

Thesis for doctoral degree (Ph.D.)
2008

Schizophrenia and criminal offending - risk factors and the role of treatment

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Stockholm 2008

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Published by Karolinska Institutet. Printed by Karolinska University Press

Box 200, SE-171 77 Stockholm, Sweden

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ISBN 978-91-7409-230-1

ABSTRACT

Background: The present thesis is written with the overall aim of advancing knowledge of criminal offending among individuals with schizophrenia. This may lead to better and more cost-effective methods for the prevention of criminal offending and, hopefully, to the reduction of public fear of mentally disordered persons. One aim of the thesis was to study risk factors for criminal offending, specifically risk factors related to antisocial behaviour, low socioeconomic status, problematic substance use, and low intelligence. Another aim of the thesis was to study the role of treatment for the reduction of criminal offending.

Methods: A quantitative research design was used throughout the thesis. Papers I and II were based on data from The Comparative Study of the Prevention of Crime by Mentally Ill Persons (CSPCMIP), an international, multi-site follow-up study on forensic and general psychiatric patients in community care ($N = 307$). Papers III and IV were based on Swedish conscription data of 1969-1970 ($N = 49\,398$; participants with a diagnosis of schizophrenia, $n = 377$) and follow-up data from the National Hospital Register and the National Crime Register. The participants of all four papers were males.

Results: Risk factors for criminal offending present in childhood or early adulthood were found to be similar for the participants with a diagnosis of schizophrenia as compared to the participants with no diagnosis of schizophrenia, specifically risk factors related to antisocial behaviour and problematic substance use (paper III). Associations were found between lower verbal intelligence and younger age of onset of non-violent criminal offending (paper I). A number of typologies of alcohol use disorder, including the well known Type I/II – Type A/B typology, were replicated (paper II). No associations were found between inpatient psychiatric treatment and criminal offending (paper IV).

Conclusions: Criminal offending among individuals with schizophrenia shares many similarities with criminal offending among individuals with no mental disorder. It is a complex phenomenon with many factors involved from a macro to a micro level, some of them out of reach for psychiatric treatment efforts. It is suggested that criminal offending among individuals with schizophrenia should be studied within a common criminological framework. Methods and theories used in criminology may be of value for the field. Also, forensic psychiatric services may gain from adopting the “what works” approach from the correctional services.

LIST OF PUBLICATIONS

- I. Eriksson, Å., Hodgins, S., & Tengström, A. (2005). Verbal intelligence and criminal offending among men with schizophrenia. *International Journal of Forensic Mental Health*, 4, 191-200.
- II. Eriksson, Å., Tengström, A., & Hodgins, S. (2007). Typologies of alcohol use disorders among men with schizophrenia. *Addictive Behaviors*, 32, 1146-1163.
- III. Eriksson, Å., Tengström, A., Romelsjö, A., & Stenbacka, M. (2008). Risk factors for criminal offending in schizophrenia – a 35-year longitudinal cohort study. Submitted for publication.
- IV. Eriksson, Å., Tengström, A., Romelsjö, A., & Stenbacka, M. (2008). The role of inpatient treatment for criminal offending among men with schizophrenia – a 35-year follow-up of a birth cohort. Submitted for publication.

CONTENTS

1	Background.....	1
1.1	The prevalence of criminal offending.....	1
1.2	A lifetime perspective.....	3
1.3	Understanding criminal offending	3
1.3.1	A focus on symptoms.....	4
1.3.2	A risk factor perspective	5
1.4	Crime prevention	11
1.4.1	Inpatient treatment.....	11
1.4.2	Outpatient treatment.....	12
1.4.3	Deinstitutionalisation	12
2	Aims.....	14
3	Method.....	15
3.1	The first data set.....	15
3.1.1	A clinical follow-up study.....	15
3.1.2	Procedure	16
3.1.3	Participants	16
3.1.4	Instruments	16
3.2	The second data set.....	19
3.2.1	A register study.....	19
3.2.2	Procedure.....	19
3.2.3	Registers	19
3.2.4	Participants	21
3.3	Statistics	21
3.4	Ethical considerations.....	24
4	Results.....	26
4.1	Paper I	26
4.2	Paper II.....	27
4.3	Paper III.....	28
4.4	Paper IV	30
5	Discussion.....	32
5.1	Risk factors of criminal offending and the role of treatment	32
5.2	Limitations	35
5.3	From a risk factor perspective.....	37
5.4	...into a criminological framework.....	38
5.5	Concluding remarks.....	43
6	Acknowledgements	44
7	References.....	45

LIST OF ABBREVIATIONS

ANOVA	Analysis of variance
ASPD	Antisocial personality disorder
BRÅ	Brottsförebyggande rådet
CI	Confidence interval
CSPCMIP	The Comparative Study of the Prevention of Crime by Mentally Ill Persons
DSM-IV	Diagnostic and Statistical Manual of Mental Disorders (IV)
FSIQ	Full scale intelligence quotient
GAF	Global assessment of functioning
HCR-20	Historical, clinical, risk management, 20 items
ICC	Intra-class correlation
ICD	International classification of mental and behavioural disorders
IQ	Intelligence quotient
NEO-PI-R	Neo Personality Inventory Revised
OR	Odds ratio
PANSS	Positive and Negative Symptoms Scale
PCL-R	Psychopathy Checklist Revised
PIQ	Performance intelligence quotient
SCID-I	Structured Clinical Interview for the DSM-IV, axis I
SCID-II	Structured Clinical Interview for the DSM-IV, axis II
SFS	Svensk författningssamling
SOU	Statens offentliga utredningar
TCO	Threat-control override symptoms
VIQ	Verbal intelligence quotient
WAIS-R	Wechsler Adult Intelligence Scales Revised

1 BACKGROUND

Schizophrenia is a mental disorder which may be very disabling and lead to a variety of negative consequences for the individuals affected by the disorder, for their families, and for the society. One of the more profound negative consequences is the higher rate of criminal offending, especially violent criminal offending.

The present thesis is written with the purpose of advancing knowledge of criminal offending among individuals with schizophrenia. This is not new. Many researchers have contributed to the field. What are the reasons for continuing to conduct research? Two main reasons may be held out.

A first reason is that better knowledge may lead to better and more cost-effective methods for treatment and prevention of criminal offending (Grann et al., 2005; Hodgins & Müller-Isberner, 2004). By providing a specific individual with a specific treatment programme, based on sound scientific evidence and designed after a careful assessment of the individual's needs, the risk of providing unnecessary treatment and/or providing treatment at improper levels may be reduced.

A second reason for conducting research in the field of schizophrenia and criminal offending is to reduce public fear of mentally disordered persons. Population studies show that the general public holds misconceptions about mental disorders; including exaggerated beliefs that individuals with schizophrenia are unpredictable and dangerous (Angermeyer & Dietrich, 2006; Ineland, Jacobsson, Salander Renberg, & Sjölander, 2008). Research should challenge such myths and misconceptions by providing in-depth knowledge.

1.1 THE PREVALENCE OF CRIMINAL OFFENDING

So, is it a myth that individuals with schizophrenia commit more crimes as compared to non-disordered individuals? No, it is not. A starting-point for this thesis is the well-established evidence that there is indeed an association between schizophrenia and criminal offending. This has consistently been shown in prospective, retrospective and follow-up studies of clinical populations and birth cohorts as well as in community-based epidemiological studies.

As seen in Table 1, most studies in the field report that the risk of committing a violent offence is between two and seven times higher for individuals with schizophrenia as compared to individuals from the general population.

