayer, J. D., Gayle, M., Meehan, M. E., & Haarman, A. K. (1990). Toward better specification of the mood- congruency effect of recall. *Journal of Experimental Social Psychology, 26,* 465-480.

McNiel, D. E., Eisner, J. P., & Binder, R. L. (2000). The relationship between command hallucinations and violence. *Psychiatric Services, 51,* 1288-1292.

Meesters, C., Muris, P., Bosma, H., Schouten, E., & Beuving, S. (1996). Psychometric evaluation of the Dutch version of the Aggression Questionnaire. *Behavioral Research and Therapy, 34,* 839-843.

Mennin, D. S. (2006). Emotion Regulation Therapy: An integrative approach to treatment-resistant anxiety disorders. *Journal of Contemplative Psychotherapy, 36,* 95-105.

Mojtabai, R. (2006). Psychotic-like experiences and interpersonal violence in the general population. *Social Psychiatry and Psychiatric Epidemiology, 41,* 183-190.

Monahan, J., & Steadman, H. J. (1994). *Violence and mental disorder. Developments in risk assessment.* Chicago: The University of Chicago Press.

Mueser, K. T., Noonan, R., Penn, D. L., Blanchard, J. J., Bellack, A. S., Nishith, P., & DeLeon, J. (1996). Emotion recognition and social competence in chronic schizophrenia. *Journal of Abnormal Psychology, 105,* 271-275.

Mullen, P. E. (2006). Schizophrenia and violence: from correlations to preventive strategies. *Advances in Psychiatric Treatment, 12,* 239-248.

Mullen, P. E., Burgess, P., Wallace, C., Palmer, S., & Ruschena, D. (2000). Community care and criminal offending in schizophrenia. *Lancet, 355,* 614-617.

Munkner, R., Hastrup, S., Joergensen, T., & Kramp, P. (2003). The temporal relationship between schizophrenia and crime. *Social Psychiatry and Psychiatric Epidemiology, 38,* 347-353.

Nederlof, A. F., Hovens, J. E., & Muris, P. (2007). *Affective Responses to Delusions Scale (ARDS)*. Internal Manuscript. Rotterdam: Erasmus University Rotterdam.

Nederlof, A. F., Hovens, J. E., Muris, P., & Novaco, R. (2009) Psychometric evaluation of a Dutch version of the Dimensions of Anger Reactions. *Psychological Reports, 105,* 585-592.

Nederlof, A. F., Muris, P., & Hovens, J. E. (2011a). Psychometric properties of an instrument for measuring threat/control-override symptoms. *Journal of Nervous and Mental Disease, 199,* 790-793.

Nederlof, A. F., Muris, P., & Hovens, J. E. (2011b). Threat/control-override symptoms and emotional reactions to positive symptoms as correlates of aggressive behavior in psychotic patients. *Journal of Nervous and Mental Disease, 199,* 342-347.

Nijman, H. L. I., Campo, J. M. L. G., Ravelli, D. P., & Merckelbach, H. L. G. J. (1999). A tentative model of aggression on inpatient psychiatric wards. *Psychiatric Services, 50,* 832-834.

Nolan, K. A., Volavka, J., Czobor, P., Sheitman, B., Lindenmayer, J., Citrome, L. L., McEvoy, J., & Liebermann, J. A. (2005). Aggression and psychopathology in treatment-resistant inpatients with schizophrenia and schizoaffective disorder. *Journal of Psychiatric Research, 39,* 109-115.

Novaco, R. W. (1975). *Dimensions of Anger Reactions.* Irvine: University of California Press.

Novaco, R. W. (1994.) Anger as a risk factor for violence. In Monahan, J., & Steadman, H. (Eds) *Violence and Mental Disorder: Development in Risk Assessment* (pp 21-59). Chicago: University of Chicago Press.

Novaco, R. W. (2003). *The Novaco Anger Scale and Provocation Inventory (NAS–PI)*. Los Angeles: Western Psychological Services.

Ohayon, M. M. (2000). Prevalence of hallucinations and their pathological associations in the general population. *Psychiatry Research, 97,* 153-164.

Patton, J. H., Stanford, M. S., & Barrat, E. S. (1995). Factor structure of the Barratt Impulsiveness Scale. *Journal of Clinical Psychology, 51,* 768-774.

Penn, D. L., Corrigan, P. W., Bentall, R. P., Racenstein, J. M., & Newman, L. (1997). Social cognition in schizophrenia. *Psychological Bulletin, 121,* 114-132.

Pollock, H. H. (1938). Is the paroled patient a threat to the community? *Psychiatric Quarterly, 12,* 236-244.

Posner, J., Russell, J. A., & Peterson, B. S. (2005). The circumplex model of affect: an integrative approach to affective neuroscience, cognitive development, and psychopathology. *Developmental Psychopathology, 17,* 715-734.

Pulay, A. J., Dawson, D. A., Hasin, D. S., Goldstein, R. B., Ruan, W. J., Pinkering, R. P., Huang, B., Chou, S. P., & Grant, B. F. (2008). Violent behaviour and DSM-IV psychiatric disorders: Results from the national epidemiologic survey on alcohol and related conditions. *Journal of Clinical Psychiatry, 69,* 12-22.

Raftery, A. E. (1995). Bayesian model selection in social research. *Sociological Methodology, 25,* 111-163.

Raine, A. (1991). The SPQ: A Scale for the Assessment of Schizotypal Personality Based on DSM-III-R Criteria. *Schizophrenia Bulletin, 17,* 555-564.

Raine, A. (2001). *Manual for the schizotypal personality questionnaire (spq and spq- b).* Los Angeles: University of Southern California.

Raine, A., & Benishay, D. (1995). The SPQ-B: a brief screening instrument for schizotypal personality disorder. *Journal of Personality Disorders, 9,* 346-355.

Rappaport, J., & Lassen, G. (1965). The dangerousness of female patients: A comparison of the arrest rates of discharged patients and the general population. *American Journal of Psychiatry, 123,* 413-419.

Rasanen, P., Tiihonen, J., Isohanni, M, Rantakallio, P., Lehtonen, J., & Moring, J. (1998). Schizophrenia, Alcohol abuse, and violent behavior: A 26-year followup study of an unselected birth cohort. *Schizophrenia Bulletin, 24,* 437-441.

Rosenthal, T. L., & Bandura, A. (1978). Psychological modeling: Theory and practice. In Garfield, S. L., & Bergin, A. E. (Eds.), *Handbook of psychotherapy and behavior change: An empirical analysis.* New York, NY: Wiley.

Rössler, W., Riecher-Rössler, A., Angst, J., Murray, R., Gamma, A., Eich, D., Van Os, J., & Gross, V. A. (2007). Psychotic experiences in the general population: A twenty- year prospective community study. *Schizophrenia Research, 92,* 1-14.

Rund, B. R. (1998). A review of longitudinal studies of cognitive functions in schizophrenia patients. *Schizophrenia Bulletin, 24,* 425-435.

Sanderman, R., Arrindell, W. A., Ranchor, A. V., Eysenck, H. J., & Eysenck, S. B. G. (1995). *Het meten van persoonlijkheidskenmerken met de Eysenck Personality Questionnaire (EPQ).* Groningen: Northern Centre for Healthcare Research, University of Groningen.

Saunders, D. G. (1991). Procedures for adjusting self-reports of violence for social desirability bias. *Journal of Interpersonal Violence, 3,* 336-344.

Siever, L. J. (2008). Neurobiology of aggression and violence. *American Journal of Psychiatry, 165,* 429-442.

Simon, G. E., & Vonkorff, M. (1995). Recall of psychiatric history in cross-sectional surveys: implications for epidemiologic research. *Epidemiologic Reviews, 17,* 221-227.

Skeem, J. L., Schubert, C., Odgers, C., Mulvey, E. P., Gardner, W., & Lidz, C. (2006). Psychiatric symptoms and community violence among high-risk patients: A test of the relationship at the weekly level. *Journal of Consulting and Clinical Psychology, 74,* 967-979.

Smith, T. E., Hull, J. W., Israel, L. M., & Willson, D. F. (2000). Insight, symptoms, and neurocognition in schizophrenia and schizoaffective disorder. *Schizophrenia Bulletin, 26*, 193-200.

Sosowsky, L. (1980). Explaining the increased arrest rate among mental patients: A cautionary note. *American Journal of Psychiatry, 137,* 1602-1605.

Soyka, M., Graz, C., Bottlender, R., Dirschedle, P., & Schoech, H. (2007). Clinical correlates of later violence and criminal offences in schizophrenia. *Schizophrenia Research, 94,* 89-98.

Soyka, M., Morhart-Klute, V., & Schoech, H. (2004). Delinquency and criminal offences in former schizophrenic inpatients 7-12 years following discharge. *European Archives of Psychiatry and Clinical Neuroscience, 254,* 289-294.

Spencer, G. A., & Bryant, S. A. (2000). Dating violence: a comparison of rural, suburban, and urban teens. *Journal of Adolescent Health, 27,* 302-305.

Spielberger, C. D., Gorsuch, R. L., & Lushene, R. E. (1970). *Manual for the State-Trait Anxiety Inventory (STAI).* Palo Alto: Consulting Psychologists Press.

Spielberger, C. D., Jacobs, G. A., Russell, S. F., & Crane, R. J. (1983). Assessment of Anger: The State-Trait Anger Scale. In Butcher, J. N., & Spielberger, C. D. (Eds.), *Advances in personality assessment* (pp.159–187). Hillsdale: Erlbaum.

Stompe, T., Ortwein-Swoboda, G., & Schanda, H. (2004). Schizophrenia, delusional symptoms, and violence: The threat/control-override concept reexamined. *Schizophrenia Bulletin, 30,* 31-44.

Stueve, A., & Link, B. (1997) Violence and psychiatric disorders: Results from an epidemiological study of young adults in Israel. *Psychiatric Quarterly, 68,* 327-342.