As the table shows, there is consistent evidence for an association between schizophrenia on one hand and violent offending on the other. Three of the studies also demonstrated evidence for an association between schizophrenia and non-violent offending (*OR* 1.2, 95% *CI*, .7-2.1, Lindqvist & Allebeck, 1990; *OR* 2.49, 95% *CI*, 1.49-4.16, Modestin & Ammam, 1996; *OR* 3.0, 95% *CI*, 1.4-6.3, Tiihonen et al., 1997). In two of the studies, separate analyses were conducted for individuals with schizophrenia and substance abuse, demonstrating a very high impact of comorbid substance abuse on the association between schizophrenia and violent offending (*OR* 25.2, 95% *CI*, 6.1-97.5, Räsänen et al., 1998; *OR* 18.8, 95% *CI*, 13.4-26.5, Wallace et al., 1998). Adjustments for socioeconomic status were made in three of the studies with

Table 1. Studies on schizophrenia and violent criminal offending

Year	Authors	Design	Participants	Results
1990 Sweden	Lindqvist & Allebeck	Hospital discharge, 15 year follow-up	Men and women with schizophrenia, <i>n</i> = 790; Compared with estimated rates from the general population	Conviction, <i>OR</i> 3.9 (95% <i>CI</i> , 3.0-5.1)
1994 England	Wessely, Castle, Douglas, & Taylor	Hospital discharge, 6-25 years follow-up	Men and women with schizophrenia, <i>n</i> = 538 Controls, <i>n</i> = 538	Men, conviction, <i>OR</i> 3.1 (95% <i>CI</i> , 1.8-5.5)
1996 Switzerland	Modestin & Ammam	Hospital discharge, life-time prevalence of criminal offending	Men with schizophrenia, <i>n</i> = 282 Controls, <i>n</i> = 282	Conviction, <i>OR</i> 5.22 (95% <i>CI</i> , 1.50-18.25)
1997 Finland	Tiihonen, Isohanni, Räsänen, Koiranen & Moring	Birth cohort, follow- up at age 26	<i>N</i> = 12 058 Men with schizophrenia, <i>n</i> = 51	Conviction, <i>OR</i> 7.2 (95% <i>CI</i> , 3.1-16.6)
1998 Finland	Räsänen, Tiihonen, Isohanni, Rantakallio, Lehtonen, & Moring	Birth cohort, follow- up at age 26	<i>N</i> = 11 017 Men and women with schizophrenia, <i>n</i> = 76	Men, conviction <i>OR</i> 7.0 (95% <i>CI</i> , 2.8-16.7)
1998 Australia	Wallace, Mullen, Burgess, Palmer, Ruschena, & Browne	Register study, life- time psychiatric care	<i>N</i> = 4 156 Men with schizophrenia, <i>n</i> = 91	Conviction in higher court, <i>OR</i> 4.4 (95% <i>CI</i> , 3.5 – 5.7)
2000 Australia	Mullen, Burgess, Wallace, Palmer, & Ruschena	Register study, hospital discharge, 10 year follow-up	Men with schizophrenia, discharged in 1975, <i>n</i> = 2 030, discharged in 1985, <i>n</i> = 1 366 Controls	Discharged in 1975; conviction, <i>OR</i> 7.9 (95% <i>CI</i> , 2.8-21.9) Discharged in 1985; conviction <i>OR</i> 6.0 (95% <i>CI</i> , 2.2-16.6)
2000 Denmark	Brennan, Mednick, & Hodgins	Birth cohort, 44-year follow-up	<i>N</i> = 335 990 Men and women with schizophrenia, <i>n</i> = 1 823	Men; arrest, <i>OR</i> 3.2 (95% <i>CI</i> , 2.6-3.9)
2000 New Zealand	Arseneault, Moffitt, Caspi, Taylor, & Silva	Birth cohort, 21 years follow-up	<i>N</i> = 961 Adolescents with schizophrenia-spectrum disorder, <i>n</i> = 39	Court conviction and/or self-reported violence, <i>OR</i> 4.6 (95% <i>CI</i> , 2.2- 9.7)

small differences from the non-adjusted odds ratios (Arseneault et al., 2000; Brennan et al., 2000; Tiihonen et al., 1997).

It is important to keep in mind that while there indeed is an increased risk of offending among individuals with schizophrenia, only a small fraction of all crimes in society are committed by individuals with the disorder. As an example, from a study on Swedish registers, it was demonstrated that 5% of all violent crimes were committed by individuals with schizophrenia and other psychoses (Fazel & Grann, 2006).

1.2 A LIFETIME PERSPECTIVE

Life-time perspectives of criminal offending among individuals with schizophrenia are rarely discussed. From a scientific and a clinical point of view, this knowledge is, however, of great value. Are criminal offences mainly committed before or after the onset of the illness? Do criminal careers among individuals with schizophrenia differ from those of individuals with no mental disorder?

From a British twin study of individuals with psychotic disorders it was reported that psychiatric contact preceded first conviction for 57.6% of the offenders (Coid, Lewis, & Revely, 1993). Hodgins and Müller-Isberner (2004) found differences between individuals with schizophrenia discharged from general psychiatric hospitals and forensic hospitals. Among the patients discharged from general psychiatric hospitals who had offended, 55.6% of the patients had offended before first admission. Among the patients discharged from forensic psychiatric hospitals and whose first admission was to general psychiatric care, 39.8% of the patients had committed an offence before first admission. A Danish register study showed a higher prevalence; 71.0% of male offenders with schizophrenia had offended before their first admission to hospital (Munkner, Haastrup, Joergensen, & Kramp, 2003).

What about the criminal careers of individuals with schizophrenia? From a population-based, longitudinal study in the UK, Wessely and co-workers (1994) reported that criminal careers of individuals with schizophrenia began later and ended earlier compared to the criminal careers of controls. The findings were not replicated in an Australian register study in where Mullen and co-workers (2000) reported that the patterns of offending over time did not significantly differ between patients and controls. The age at first offence was similar between patients and controls and most crimes were conducted before age 25 in both groups.

To conclude, findings on schizophrenia and criminality from a lifetime perspective have come to inconsistent, if not contradictory, results. Roughly half of all offenders with schizophrenia have offended before their first contact with the psychiatric treatment system. Criminal careers of individuals with schizophrenia have been described to be similar to but also different from criminal careers of individuals with no mental disorder.

1.3 UNDERSTANDING CRIMINAL OFFENDING

In the following, two different views will be presented on how to understand criminal offending among individuals with schizophrenia. The first view takes off from the most obvious difference between individuals with schizophrenia and individuals from the general population: the symptoms of schizophrenia. The second view stems from violence risk assessment research during the 1980's and 1990's. From this research we

have gained substantial knowledge on risk factors for offending among individuals with mental disorders, knowledge that has been codified in various checklists, such as the HCR-20 (Webster, Douglas, Eaves, & Hart, 1997).

1.3.1 A focus on symptoms

Symptoms of schizophrenia can be divided into positive and negative symptoms (Kay, Fiszbein, & Opler, 1987). Positive symptoms are symptoms such as hallucinations, delusions, and threat/control override symptoms. Data from studies on *hallucinations* and offending do not show any clear evidence of an association (Cheung, Schweitzer, Crowley, & Tuckwell, 1997; Kasper, Rogers, & Adams, 1996; for a review, see Bjorkly, 2000a).

Delusions are misperceptions of reality, e.g., paranoid delusions or delusions of grandeur. There is support for an association between delusions and offending (Arsenault et al., 2000; Taylor et al., 1998). By contrast, from an interview study of psychiatric inpatients, Junginger, Parks-Levy, and McGuire (1998) concluded that delusional motivation of violence was rare.

The term *threat/control override (TCO) symptoms* refers to a specific cluster of psychotic symptoms. Individuals with TCO symptoms experience that people want to harm them (threat) and/or that they cannot control their own thinking due to either the mind dominated by forces outside of their own control or that other people's thoughts were put into their heads (override). TCO symptoms have been hypothesized to be an important link between symptoms and offending. Evidence for an association between TCO symptoms and offending have been demonstrated (Link, Stueve, & Phelan, 1998; Swanson, Borum, Swartz, & Monahan, 1996) and between TCO symptoms and severe violence (Stompe, Ortwein-Swoboda, & Schanda, 2004).

Negative symptoms of schizophrenia involve decreased normal functions, e.g., initiative and emotional expression. It may be counterintuitive to view negative symptoms as a possible risk factor for offence, and, in accordance, research is scarce. Krakowski, Czobor, Pal, and James (1999) observed that persistently violent patients in a hospital ward had significantly more negative symptoms as compared to non-violent patients and patients with decreasing violence.

Research on criminal offending with a focus on symptoms has been criticized for not investigating factors that may mediate the relationship between psychotic symptoms and antisocial behaviour. It has been reported that fright, sadness, or anxiety may act as mediating factors (Buchanan, 1997), as well as negative emotions (Cheung et al., 1997) and distress in the form of anxiety and depression (Hodgins, Hiscoke, & Freese, 2003). Haggård-Grann, Hallqvist, Långström, and Möller (2006a) suggested that suicidal ideation and interpersonal stressors may serve as triggers of violence. On the basis of a review, Bjorkly (2002b) summarised that the link between delusions and violence would be "*delusional distress*", i.e., emotional distress such as anxiety, fear, anger or irritability. Cognitive beliefs may also serve as mediators. Hacker, Birchwood, Tudway, Meaden, and Amphlett (2008) found that acting on voices was associated with beliefs about voice omnipotence.

The main criticism towards research on offending with a focus on symptoms is that it neglects other risk factors. As an example, in a classical meta-analysis, Bonta, Law and Hanson (1998) demonstrated that psychiatric status was a poor predictor of criminal

recidivism when studied together with other potential risk factors. In a recent study, Shawyer and co-workers (2008) found that traditional risk factors of violence reduced the odds of violence due to command hallucinations. It was estimated from a Finnish study that among homicide offenders with schizophrenia, a majority of the offences were driven by psychotic symptoms (Joyal, Putkonen, Paavola, & Tiihonen, 2004). Interestingly, this was not the case for homicides committed by offenders with schizophrenia and a co-occurring antisocial personality disorder. Swanson and co-workers (2008) found positive psychotic symptoms to be linked to violence among individuals with schizophrenia; however, this finding was restricted to those individuals who did not have a childhood conduct disorder.

To conclude, research on the role of symptoms as a cause of violence is inconclusive. The main criticism at research with a focus on symptoms is that it does not take other risk factors into account. Also, it has been suggested that research should focus on factors mediating the relationship between symptoms and violence.

1.3.2 A risk factor perspective

The section starts out with a general discussion on risk and risk factors. It is followed by a brief review over some of the most commonly investigated risk factors for criminal offence among individuals with schizophrenia.

Risk is a widely used concept and various definitions are used throughout the literature, more or less stringent. The terminology of risk will therefore be briefly discussed. In an important article, Kraemer and co-workers (1997) stated that the issues in risk research are much too important to tolerate less than precise terminology. In a series of papers, the authors defined and clarified some of the misleading terms used in previous research (Kazdin, Kraemer, Kessler, Kupfer, & Offord, 1997; Kraemer et al., 1997; Kraemer, Wilson, Fairburn, & Agras, 2002).

To start, it is important that a distinction is made between correlates of risk and risk factors. A *correlate* is a variable that is associated with the outcome variable, but where it cannot be decided which of the variables that precedes the other. In the absence of an established timeline, the variables involved should be labelled correlates rather than risk factors. Identifying correlates may be very important in a first stage of research where hypotheses are generated rather than tested.

If it can be determined that a correlate precedes the outcome, the term risk factor may be used. Three different types of risk factors have been proposed: fixed markers, variable markers, and causal risk factors. *Fixed markers* are those risk factors that cannot be changed (gender is an example). *Variable markers* are risk factors that can be changed either spontaneously or by intervention. *Causal risk factors* are those risk factors that have been shown to be possible to manipulate, and, when manipulated, also change the outcome. To summarise, only some risk factors are causal risk factors.

In risk research, complexity is the rule. One specific outcome may be predicted by multiple risk factors, or one specific risk factor may increase the risk for various outcomes. Risk factors may interact in different ways. An increased risk for a certain outcome may require a number of risk factors accumulated. Risk factors may also interact in a synergistic way, for example, if a second risk factor is added to a first, the risk for a certain outcome is not merely added, but multiplied. Global measures of risk factors are composed by many risk factors. An example is low socio-economic status

(SES), a global measure of risk factors (such as low income, low level of education, low occupational status) which has been found to be associated with a number of undesired outcomes (e.g., delinquency and early substance abuse). In research it is valuable to break down global risk factors into smaller, more manageable units.

Risk factors may also differ between different populations and different time periods in an individual's life. In developmental psychology, it is generally considered that different risk factors may be influential at different periods of time within an individual's life. This may lead to subtypes of individuals with the same outcome, e.g., criminal behaviour, but for whom different risk factors may have operated at different periods of time.

This short discussion on risk factors may be concisely summarised in the words of Kazdin et al. (1997):

... whether a characteristic, event, or experience is a risk factor 'depends'. (p. 378)

1.3.2.1 Antisocial behavioural style

In the following section, evidence of associations between an antisocial behavioural style and criminality among individuals with schizophrenia will be reviewed.

Conduct disorder refers to a childhood pattern of behaviours where the basic rights of others or age-appropriate societal norms are violated. Conduct disorder has consistently been shown to be a risk factor of early-onset, persistent offending among persons with schizophrenia. Findings from the longitudinal Dunedin study indicated that conduct disorder during childhood was one of the most important predictors of violence among persons with schizophrenia-spectrum disorder (Arsenault et al., 2000). Recent data from the NIMH CATIE study showed that violence among individuals with schizophrenia was more common among those individuals who had a history of childhood conduct problems than it was among individuals with no such history (Swanson et al., 2008). Retrospective studies have demonstrated associations between conduct disorder and early-onset offending among male offenders with schizophrenia (Hodgins, Lapalme, & Toupin, 1999; Hodgins, Tiihonen, & Ross, 2005; Tengström, Hodgins, & Kullgren, 2001).

Antisocial personality disorder is characterised by a pervasive pattern of disregard for and violation of the rights of others, starting in childhood. Individuals with an antisocial personality disorder are impulsive, aggressive and easily get into law-breaking behaviours. Among individuals with schizophrenia, associations have been found between antisocial personality disorder and aggressive assault (Moran et al., 2003), time incarcerated (Mueser et al., 1997), number of previous convictions (Joyal, et al., 2004), and early-onset offending (Joyal et al., 2004; Tengström et al., 2001).

An antisocial behavioural style may be viewed as a global measure of risk. It comprises a number of factors that may correlate with offending, e.g., impulsivity, irritability, and substance abuse. To understand the relation between personality and offending, it would be valuable to break down the concept of personality into smaller units.

1.3.2.2 Intelligence

Research aiming at investigating intelligence as a risk factor of offending among individuals with schizophrenia is scarce. Table 2 gives a summary of the studies published to date.

As demonstrated in the table, in three of the studies individuals with and without previous criminal behaviour were compared. No differences were found in any of the measures of intelligence. Neither was low intelligence found to predict violence in a prospective, follow-up study. By contrast, from assessments of inpatients with previous violent offending it was suggested that there might be a deterioration of intelligence after the onset of the disorder.

To current knowledge, there is still no study on the association between intelligence and criminality in schizophrenia which has used a longitudinal design. However, data from a Finnish cohort study (Cannon et al., 2002) revealed an association between lower educational achievement and adult convictions among individuals with schizophrenia.