Swanson, J. W. (1994). Mental disorder, substance abuse, and community violence: An epidemiological approach. In Monahan, J., & Steadman, H. (Eds), *Violence and mental disorder: Development in risk assessment* (pp 101-136). Chicago: University of Chicago Press.

Swanson, J. W., Borum, R., Swartz, M. S., & Monahan, J. (1996). Psychotic symptoms and disorders and the risk of violent behavior in the community. *Criminal Behavior and Mental Health, 6,* 309-329.

Swanson, J. W., Holzer, C. E., Ganju, V. K., & Tsutomu Jono, R. (1990). Violence and psychiatric disorder in the community: Evidence from the epidemiologic catchment area surveys. *Hospital Community Psychiatry, 41,* 761-770.

Swanson, J. W., Swartz, M. W., Van Dorn, R. A., Elbogen, E. B., Wagner, H. R., Rosenheck, R. A., Stroup, T. S., McEvoy, J. P., & Liebermann, J. A. (2006). A national study of violent behavior in person with schizophrenia. *Archives of General Psychiatry, 63,* 490-499.

Swanson, J. W., Van Dorn, R. A., Swartz, M. S., Smith, A., Elbogen, E. B., & Monahan, J. (2008). Alternative pathways to violence in persons with schizophrenia: The role of childhood antisocial behavior problems. *Law and Human Behavior, 32,* 228-240.

Swartz, J. A., & Lurigio, A. J. (2007). Serious mental illness and arrest. The generalized mediating effect of substance use. *Crime Delinquency, 53,* 581-604.

Tardiff, K. (1984). Characteristics of assaultive patients in private psychiatric hospitals. *American Journal of Psychiatry, 141,* 1232-1235.

Teasdale, B., Silver, E., & Monahan, J. (2006). Gender, Threat/control-override delusions and violence. *Law and Human Behavior, 30,* 649-658.

Tengstrom, A., Hodgins, S., Grann, M., Langstrom, N., & Kullgren, G. (2004). Criminal history among violent offenders with schizophrenia: Associations to psychopathy and substance use disorders. *Criminal Justice and Behavior, 31,* 367-391.

Thorvaldsen, G. (1998). Historical databases in Scandinavia. *The History of the Family, 3,* 371-383.

Tiihonen, J., Isohanni, M., Rasanen, P., Koiranen, M., & Moring, J. (1997). Specific major mental disorders and criminality: a 26-year prospective study of the 1966 northern Finland birth cohort. *American Journal of Psychiatry, 154,* 840-845.

Tschann, J. M., Flores, E., Pasch, L. A., & VanOss Marin, B. (2005). Emotional distress, alcohol use, and peer violence among Mexican-American and European-American adolescents. *Journal of Adolescent Health, 37,* 11-18.

Van der Gaag, M., & Ferwerda, J. (2008). *Dutch translation of the Green Persecutory Thoughts Scale.* http://www.gedachtenuitpluizen.nl/index.php?pagina=meet instrumenten

Van der Meer, L., Van 't Wout, M., & Aleman, A. (2009) Emotion regulation strategies in patients with schizophrenia. *Psychiatry Research, 170,* 108-113.

Van der Ploeg, H. M., Defares, P. B., & Spielberger, C. D. (1980). *ZBV: A Dutch-Language Adaptation of the Spielberger State-Trait Anxiety Inventory.* Lisse, NL: Swets & Zeitlinger.

Van der Ploeg, H. M., Defares, P. B., & Spielberger, C. D. (1982). *ZAV: A Dutch-Language Adaptation of the Spielberger State-Trait Anger Scale.* Lisse, NL: Swets & Zeitlinger.

Van Os, J., Hanssen, M., Van Bijl, R., & Ravelli, A. (2000). Strauss (1969) revisited: a psychosis continuum in the general population? *Schizophrenia Research, 45,* 11- 20.

Van Os, J., Verdoux, H., & Hanssen, M. (1999). *Community Assessment of Psychic Experiences.* Maastricht: Maastricht University.

Verdoux, H., & Van Os, J. (2002). Psychotic symptoms in non-clinical populations and the continuüm of psychosis. *Schizophrenia Research, 54,* 59-65.

Vermunt, J. K., & Magidson, J. (2002). Latent class cluster analysis. In Hagenaars, J., & McCutcheon, A. (Eds.) *Applied latent class analysis* (pp. 89-106). Cambridge University Press:

Walker, E., Kestler, L., Bollini, A., & Hochman, K. M. (2004). Schizophrenia: Etiology and course. *Annual Review in Psychology, 55*, 401-430.

Wallace, C., Mullen, P. E., & Burgess, P. (2004). Criminal offending in schizophrenia over a 25-year period marked by deinstitutionalization and increasing prevalence of comorbid substance use disorders. *American Journal of Psychiatry, 161,* 716-727.

Wallace, C., Mullen, P., Burgess, P., Palmer, S., Ruschena, D., & Browne, C. (1998). Serious criminal offending and mental disorder. Case linkage study. *British Journal of Psychiatry, 172,* 477-484.