It may be that the associations between intelligence and criminality are so subtle that they may not be captured by intelligence tests. Recent research, using fMRI, has revealed neuropsychological differences among offenders with schizophrenia as compared to non-offenders with schizophrenia (Joyal et al., 2007; Kumari et al., 2006).

To summarise, there is so far no convincing evidence of an association between intelligence and offending in schizophrenia. At this stage of research, the task is to identify whether or not intelligence may be a correlate of offending.

Table 2. Studies on intelligence and offending in schizophrenia

Year	Authors	Design	Participants, <i>n</i>	Results
		<u>Retrospective comparison between groups</u>		
1996 USA	Krakowski et al.	History of violent arrest No history of violent arrest	In-patients, <i>n</i> = 102	No differences in verbal intelligence quotient (VIQ), performance intelligence quotient (PIQ), or intelligence quotient (IQ) between groups*
2003 USA	Lafayette, Franckle, Pollock, Dyer, & Goff	History of violent arrest History of non-violent arrest No history of arrest	Out-patients, <i>n</i> = 96	No differences in VIQ, PIQ, or IQ between groups
2005 UK	Barkataki et al.	History of violence and antisocial personality disorder (ASPD) History of violence, no ASPD No history of violence	Incarcerated and hospitalized patients, <i>n</i> = 58	No differences in VIQ, PIQ, or IQ between groups
		<u>Prospective follow-up study</u>		
2004 UK	Walsh et al.	Sociodemographic and clinical predictors of violence	Patients at discharge, <i>n</i> = 272	Low IQ did not predict violence at 2-year follow-up
		<u>Assessment of in-patients, no controls</u>		
2002 UK	Puri, Richardson, Higgins, & Tresaden	Comparison between pre-morbid IQ and current IQ	In-patients who had offended, <i>n</i> = 17	Deterioration of IQ after onset of disorder

* The intelligence quotient (IQ) is often presented according to a two-factor model that consists of a verbal intelligence quotient (VIQ) and a performance intelligence quotient (PIQ).

1.3.2.3 Substance use disorders

Many individuals with schizophrenia use alcohol and/or drugs and some of them develop an abuse or dependence. In a Swedish study almost half of the participants (48.3%), patients at an outpatient clinic in Malmö, met criteria for a lifetime prevalence of substance abuse (Cantor-Graae, Nordström, & McNeil, 2001). This is in concordance with often cited findings from the Epidemiological Catchment Area Study, based on data from more than 20 000 community citizens and individuals in institutions in the United States (Regier et al., 1990). The study revealed a lifetime prevalence of forty-seven percent for substance use disorder among individuals with schizophrenia. The odds of having a life-time diagnosis of a substance use disorder was estimated to be almost five times as high for individuals with schizophrenia as for the general population. Despite different research designs, a number of recently conducted studies from around the world have reported similar figures (shown in Table 3).

However, it should be noted that figures of current substance use disorders are lower. This indicates that while individuals with schizophrenia may be at high risk for substance use disorders, they are not automatically persistent substance abusers. Some of them may have stopped using substances in a harmful way on their own; others may have benefited from treatment.

Table 3. Life-time and current prevalence of substance use disorders among individuals with schizophrenia.

Year	Authors	Design	Participants, <i>n</i>	Prevalence	
				Life-time	Current
2000 Ireland	Kamali et al.	Clinical study	Inpatients, <i>n</i> = 102	40%	20%
2000 USA	Mueser et al.	Clinical study	Inpatients, <i>n</i> = 89	58%	
2001 Sweden	Cantor-Graae, Nordström, & McNeil	Clinical study	Inpatients and outpatients, <i>n</i> = 87	48.3%	15%
2001 Ireland	Condren, O'Connor, & Browne	Clinical study	Outpatients, <i>n</i> = 99	45%	
2004 Canada	Van Mastrigt, Addington, & Addington	Clinical study	First episode, inpatients and outpatients, <i>n</i> = 357		44.5%
2004 Canada	Margolese, Malchy, Negrete, Tempier, & Gill	Clinical study	Outpatients, <i>n</i> = 207	44.9%	14%
2004 Australia	Wallace, Mullen, & Burgess	Register study	Discharged patients, <i>n</i> = 2 861	11.4%	

Substance use disorders have been found to be associated with an increased risk of offending. Results from a longitudinal study in the United States revealed that individuals with schizophrenia and poly-substance abuse had odds of violence over twelve times higher than individuals with schizophrenia and no abuse (Cuffel, Shumway, Chouljian, & MacDonald, 1994). Interestingly, no higher risk was found for individuals with schizophrenia who used alcohol only or marijuana only. This finding is in contrast with findings from a Finnish study. Results from a birth cohort prospective study demonstrated that at age twenty-six more than one third of individuals with schizophrenia and an alcohol use disorder had committed a violent crime as compared to less than one tenth of individuals with schizophrenia and no alcohol use disorder (Räsänen et al., 1998). Findings from a Swedish, forensic sample revealed that males with schizophrenia and a co-morbid substance use disorder were four times more likely to recidivate into a violent offence as compared to males with schizophrenia and no substance abuse (Tengström, Hodgins, Grann, Långström, & Kullgren, 2004). Despite differences in methodology, similar results have been reported from studies in many countries, e.g., England (Scott et al., 1998), Switzerland (Modestin & Wuermle, 2005), New Zealand (Arseneault et al., 2000), and Australia (Wallace, Mullen, & Burgess, 2004).

All the findings reviewed above refer to violent offending. Data on non-violent offending have not been shown specifically. However, from interpolating data on general offending, it may be concluded that the impact of co-morbid substance use disorders on non-violent offending may be large. Data from the British and Australian studies referred to above demonstrated that for individuals with schizophrenia, a co-morbid substance abuse increased risk for any offence with five times and thirteen times, respectively (Scott et al., 1998; Wallace et al., 2004).

The relationship between substance abuse and offence has been described as very complex, interactional, and multi-factorial (Boles & Miotto, 2003; Hoaken & Stewart, 2003). While the studies discussed in this section may be described as primarily correlational, substance abuse may best be labelled a correlate or a marker of offence. As discussed by Haggård-Grann, Hallqvist, Långström, and Möller (2006b), asking an offender why he or she committed an offence may give rise to a tendency to blame substances. Retrospective studies are thus not very helpful in determining causal relationships. Evidence from laboratory and empirical studies support the possibility of alcohol as a causal risk factor for violent behaviour (for a review, see Boles & Miotto, 2003).

There is no single theory on substance abuse among individuals with schizophrenia which is commonly agreed upon although a number of theories have been proposed (for a review, see Mueser, Drake, & Wallach, 1998). However, one way to study substance use disorders is through the use of typologies, that is, the classification of individuals with substance use disorders into distinct subtypes such as the Type I/II typology (Cloninger, Bohman, & Sigvardsson, 1981) or the Type A/B typology (Babor et al., 1992). In short, individuals of the Type I/A subtype have been described as guilt-ridden and harm-avoidant. Their substance abuse is viewed as genetic and environmental and starts late in life (after the age of 25). In contrast, individuals of the Type II/B subtype are antisocial and get into substance abuse at an early age. Their substance abuse is primarily genetic but there are also familial risk factors for abuse.

So far, no studies on typologies of substance abuse have been carried out among individuals with schizophrenia. If subtypes of substance abuse among this population could be identified, an expectation would be that better and more differentiated treatment programmes would ultimately be developed.

1.3.2.4 Socioeconomic factors

Despite much research on the associations between socioeconomic factors and criminal offending in the general population (Sarnecki, 2003), few studies have been designed to investigate this relationship among individuals with schizophrenia. From clinical studies, associations have been reported between factors of lower social class and criminal offending (Stompe et al., 2006), between neighbourhood poverty and violence (Silver, Mulvey, & Monahan, 1999), and between violence in the surrounding environment and violent behaviour (Swanson et al., 2002).

1.4 CRIME PREVENTION

As shown, criminal offending is more prevalent among individuals with schizophrenia as compared to non-mentally disordered individuals. Clinicians and researchers have thus a challenge to prevent criminality among individuals with schizophrenia in inpatient and outpatient settings.

1.4.1 Inpatient treatment

Despite half a century of deinstitutionalisation, many individuals with schizophrenia are still admitted to hospitals for treatment. In an extensive review study by Knapp, Mangalore, and Simon (2004) it was reported that between one-third and two-thirds of the total health costs of schizophrenia was for hospitalisation in most countries represented in the review. Total health costs include direct costs, such as costs for hospitalisation and medication, and indirect costs, e.g., loss of productivity. From a Swedish study on 225 risperidone-treated individuals with schizophrenia, it was reported that hospital costs amounted to 64% of the direct and 38% of the indirect annual costs by the first year of the study. After five years, the costs for hospitalisation had decreased to 18% of the direct and 10% of the indirect costs (Lindström, Eberhard, Neuvius, & Levander, 2007).

The literature on inpatient treatment for individuals with schizophrenia in risk of offending is mainly limited to studies on pharmacological interventions (Chengappa et al., 2002; Krakowski, Czobor, Citrome, Bark, & Cooper, 2006; Lambert et al., 2008; Stone & Niz, 2004; Volavka et al., 2004). There is research in the field of crime prevention in forensic inpatient settings, but the programmes reported were designed for patients with personality disorder (Hornsveld, Nijman, Hollin, & Kraaimaat, 2008; Timmerman & Emmelkamp, 2005). Studies on psychosocial or psychotherapeutic interventions to prevent offending among inpatients with schizophrenia have, to my knowledge, not been published.

There are, however, recommendations. It has been suggested that inpatient treatment of offenders with schizophrenia should include pharmacologic interventions, substance abuse treatment, programmes aimed at reducing antisocial behaviours and attitudes, aggression management, cognitive retraining, social skills training, all tailored for the specific needs of the individual. Furthermore, staff should behave in a calm way (Buscema et al., 2000; Hempel & Cormack, 2001; Hodgins & Müller-Isberner, 2004).

In lack of treatment studies, we may turn our focus to the outcome of inpatient treatment. From treatment outcome studies in the UK, Germany, Sweden, and New Zealand, the proportion of individuals committing new crimes after discharge from hospital has been reported to vary between 13% and 46%, depending on type of hospital and follow-up time (Buchanan, 1998; Davies, Clarke, Hollin, & Duggan, 2007; Jamieson & Taylor, 2002; Maden, Rutter, McClintock, Friendship, & Gunn, 1999; Skipworth, Brinded, Chaplow, & Frampton, 2004; Socialstyrelsen, 2002; Soyka, Morhart-Klute, & Schoech, 2004; the proportion of discharged patients with a diagnosis of schizophrenia varied from 33% to 100% between groups).

1.4.2 Outpatient treatment

During the last decades, specific outpatient treatment programmes have been developed, aimed at individuals with schizophrenia in risk of offending. The treatment elements of these programmes are not always clearly defined. However, many outpatient treatment programmes have been evaluated as to their efficiency. The results of the evaluations are mixed.

Swartz and co-workers (2001) assessed a programme for involuntary outpatients in the US, a programme which included case management and other outpatient treatment services. Patients with a sustained period of outpatient commitment (up to nine months) and intensive treatment were less likely to be violent as compared to patients with a short period of outpatient commitment (up to three months) or no outpatient commitment at all. In another study from the US, McNiel and Binder (2007) assessed a mental health court programme with mental health professionals offering treatment and services and also providing supervision. In comparison with regular jail services, the mental health court programme was associated with a decrease in criminality. Results from the evaluation of another mental health court programme in the US (Herinckx, Swart, Ama, Dolezal, & King, 2005) showed similar results. On the other hand, Walsh and co-workers (2001) evaluated an intensive case management programme in the UK. Intensive case management (10-15 cases per manager) did not reduce the prevalence of violence in comparison with standard case management (30-35 cases per manager). Mueser, Bond, Drake, and Resnick (1998) concluded from a review of 75 studies on assertive community treatment and intensive case management that they had little effect on arrests and time spent in jail. (Again, the proportion of patients with a diagnosis of schizophrenia varied between studies, ranging from 22% to 100%).

1.4.3 Deinstitutionalisation

Since World War II, inpatient psychiatric services have given way to outpatient psychiatric services. In Sweden the number of beds in psychiatric treatment decreased from 35 000 (1969) to 5 565 (2001) (Socialstyrelsen, 2003). American figures are similar: the number of residents in state and country hospitals in the US decreased from 512 501 (1950) to 61 722 (1998) (Geller, 2000).

There are many reasons for this deinstitutionalisation process: widespread criticism of the conditions at the large mental hospitals, ideological changes in society towards increased rights for the individual, better methods for outpatient services, and a belief that outpatient services are more cost-effective than treatment in hospital (SOU, 2006). As pointed out by Lamb and Bachrach (2001), these assumptions were not tested empirically before the commencement of the deinstitutionalisation process. Evaluations

of cost-effectiveness have come to inconsistent results. As an example, there are studies on non-forensic populations with mental disorders demonstrating the cost-effectiveness of outpatient care in comparison with treatment in hospital (Dickey, Fisher, Siegel, Altaffer, & Azeni, 1997; Lapsley et al., 2000; Rothbard, Kuno, Schinnar, Hadley, & Turk, 1999) but contrary findings have also been shown (Rothbard, Schinnar, Hadley, Foley, & Kuno, 1998; for a meta-analysis, see Burns et al., 2001).

It has been argued that the closure of mental hospitals and the down-sizing of psychiatric wards may have led to increased criminal offending among individuals with schizophrenia (Lamb & Bachrach, 2001; Munk-Jorgensen, 1999). This has not been shown empirically. What has been shown is an increase of mentally disordered people in jails (Gunn, 2000; Lamb & Weinberger, 2005; Torrey, 1995). In an interesting article, Gunn (2000) explains this confusion as an effect of the so called Penrose's law, by which is meant an inverse relationship between the number of mental hospital beds and the number of *prisoners*, discovered by Lionel Penrose, psychiatrist, psychoanalyst, and professor, in a comparison between European countries prior to World War II. However, Penrose's findings have unfortunately been referred to as an inverse relationship between mental hospital beds and *crimes*, and this "law" has continued to influence public opinion.

What may research tell us about the effects of deinstitutionalisation on criminal offending? In two studies from Victoria, Australia, patients admitted for schizophrenia for their first time were followed. The first patients were admitted in 1975, before the deinstitutionalisation process started. It was found that patients admitted later, when community care was the rule, had committed more offences, but this increased offending was matched by a similar increase in offending among non-mentally disordered individuals (Mullen et al., 2000; Wallace et al., 2004). A study on veterans in the US showed similar results. Extensive psychiatric hospital bed closures between 1994 and 1997 were not followed by increased numbers of mentally ill veterans in jails (Rosenheck, Banks, Pandiani, & Hoff, 2000).

Related to the topic are the results from a recent British study. It showed decreased numbers of homicides among mentally ill persons after the middle of the 70's. This was unexpected since the numbers of homicides committed by non-mentally ill persons have increased (Large, Smith, Swinson, Shaw, & Nielssen, 2008).

2 AIMS

The overall aim of the present study was to advance knowledge on criminal offending among males with schizophrenia.