Walsh, E., Buchanan, A., & Fahy, T. (2002). Violence and schizophrenia: Examining the evidence. *British Journal of Psychiatry, 180*, 490-430.

Wessely, S. (1998). The Camberwell study of crime and schizophrenia. *Social Psychiatry and Psychiatric Epidemiology, 33*, S24-S28.

Wessely, S., Buchanan, A., Reed, A., Cutting, J., Everitt, B., Garety, P., & Taylor, P. J. (1993). Acting on delusions, I: Prevalence. *British Journal of Psychiatry, 163*, 69-76.

Wessely, S. C., Castle, D., Douglas, A. J., & Taylor, P. J. (1994). The criminal careers of incident cases of schizophrenia. *Psychological Medicine, 24,* 483-502.

Musical references

Chopin, F. (1835/1990). *Waltz No. 12. J.M. Luisada (pianist).* Hamburg: DG Deutsche Grammophon.

Delibes, L. (1870/1969). *Coppelia (Mazurka, Act 1, No.3). Orchestre de la Suisse Romande*. New York: London Records/Polygram.

Herrmann, B. (1942/1988). *Selection from the film soundtrack 'Psycho'.* Cincinnati Pops Orchestra. Cleveland, OH: TELARC.

Mussorgsky, M. P. (1839/1881). *Night on bald mountain, symphonic poem.* Fright night: Music that goes bump in the night. UK: Amazone.

APPENDICES

Appendix A

Threat/Control-Override Questionnaire (TCOQ; Dutch version)

Instructie: Sommige mensen hebben overtuigingen die andere mensen niet hebben. De vragen hieronder gaan over overtuigingen die mensen kunnen hebben. Geeft u alstublieft voor elk van onderstaande uitspraken aan in hoeverre u het er mee eens bent. Zet bij elke uitspraak een rondje om het cijfer in de schaal aan de rechterkant dat voor u het beste antwoord weergeeft: 1 = 'niet mee eens', 2 = 'onzeker', 3 = enigszins mee eens' en 4 = 'sterk mee eens'. Kijkt u naderhand goed of u geen vragen heeft overgeslagen. Dank u voor uw medewerking.	**Niet mee eens**	**Onzeker**	**Enigszins mee eens**	**Sterk mee eens**
1. Ik ben onder controle van een externe kracht die mijn acties bepaalt.	**1**	**2**	**3**	**4**
2. Anderen hebben mijn manier van bewegen onder controle.	**1**	**2**	**3**	**4**
3. Anderen hebben geprobeerd mij te vergiftigen of kwaad te doen.	**1**	**2**	**3**	**4**
4. Anderen kunnen gedachten in mijn hoofd stoppen.	**1**	**2**	**3**	**4**
5. Iemand heeft mij opzettelijk geprobeerd ziek te maken.	**1**	**2**	**3**	**4**
6. Mijn gedachten worden gedomineerd door een kracht van buitenaf.	**1**	**2**	**3**	**4**
7. Anderen hebben in het geheim een plan gesmeed om me te ruïneren.	**1**	**2**	**3**	**4**
8. Ik heb het gevoel dat anderen mijn gedachten kunnen bepalen.	**1**	**2**	**3**	**4**
9. Iemand heeft kwade plannen tegen mij gehad.	**1**	**2**	**3**	**4**
10. Mensen kunnen gedachten uit mijn hoofd halen.	**1**	**2**	**3**	**4**
11. Ik heb gedacht dat ik werd achtervolgd voor een speciale reden.	**1**	**2**	**3**	**4**
12. Ik heb het gevoel dat anderen de controle over mij hebben.	**1**	**2**	**3**	**4**
13. Mensen hebben geprobeerd mij krankzinnig te maken.	**1**	**2**	**3**	**4**
14. Mijn leven wordt bepaald door iets of iemand buiten mijzelf.	**1**	**2**	**3**	**4**

Appendix B

Affective Responses to Delusions Scale (ARDS; Dutch version)

Deel 1 - Woede (part one – anger)

(De onderzoeker geeft u instructie mbt. de interpretatie van 'overtuiging')

Instructie: Er zijn mensen die bijzondere overtuigingen hebben die andere mensen niet hebben. Soms kunnen dergelijke overtuigingen ervoor zorgen dat iemand **boos** wordt. Het invullen van deze vragenlijst kan helpen na te gaan hoe u reageert op de overtuigingen die u hebt. Zet bij de onderstaande vragen een rondje om het getal van uw keuze in de schaal aan de rechterkant: 1 = 'niet mee eens', 2 = 'een beetje mee eens', 3 = enigszins mee eens' en 4 = 'sterk mee eens'. Hebt u géén overtuiging, vult u deze vragenlijst dan niet verder in. Kijkt u naderhand goed of u geen vragen heeft overgeslagen.Dank u voor uw medewerking.	**Niet mee eens**	**Een beetje mee eens**	**Nogal mee eens**	**Sterk mee eens**
1. Mijn overtuiging zorgt ervoor dat ik boos word.	**1**	**2**	**3**	**4**
2. Als ik denk aan mijn overtuiging word ik razend.	**1**	**2**	**3**	**4**
3. Mijn overtuiging maakt mij woedend.	**1**	**2**	**3**	**4**
4. Ik word driftig als ik aan mijn overtuiging denk.	**1**	**2**	**3**	**4**
5. Het kost moeite mijn kalmte te bewaren als ik aan mijn overtuiging denk.	**1**	**2**	**3**	**4**
6. Mijn overtuiging maakt mij kwaad.	**1**	**2**	**3**	**4**
7. Mijn overtuiging irriteert mij.	**1**	**2**	**3**	**4**
8. Het komt voor dat ik mijn zelfbeheersing verlies door mijn overtuiging.	**1**	**2**	**3**	**4**