Specifically,

- *Paper I* aimed at investigating the associations between low verbal intelligence and criminal offending and between low verbal intelligence and early-onset persistent offending among men with schizophrenia
- *Paper II* aimed at validating four uni-dimensional and one multi-dimensional alcohol use typology among men with schizophrenia spectrum disorders, and also at exploring whether a typology with a number of subtypes exceeding two would be valid and clinically useful
- *Paper III* aimed at investigating possible risk factors for lifetime criminal offending among men with a diagnosis of schizophrenia as compared to men with no diagnosis of schizophrenia, and also at predicting lifetime severe violent offending among men with a diagnosis of schizophrenia based on risk factors present in childhood or early adulthood
- *Paper IV* aimed at describing lifetime criminal offending and lifetime patterns of inpatient psychiatric treatment, inpatient substance abuse treatment, and imprisonment among men with a diagnosis of schizophrenia as compared to men with no diagnosis of schizophrenia, and also at investigating the role of inpatient treatment and imprisonment for lifetime criminal offending among men with a diagnosis of schizophrenia

3 METHOD

The present thesis is based on two different data sets. The first data set consisted of data from The Comparative Study of the Prevention of Crime by Mentally Ill Persons (CSPCMIP). The second data set consisted of Swedish conscription data of 1969-1970 and follow-up data from the National Hospital Register and the National Crime Register.

Table 4. Papers of the thesis

Data set	Study	Paper	Participants	<i>n</i>	Controls	<i>n</i>
1	CSPCMIP	I	Men, schizophrenia spectrum disorder	219	-	-
	Clinical follow-up study	II	Men, schizophrenia spectrum disorder, alcohol use disorder	139	-	-
2	Swedish conscription data	III + IV	Men, schizophrenia	377	Men, no schizophrenia	49 021
	Register study					

3.1 THE FIRST DATA SET

3.1.1 A clinical follow-up study

CSPCMIP is an international, multi-site follow-up study on forensic and general psychiatric patients in community care. The study, which started in 1998, is led by Professor Sheilagh Hodgins. The main objectives of the study were to study treatment and its relations to the needs of the patients, and to identify legal powers that contribute to treatment. Additional objectives were to assess the predictive validity of the HCR-20 and to assess the validity of hair analysis for measuring medication use and alcohol and drug consumption (Hodgins et al., 2007).

The sites of the study were Province of British Columbia (Canada), the entire country of Finland, Hessen (Germany), and Southern Sweden, geographical areas with a total number of inhabitants of almost 18 million. The sites were selected on the grounds that they were responsible for all forensic patients of the catchment area. They were also considered to have adequate resources for optimal care to forensic patients and to be able to guarantee that the study follow-up would be carried out.

CSPCMIP is a naturalistic case-control study. The treatment programmes at the four sites are non-standardised and the patients are assigned to different treatment programmes according to the routines of the sites and the needs of the patients and not, as would be the case in an experimental study, randomly assigned to different treatment conditions. No control conditions have been involved in the study. Instead, the sites included were judged to differ on several features of treatment, social service, and legislation. Thus, comparisons between sites would generate valuable knowledge on treatment. To make this possible, treatment components are being described in detail.

3.1.2 Procedure

All persons with a major mental disorder about to be discharged from the forensic hospitals within the catchment area were invited to participate in CSPCMIP. The patients gave their written informed consent to participate and gave access to medical and criminal records. They also named a family member to provide information on them. When consent was given, a structured diagnostic interview was completed. If a diagnosis of a major mental disorder was confirmed, the patient was included into the study. For each included participant from a forensic hospital, a participant from a general psychiatric hospital was invited to participate. The participants from general psychiatric hospitals were matched with the participants from forensic psychiatric hospitals on diagnosis, sex and age. With the exception of the matching procedure, the procedure of inclusion into the study was the same for both subgroups.

All participants underwent assessment prior to discharge. An extensive battery of diagnostic interviews and tests were used. Historical data was extracted from official files and from the participant and his family. After discharge, the participants were interviewed and reassessed at four occasions with six months interval. At each stage of data collection, all available sources of information were used to provide data; interviews with participants and relatives, official records, and information from staff.

The refusal rate was 167 persons out of the 475 persons originally invited to participate. To understand possible biases of the sample, approval had been obtained to record a small amount of information on the patients who refused to participate.

3.1.3 Participants

For the present study, all male participants of CSPCMIP with a diagnosis of schizophrenia, schizoaffective disorder, or schizophreniform disorder were selected (DSM-IV; Spitzer, Williams, Gibbon, & First, 1990a&b). The choice to leave out females was undertaken due to their low number ($n = 8$). The participants comprise two subgroups. One subgroup consists of patients from forensic psychiatry ($n = 186$). The other subgroup consists of patients from general psychiatry ($n = 122$).

3.1.4 Instruments

In the following, the instruments used in the present study will be presented. It is to be noted that all figures on inter-rater reliability were calculated by a second assessment on 15% of the participants of the entire sample of CSPCMIP.

3.1.4.1 *Structured Clinical Interview for DSM-IV (SCID; Spitzer, Williams, Gibbons, & First, 1990a&b)*

Psychiatric diagnoses were made using Structured Clinical Interview for DSM-IV (SCID). SCID is a semi-structured interview guide. It comprises fixed questions, but also leaves an opportunity to formulate questions freely. Studies have shown that axis I and axis II disorders can be reliably and validly diagnosed with SCID (Maffei et al., 1997; Schneider et al., 2004; Zanarini et al., 2000).

A complete SCID-I interview was conducted along with an additional SCID-II interview on conduct disorder and antisocial personality disorder. The psychiatrists who interviewed the participants of the study were trained and examined by the authors of the instrument. Additional information was provided from collaterals and records.

Inter-rater reliabilities were measured by a second assessment on 15% of the participants. The agreement between raters on diagnoses was excellent; schizophrenia spectrum diagnosis versus other diagnoses, $\kappa = 1.0$ ($n = 35$), conduct disorder, $\kappa = 1.0$ ($n = 34$), and antisocial personality disorder $\kappa = 1.0$ ($n = 34$). The agreement between raters on alcohol abuse or dependence was lower, $\kappa = .79$ ($n = 35$).

3.1.4.2 *Wechsler Adult Intelligence Scale Revised (WAIS-R; Wechsler, 1981, Wechsler, 1997)*

Intelligence was assessed by Wechsler Adult Intelligence Scale Revised (WAIS-R). The instrument is a revision of previous versions of the Wechsler Intelligence Scale, first published in 1939 and now worldwide used. WAIS-R consists of eleven subtests, six of them measuring verbal abilities, five of them measuring non-verbal (performance) abilities. The person to be assessed is asked questions on for example the meaning of words and general knowledge. He is also asked to perform tasks such as puzzles and paper-and-pencil assignments. Some of the subtests are time-limited. A WAIS-R test usually takes between 60 and 90 minutes to administer. The results of a test with WAIS-R may be shown as an intelligence quotient (IQ). Traditionally, the Wechsler Intelligence Scale was considered to consist of two subscales, a verbal subscale and a performance subscale. In line with this, the results from the subtests are often summarised into a verbal IQ score (VIQ) and a performance IQ score (PIQ), respectively. The results from all subtests are then summarised into a full scale IQ score (FSIQ).

WAIS-R was administered according to standard protocol. If a participant had completed a WAIS-R test within a year before discharge, the results of that test were used for the study. VIQ and PIQ were calculated separately. Low VIQ was defined as $VIQ \leq 85$, one standard deviation below the mean. All participants with $VIQ > 85$ were considered to have “normal range” VIQ despite the fact that IQ scores > 110 in clinical practice generally are considered to be “high average”, “superior”, or “very superior”

3.1.4.3 *Psychopathy Checklist Revised (PCL-R; Hare, 1991; Hare, 2003)*

Psychopathy is a psychological and behavioural disorder characterised by deficient affective and interpersonal traits, and antisocial behaviour (Cooke & Michie, 2001). Psychopathic traits are assessed with the PCL-R, a widely used instrument with reliable and valid psychometric measures (Hare, 2003). The instrument comprises twenty items reflecting psychological and behavioural traits commonly observed in individuals with psychopathy. Each item is rated 0-2. 0 means not present, 2 means clearly present. The assessment is based on information from multiple sources. A semi-structured interview is conducted and all available files and records are scrutinised. Factor analyses of PCL-R have yielded a two-factor model, Factor 1 consisting of psychological traits and Factor 2 consisting of behavioural traits (Hare, 1991) as well as a three- and four-factor models (Cooke & Michie, 1999; Hare, 2003).

In the present study, the assessments were made by psychiatrists in collaboration with the research assistants who had done the interviews with the patients and the collaterals and who had read all the files. The psychiatrists had been trained and examined by the author of the instrument. Inter-rater reliabilities were measured by a second assessment on 15% of the participants. For the PCL-R total score, $ICC = .94$ ($n = 35$).

3.1.4.4 *Positive and Negative Symptoms Scale (PANSS; Kay, Fiszbein & Opler, 1987)*

Positive and negative symptoms of schizophrenia were assessed with the Positive and Negative Symptoms Scale (PANSS). Positive symptoms include delusions and hallucinations, while negative symptoms have characteristics such as affective flattening and lack of motivation. The instrument consists of 30 items. The original positive and negative scales each consist of seven items rated 1 (absent) to 7 (extreme). There is also a scale of general psychopathology, comprising sixteen items, also rated 1 to 7. Due to good reliability and validity of the instrument, it has been widely used in clinical and research settings.

For the present study, the same psychiatrists who conducted the SCID also conducted the PANSS assessment after training to use the instrument. The inter-rater reliability was assessed with the same procedure as for the other instruments. For the positive scale, $ICC = .71$ ($n = 34$). For the negative scale, $ICC = .52$ ($n = 34$).

3.1.4.5 *Neo Personality Inventory Revised (NEO-PI-R; Costa & MacGrae, 1992)*

All participants completed the Neo Personality Inventory Revised (NEO-PI-R) self-report form to assess personality traits. The instrument is based on the Five Factor model of personality and was designed to provide a general description of normal personality. It has been used in research to assess personality traits among individuals with schizophrenia (Bagby et al., 1997; Camisa et al., 2005; Gurrera, Nestor, & O'Donnell, 2000; Kentros et al., 1997; Reno, 2004). The five factors include neuroticism, extraversion, openness to experience, agreeableness, and conscientiousness. The instrument comprises 243 items, each rated on a 5-point scale. The results are summarised into the five factors, each consisting of six facet scales for more detailed analysis. As an example, the neuroticism factor includes an anxiety facet, a hostility facet, a depression facet, a self-consciousness facet, an impulsiveness facet, and a vulnerability facet. Research has consistently demonstrated good reliability and validity as well longitudinal stability for the instrument (Miller, Reynolds, & Pilkonis, 2004; Quirk, Christiansen, Wagner, & McNulty, 2003; Young & Schinka, 2001).

3.1.4.6 *Background information*

It was considered important to measure childhood and family variables to understand their influence as risk factors for undesired outcomes in adult age. Thus, information on childhood attention/hyperactivity problems, childhood depression/anxiety, and institutionalisations during childhood was collected. Information was also collected on mental disorder, substance abuse, and criminality among parents and siblings. All information on pre-morbid risk factors was provided from the participant, family members, and from records.

3.1.4.7 *Criminality*

Information on criminal variables was collected from official records. Separate analyses were conducted for non-violent and violent offending. Non-violent offending included offences such as stealing, car theft, and break-and-enter. Violent offences were murder, manslaughter, assault, arson, threat of violence or harassment, sexual offence, robbery, forcible confinement, and illegal possession of firearms or explosives.

Information on crimes and convictions was collected from official files on criminality. The term conviction refers to convictions within the legal system as well as judgments of non-responsibility due to a mental disorder. A measure was created to make it possible to control for the effects of hospitalisations and incarcerations on criminality. Years at risk for offending was defined as the number of years after age 15 (or, if that was the case, after immigration) that a participant had not been hospitalised or incarcerated.

3.1.4.8 Follow-up measures

Information on alcohol and drug use and medication compliance was collected from participants and informants at four interviews conducted at six month intervals during the two-year follow-up period. At each interview session, it was asked if the patient had used alcohol and/or drugs during the last week and if the patient had been non-compliant with medication or had committed an aggressive behaviour during the six month period since the last interview session. Alcohol and/or drug use, non-compliance, and aggressive behaviour were judged to have occurred if reported from either the patient or the informant (or both).

3.2 THE SECOND DATA SET

3.2.1 A register study

The second data set consisted of data from three Swedish registers; Swedish conscription data (Mönstringsdata) from 1969-1970, data from the Patient register (Patientregistret), and data from a national crime register, Persons found guilty of offences (Lagfördaregistret). For paper III, data from all three registers were used. For paper IV, only data from the Patient register and from the national crime register were used.

3.2.2 Procedure

To assemble the second data set, applications for register data were sent out to the register holders. After administrative decisions and ethical approvals at each of the agencies involved, data from the conscription in 1969-1970 were sent over from the Military Archives of Sweden (Krigsarkivet) to Statistics Sweden (Statistiska Centralbyrån), the Swedish central government authority for official statistics. Following this, Statistics Sweden made requests to the National Board on Health and Welfare (Socialstyrelsen) of data on all individuals in the conscription register. Data from the national crime register on the conscripts were already kept at Statistics Sweden. Linkage was completed at Statistics Sweden through the Swedish personal identity number. Before sending the data set to the researchers, all personal identity numbers were removed from the data file and replaced with consecutive numbers.

3.2.3 Registers

3.2.3.1 Swedish conscription data 1969-1970

Until recently, most Swedish young men had to go through conscription into the army. Excluded were individuals with mental or physical handicaps or with mental retardation. The conscription procedure lasted for two days and included physical tests, a medical examination, an interview made by a psychologist, an intelligence test, and a number of questionnaires to be filled out. (The system was changed in 2007. The authorities now decide who will be summoned for conscription on the basis of a web-

based questionnaire.) All data from the conscription are initially kept by the National Service Administrations (Pliktverket). Historical data are stored at the Military Archives of Sweden.

In paper III, data from the intelligence test and the questionnaires were used along with ratings made by the military authorities and calculations on alcohol use made by the authors of the paper.

The intelligence test has been classified as military material and has therefore not been published. It consists of four subtests; a verbal subtest, a visuospatial subtest, a subtest of general knowledge, and a subtest of mechanical ability and knowledge of basic physics (David, Malmberg, Brandt, Allebeck, & Lewis, 1997). The results of each of the subtests were presented in stanines, i.e., in normally distributed scores ranging from 1 to 9. The military psychologist also summarised the scores of the four subtests into one total score, also presented as a stanine score.

At conscription 1969-1970 each conscript filled out two extensive questionnaires. The first questionnaire included 66 questions on social background, family, behaviour and adjustment, and on psychological and physical health. The second questionnaire comprised 39 questions on the use of tobacco, alcohol, and drugs. The questionnaires have been used in previous studies on the cohort (Malmberg, Lewis, David, & Allebeck, 1998; Romelsjö & Leifman, 1999, Stenbacka & Leifman, 2001; Zammit, Allebeck, Andreasson, Lundberg, & Lewis, 2002).