Deel 2 Angst (part two – anxiety)

(De onderzoeker geeft u instructie mbt. de interpretatie van 'overtuiging')

Instructie: Er zijn mensen die bijzondere overtuigingen hebben die andere mensen niet hebben. Soms kunnen dergelijke overtuigingen ervoor zorgen dat iemand **angstig** wordt. Het invullen van deze vragenlijst kan helpen na te gaan hoe u reageert op de overtuigingen die u hebt. Zet bij de onderstaande vragen een rondje om het getal van uw keuze in de schaal aan de rechterkant: 1 = 'niet mee eens', 2 = 'een beetje mee eens', 3 = enigszins mee eens' en 4 = 'sterk mee eens'. Hebt u géén overtuiging, vult u deze vragenlijst dan niet verder in.Kijkt u naderhand goed of u geen vragen heeft overgeslagen.Dank u voor uw medewerking.	**Niet mee eens**	**Een beetje mee eens**	**Nogal mee eens**	**Sterk mee eens**
1. Mijn overtuiging zorgt ervoor dat ik angstig word.	**1**	**2**	**3**	**4**
2. Ik krijg het warm en begin te zweten op het moment dat mijn overtuiging in mij opkomt.	**1**	**2**	**3**	**4**
3. Als ik nadenk over mijn overtuiging word ik onrustig.	**1**	**2**	**3**	**4**
4. Ik word zenuwachtig door mijn overtuiging.	**1**	**2**	**3**	**4**
5. Ik raak gespannen als ik denk aan mijn overtuiging.	**1**	**2**	**3**	**4**
6. Mijn overtuiging maakt mij nerveus.	**1**	**2**	**3**	**4**
7. Door mijn overtuiging durf ik sommige dingen niet meer te doen.	**1**	**2**	**3**	**4**
8. Mijn overtuiging maakt mij bang.	**1**	**2**	**3**	**4**

Appendix C

Word-stems used for the Aggression Word-Stem Completion Task

SLO___	KWA___	DOO___
STO___	AGR___	RU___
KRIJ___	VERK___	UITH___
STAM___	GEM___	PES___
BIJ___	SLA___	SCHR___
AFK___	VE___	NIJ___
KAP___	BOO___	AANR___
SPU___	WU___	DAD___
WR___	GEW___	MANI___
SCHE___	VLOE___	GEV___
BLOE___	KNU___	AANV___
IR___	POL___	GEWE___
SLE___	CRI___	REL___
TIE___	STR___	HAA___
VAN___	UITB___	WOE___

DANKWOORD

(Acknowledgements in Dutch)

'Bedankt' is maar een klein woord, echter niet minder dan hoe het hoort. Want een proefschrift schrijven doe je niet alleen, maar met alle mensen om je heen. De mensen die hun interesse en medeleven tonen; juist hen dien je met een 'uitgesproken' waardering te belonen. Daarom de laatste pagina's van dit proefschrift bedrukt, met de woorden: 'Allemaal heel veel dank, zonder jullie was het mij nooit gelukt!'

Allereerst wil ik mijn dank uitspreken naar mijn promotoren Hans Hovens en Peter Muris, van wie ik de afgelopen vier jaar erg veel heb geleerd. Door de begeleiding van jullie beiden en de invulling van het project heb ik mijzelf kunnen ontwikkelen in het onderzoek alsook in de praktijk. Hans, ik ben je zeer dankbaar voor de mogelijkheid die je me hebt geboden om aan dit project te werken. Het begon, na mijn sollicitatiegesprek, met een mail van jou aan mij waarin stond dat 'de commissie unaniem had besloten' dat ik de AiO-plek mocht vervullen. Dit was de eerste van zo'n 5.000 mails die in de afgelopen jaren over en weer zijn gegaan. Elk bericht dat ik je stuurde beantwoordde je gemiddeld binnen 10 minuten, zelfs vanuit Madagaskar, Oezbekistan, Kirchizie en Groenland. Je enthousiasme en interesse voor het project motiveerden mij enorm. Ook op de momenten dat ik er doorheen zat kon ik altijd bij je terecht; binnen een mum van tijd kreeg je me weer uit dat dal. Ik heb veel geleerd van de input die je inhoudelijk hebt gegeven aan het project. Bovendien bewonder ik de kennis en ervaring die je hebt op het gebied van onderzoek en patiëntenzorg, maar ook daarbuiten. Ook de congres-tripjes die we hebben gemaakt zullen me altijd bij blijven; allereerst Stockholm, daarna Boston, en afgelopen oktober Praag. Door jou weet ik van deze steden bijna net zoveel als van de onderwerpen die op de congressen centraal stonden. Hans, je bent een fantastische leermeester en ik had me geen andere begeleider willen wensen. Dankjewel.

Peter, de eerste twee á drie jaar was je veelvuldig op de universiteit aanwezig en op korte afstand betrokken bij het project. Als dagelijkse begeleider heb ik je toen veel gesproken. Het was fijn dat ik altijd bij je aan kon kloppen (lees: je kamer kon binnenstormen) met de vragen of problemen die ik had. De soms lange gesprekken die we hebben gevoerd hebben me doen groeien. Het was soms lastig, maar ik ben je er toch ook dankbaar voor. Verder waardeer ik de zeeën van tijd en moeite die je hebt gestoken in het reviseren van mijn stukken, ook toen je het laatste (half) jaar werkte vanuit Maastricht. Het tempo en de nauwkeurigheid waarmee je dit deed maakte die befaamde rode (of zwarte of blauwe of groene) pen altijd weer goed. Bovendien vond ik het fascinerend hoe bekwaam je was in het beknopt en helder opschrijven van hetgeen ik dacht, maar nooit zo op papier kon krijgen. Soms frustrerend, maar anderszijds erg leerzaam; dank daarvoor.

Ook dank aan de overige leden van mijn promotiecommissie: Eric Rassin, Ingmar Franken, Elke Geraerts, Arthur van Gool, Henk Nijman en Anton Loonen. Ik waardeer de bereidheid die jullie hebben getoond om kennis te nemen van mijn proefschrift, deze kritisch te lezen en te beoordelen. Ook dank ik jullie voor de betrokkenheid en/of de hulp die ieder op zijn of haar eigen wijze heeft getoond en geleverd gedurende mijn promotietraject.

Verder gaat mijn dank uit naar Delta Psychiatrisch Centrum. In samenwerking met hen is mijn promotieproject, inclusief het huidige proefschrift, tot stand gekomen en tot uitvoering gebracht. Zowel de staff van verschillende afdelingen als de patiënten die hebben deelgenomen aan de studies hebben mij erg geholpen. Speciale dank gaat uit naar Marjolein de Bos, Erik van Gelder en Angela Ooms. Ook Yulius (voorheen RMPI de Grote Rivieren) is mij zeer van dienst geweest ten behoeve van de dataverzameling voor de klinische studies die ik heb uitgevoerd. Hierbij wil ik in het bijzonder Arthur van Gool, Frans Thomas, Frans Hoogland en Irma de Hoop bedanken voor hun inzet. Tot slot wil ik de Bavo RNO Groep bedanken voor de mogelijkheid tot het verzamelen van data binnen hun organisatie.

Mijn directe collega's op de universiteit wil ik graag bedanken voor hun betrokkenheid en input. Allereerst Gera, mijn kamergenootje vanaf dag numéro één. Vier jaar lang hebben we lief en leed mogen delen, wat nu 'opeens' stopt, hoe vreemd is dat? Niet meer dag in dag uit van gemiddeld 8.00u tot 20.00u met de computers tegenover elkaar. Toch raar. Je luisterend oor, je nuchtere instelling, ons thee-drink ritueel en de momenten van 'samen huilen, samen lachen', hebben zonder twijfel significant bijgedragen aan het volbrengen van mijn project. Wat zal ik dat missen. Ik ben blij dat ik gedurende vier jaar met jou een kamer mocht delen. Ook vind ik het fijn dat jij mijn eerste paranifm wilt zijn. Gera, dankjewel voor de jaren die we samen hebben gedeeld. Hoewel ongetwijfeld minder, hoop ik toch het contact met je te behouden (minstens het jaarlijkse eftelingtripje).

Ook alle andere (ex)collega's van het Instituut voor Psychologie wil ik bedanken. Allereerst de mensen van de klinische sectie: de vaste staff Arjan, Birgit, Colin, Guus, Ilse, Jorg, Katrien, Marlies, Renske en Susan, en de mede (ex)AiO's Anita, Anja, Danielle, Ivo, Leonie, Maartje, Marianne, Reshmi, Sabine en Suzanne. In het bijzonder wil ik de (ex)AiO's Maartje, Marianne, Leonie en Suzanne bedanken. Maartje, voor je enthousiasme en positiviteit ('de kracht van het positief denken' staat nog steeds op mijn whiteboard geschreven), Marianne voor de gezellige logeerpartijtjes die we hopelijk gewoon voort gaan zetten, en Leonie en Suzanne voor de leuke en goede gesprekken en avonturen in het buitenland. Daarnaast wil ik ook nog enkele andere (ex)collega's van het instituut voor psychologie bedanken: Benjamin, voor de 'Engelse les',

kletspraatjes en eftelingtripjes, Lisa, voor het stappen en de Salsa-uren, Kiki, voor het fijne contact, Bernice voor je momenten van binnenstormen, koffie/thee drinken en vrolijkheid, Marike, Samantha en Gabriela, voor de gezelligheid en de bereidheid tot het beantwoorden van statistiekgerelateerde vragen, Hanny, Mirella, Angelique, Marja, de medewerkers van het onderwijsbureau en de mensen van PsyWeb voor de praktische ondersteuning, de medewerkers van het lab: Christiaan, Gerrit-Jan, Freek en Marcel, voor alle technische hulp bij mijn experimentele studies, en alle andere collega's die ik niet bij naam heb genoemd maar mij wel veel dank verschuldigd zijn. Ik zal jullie missen!

Verder wil ik de studenten noemen die zich hebben ingezet voor een deel van de dataverzameling van de studies die in dit proefschrift zijn gepresenteerd. Marlies Baltus, Elles van den Broek en Monique van Winden. Veel dank hiervoor. Zonder jullie had ik deze studies nooit zo vlot kunnen uitvoeren en opschrijven. Ik wens jullie heel veel succes in jullie verdere loopbaan!

Ik wil graag mijn familie bedanken voor alle liefde, interesse, steun en afleiding die ik van jullie heb gekregen tijdens deze 'studie' (het woord 'promotieproject' kreeg ik er niet bij jullie in), het schrijven van deze 'scriptie' (het woord 'proefschrift' evenmin) en het houden van alle 'spreekbeurten' in het binnen- en buitenland. Allereerst mijn lieve lieve vader. Daddie, dankjewel voor het vertrouwen dat je altijd in me hebt gehad. Zonder jou had ik het nooit zo ver kunnen schoppen. Je staat altijd voor me klaar, wat er ook is. Je bent er voor me en daar ben ik je dankbaar voor. Marielle en Chantalle, ik ben blij dat jullie in ons leven zijn gekomen. Ook aan jullie dank voor de betrokkenheid en het geduld dat jullie hebben gehad de afgelopen jaren. Verder wil ik mijn oom Marc en mijn tante Karin noemen. Marc, wat begon als grapje (of droom?) is toch werkelijkheid geworden: Jij als paranimf bij mijn promotie. Niemand die begreep waarover het ging; binnen korte tijd was je de nymfomaan van de familie, maar gelukkig wisten wij wel beter. Karin, dank voor alle keren dat ik bij je op de bank mocht crashen en de pannen leeg mocht schrapen. 'Samen *in* de laptop', 'samen *in* de iPhone', 'samen in de sauna' en 'samen in de stress', wat hebben we niet gedeeld? Zonder gekheid, het heeft me meer dan goed gedaan en dank daarvoor. Ook wil ik mijn lieve Oma Verhoeven en Opa Nederlof noemen, een dikke kus voor u allebei. Ik hoop dat het me lukt om nu weer wat vaker op de koffie te komen.

En natuurlijk wil ik al mijn lieve vriendjes en vriendinnetjes laten weten dat ik hun steun en warmte deze jaren heel erg heb gewaardeerd. Af en toe was ik niet te genieten (I know!) en sloot ik mezelf op om dit project tot een noemenswaardig eind te brengen (this is the result ☺). Maar! betere tijden zijn in aantocht (al dan niet aangebroken) en bij deze beloof ik plechtig dat mijn agenda binnenkort weer vol staat met jullie namen en ik weer volop van de

partij zal zijn. Ook mijn fantastische sportcollegaatjes van WorkoutFitness-Center Difference kunnen in dit dankwoord niet ontbreken. Het 'afmatten' van de leden (en bovenal van jullie ;)) staat ver bovenaan mijn 'I like to do-' lijstje (zie stelling 11), mede mogelijk gemaakt dankzij jullie!

Tot slot wil ik iedereen bedanken die ik nu niet heb genoemd, maar die er in de afgelopen jaren wel voor me is geweest: Lieve allemaal heel veel dank!

Angela, november 2011

CURRICULUM VITAE

Curriculum Vitae

Angela Nederlof was born in Dordrecht, The Netherlands, on April 29th, 1985. She completed secondary education, Atheneum, in 2003 at 'De Lage Waard' in Papendrecht, after which she started studying Psychology at the Erasmus University in Rotterdam. In 2006 she obtained her Bachelor's degree, and in 2007 she received her Master's degree in Clinical Psychology (cum laude). Her master thesis was on affect regulation in borderline and somatoform disorders. Directly after graduation she started working as a Ph.D. student at the Institute of Psychology, Erasmus University Rotterdam, in collaboration with Delta Psychiatric Center. The studies in this project focused on the intra-individual determinants of aggressive behavior in psychosis and were supervised by Prof.dr. Hans Hovens and Prof.dr. Peter Muris; the present dissertation is the result of this project. During her Ph.D. project she participated as a student in the education program of the Dutch-Flemish post-graduate research school 'Experimental Psychopathology'. She was also engaged in teaching a number of psychology bachelor and master courses: she coordinated a bachelor course on Depression and Psychosis, trained students in various clinical practical lessons, lectured on clinical subjects, and supervised the theses of several bachelor and master students. For the Netherlands Institute of Psychologists (NIP) she worked as a book reviewer and she reviewed empirical articles for several international journals.

PUBLICATIONS

Nederlof, A.F., Koppenol-Gonzalez, G.V., Muris, P., & Hovens, J.E. (in press). Psychiatrists' view on the risk factors for aggressive behavior in psychotic patients. *Clinical Schizophrenia and Related Psychoses.*

Nederlof, A.F. & Hovens, J.E. (2011). Anxiety and anger as predictors for violent behavior in psychosis: An experimental study. In Needham, I., Nijman, H., Palmstierna, T., Almvik, R., & Oud, N (Eds.). *Proceedings of the 7th European Congress on Violence in Clinical Psychiatry* (pp. 247-250). Amsterdam: Kavanah.

Nederlof, A.F., Muris, P. & Hovens, J.E. (2011). Threat/control-override symptoms and emotional reactions to positive symptoms as correlates of aggressive behavior in psychotic patients. *Journal of Nervous and Mental Disease, 199,* 342-347.

Nederlof, A.F., Muris, P., & Hovens, J.E. (2011). Psychometric properties of an instrument for measuring threat/control-override symptoms. *Journal of Nervous and Mental Disease*, 199, 790-793.

Nederlof, A.F., Hovens, J.E. & Muris, P. (2009). Aggressive Behavior in Psychiatric Inpatients with a Psychotic Disorder: Prevalence and Intra-individual Risk Factors. In Needham, I., Callaghan, P., Palmstierna, T., Nijman, H., & Oud, N. (Eds.), *Proceedings of the 5th European Congress on Violence in Clinical Psychiatry* (pp. 254-258). Amsterdam: Kavanah.

Nederlof, A.F., Hovens, J.E., Muris, P., & Novaco, R.W. (2009). Psychometric evaluation of a Dutch version of the Dimensions of Anger Reactions. *Psychological Reports, 105*, 585-592.

Dutch publications

Nederlof, A.F. (2011). Een ware Eye-, of beter: 'Mindopener' (book review). *De Psycholoog*, *46*, pp. 22-23.

Nederlof, A.F., Baltus, M., Duxbury, J. & Hovens, J.E. (2010). Dwang op twee gesloten opname afdelingen: De visie van behandelaars. *Psychopraktijk, 2,* 19-21.

Submitted manuscripts

Nederlof, A.F., Muris, P., & Hovens, J.E. (2011). Anger, anxiety, and feelings of delusional threat as triggers of aggressive behavior: An experimental mood induction study in a non-clinical sample. Manuscript submitted for publication.

Nederlof, A.F., Muris, P., & Hovens, J.E. (2011). Psychotic-like experiences and aggressive behavior in a non-clinical sample. Manuscript submitted for publication.

Nederlof, A.F., Muris, P., & Hovens, J.E. (2011). The epidemiology of violent behavior in schizophrenic patients: A systematic review of studies since 1980. Manuscript submitted for publication.

Presentations

Oral

Nederlof, A.F. (2011, 22 October). Anxiety and anger as predictors for violent behavior in psychosis: An experimental study in psychotic patients and healthy controls. European Violence in Psychiatry Research group Conference, Prague, Czech Republic.

Nederlof, A.F. (2010, 4 June). Aggressive behavior in psychotic patients: The role of anger and anxiety. 6th World Congress of Behavioral Cognitive Therapy, Boston, USA.

Nederlof, A.F. (2010, 23 March). Aggressive behavior in schizophrenic patients: The role of emotions and psychotic symptoms. Expert meeting Cardiff University, Cardiff, UK.

Nederlof, A.F. (2009, 22 October). Aggressive behavior in psychiatric inpatients with a psychotic disorder: Prevalence and Intra-individual Risk Factors. European Violence in Psychiatry Research group Conference, Stockholm, Sweden.

Poster

Lennertz, D., Nederlof, A.F., Dijke, A. van, Sonneville, L.M.J. de, & Hovens, J.E. (2010). Neuropsychologisch onderzoek bij recente en chronische schizofrenie. Abstract in: Samenvattingen 38ste voorjaarscongres Nederlandse Vereniging voor Psychiatrie, volume 52. *Tijdschrift voor Psychiatrie* (pp. 285). Utrecht: De Tijdstroom.

Nederlof, A.F., Muris, P. & Hovens, J.E. (2010). Agressief gedrag bij patiënten met een psychotisch stoornis. Abstract in: Samenvattingen 38ste voorjaarscongres Nederlandse Vereniging voor Psychiatrie, volume 52. *Tijdschrift voor Psychiatrie* (pp. 271). Utrecht: De Tijdstroom.

Nederlof, A.F., Baltus, M. & Hovens, J.E. (2010). De opvattingen van psychiaters over agressief gedrag bij psychotisch patiënten. Abstract in: Samenvattingen 38ste voorjaarscongres Nederlandse Vereniging voor Psychiatrie, volume 52. *Tijdschrift voor Psychiatrie* (pp. 274). Utrecht: De Tijdstroom.

ISBN 978-94-6191-090-5