The military authorities rated socioeconomic status according to Swedish election statistics based on father's occupation. The authors of the paper calculated alcohol consumption on the basis of the questions in the questionnaires on frequency and quantity of alcohol consumption.

There was not much missing data. Single items within the questionnaires were sometimes left out. For the variables used in the analyses of the present study, there was an internal non-participation of .2% - 6.9%.

3.2.3.2 *The Patient Register*

The Patient Register is run by the Swedish National Board on Health and Welfare, a government agency under the Ministry of Health and Social Affairs (Socialstyrelsen, 2008). The register was started in 1964, under the name of the National Hospital Register, but was not complete until 1987. All caregivers providing inpatient treatment were mandated to report to the register. Outpatient treatment was included in 2001, but registration on outpatient treatment is still not complete. The name of the register is now the Patient Register.

Originally, data on psychiatric inpatient treatment were reported to a special register. Data reported to the register before 1973 have been removed; however, from 1973 data are almost complete (among a total number of 26 regions, two regions did not deliver data during 1984-1986 and three regions did not deliver data during 1984). The register was later made a part of the National Hospital Register and the Patient Register.

The Patient Register provides data on the patient, the treatment unit, administrative data, and medical data, including diagnoses at discharge.

3.2.3.3 *Crime statistics; Persons found guilty of offences*

The Register on persons found guilty of offences is run by the Swedish National Council for Crime Prevention (Brottsförebyggande rådet; BRÅ, 2008a). It comprises all convictions from 1973 and all convictions except those where the offender was only fined since 1966. The register includes data on the convicted person, the conviction, time in prison, and type of criminal offence. For this study, major violent offence was defined as homicide, manslaughter, assault, robbery, assaulting or threatening an officer, forcible confinement, rape, sexual enforcement, and sexual use (attempts were included).

3.2.4 **Participants**

From July 1st, 1969 to June 30th, 1970, 50 443 young men went through conscription. Unfortunately there were no exact numbers available on how many young men that missed out from conscription. From official statistical data (Statistiska centralbyrån, 2008), it can be estimated that 55 000 boys were born in 1951, the birth year of the majority of the conscripts of the present data set. Reasonably, a few persons died in infancy or during childhood while some others left Sweden before reaching mature age. An additional small number was excused from conscription. If certified by a doctor, persons with a physical or mental handicap or with mental retardation did not have to show up for conscription (SFS 1941:967; SFS 1969:369). Taking these limitations into consideration, it is still reasonable to label the second data set a total birth cohort of men.

The conscripts were born between 1939 (one person) and 1954 (one person). To facilitate conclusions of the study, it was decided that all individuals born before 1949 and after 1951, $n = 945$, should be excluded. Thus, 49 398 individuals were selected to be participants of the study (born in 1949, $n = 2\ 837$; born in 1950, $n = 8\ 835$; born in 1951, $n = 37\ 726$).

Participants with a diagnosis of schizophrenia ($n = 377$) were identified through the Patient Register. Diagnoses were set by the ICD system (WHO, 1992). All participants who had been hospitalised at least once and given one of the following diagnoses at discharge were identified: ICD-7, 300,99; ICD-8, 295; ICD-9, 295; ICD-10, F20. Due to changes in classification of schizoaffective disorder in ICD-10, participants with schizoaffective disorders were not considered to have a diagnosis of schizophrenia. Participants with schizoaffective disorder and participants with diagnoses of psychotic disorders other than schizophrenia ($n = 501$) were included in further analyses, classified as participants with no diagnosis of schizophrenia.

Some of the participants with a diagnosis of schizophrenia may not have been identified in the study. Data from the inpatient psychiatric treatment register for the period before 1973 have been removed from the register. Theoretically a small number of young men may have been hospitalised for schizophrenia after conscription but before 1973. They have not been identified as participants with a diagnosis of schizophrenia in this study.

3.3 **STATISTICS**

The statistical methods used in this study were Pearson's product moment correlations, χ^2 -tests, t -tests, analysis of variance (ANOVA), multiple regressions, logistic

regressions, *k*-means cluster analyses, Cohen's kappa (κ), and intra-class correlations. If not otherwise indicated, the text below refers to Howell (2002), Pallant (2001), and Tabachnick & Fidell (2001).

Pearson's product moment correlation coefficient (r) is a measure of the degree of linear relationship between two variables. The coefficient is on the scale between -1 and 1 . The closer to the extremes, the stronger relationship. The squared coefficient (r^2) gives the shared variance between variables. In Paper I, r was used to show the strength of association between e.g. VIQ and various measures of criminality.

χ^2 -tests are used to investigate whether two or more groups are different from each other on categorical data. This is accomplished by comparing the frequencies observed in data with the expected frequencies, would the groups not differ from each other. χ^2 -tests are very common in research and were used throughout the study. As an example, in Paper II, χ^2 -tests were used to investigate whether the proportion of participants with a Type I/A alcohol use disorder was different from the proportion of participants with a Type II/B alcohol use disorder as to life-time drug abuse/dependency.

T-tests are used to test the differences between means. Often *t*-tests are used to test if the difference between the means of two independent groups is large enough to justify a conclusion that the two groups really differ from each other as to the variable of interest. To illustrate, in Paper II, *t*-tests were applied to test whether the mean age of first conviction for a non-violent crime among participants with a Type I/A alcohol use disorder was significantly different from that of the participants with a Type II/B alcohol use disorder.

Analysis of variance (ANOVA) is a method used for the same purpose as a *t*-test when there are more than two groups involved. In Paper II, an ANOVA was used to analyse the defining variables of the three-cluster solution. An ANOVA test only indicates whether there are or are not significant differences between groups. To further explore the differences between each of the groups, post-hoc analyses are performed. For the present study, the method of choice was the Tukey test.

A multiple regression may be viewed as an extended method of correlation. It explores how well a set of independent variables predicts a certain, continuous, dependent variable. The analysis gives information on the model but also on the contribution of each of the variables. In Paper I, multiple regression was used to explore how well VIQ would predict age at first conviction for a non-violent crime. Multiple regressions are very sensitive for outliers, that is, cases with extreme values. Therefore, outliers that were found to deviate more than three standard deviations from the mean were removed from the analyses.

Logistic regressions are used to predict categorical outcomes, e.g. yes/no. The predictor variables may be continuous or categorical or a mix. The technique is often used in research. One reason is its flexibility; it is not required that the predictor variables are normally distributed or share an equal variance. Another advantage is the possibility to explore the impact of a predictor for a certain outcome through odds ratios. In the present study, logistic regressions were used in paper III and IV. In paper III, the method was used to explore the association between early adulthood risk factors and life-time convictions. In paper IV, associations between in-patient treatment and convictions for criminal offences were explored through logistic regressions.

Odds ratios (*OR*'s, sometimes denoted Ω) demonstrate the degree to which one variable affects another and may be calculated when conducting a logistic regression. The odds ratio is the increase in odds of an outcome (the dependent variable of the logistic regression) if the predictor value (the independent variable) increases. If the predictor variable is categorical and increases from 0 to 1, the increase in odds may be considerable. If, on the other hand, the predictor is continuous, the odds ratio may be small, since it represents the change in odds per unit increase of the predictor. Several predictors may be explored at the same time. As an example, in paper III, twelve potential risk factors (independent variables) were entered into one logistic regression on which *OR* was calculated for each of the risk factors. Odds ratios greater than 1 mean that a change in the predictor value by one unit increases the odds of being in one group. Odds ratios smaller than 1 mean that a change in the predictor value decreases the odds of being in that particular group.

Cluster analysis is a method used to find natural groups within a data set. There are two widely used methods of clustering: hierarchical cluster analysis and *k*-means cluster analysis. In a hierarchical cluster analysis, one of two approaches is followed. Either is each single case initially constituting a cluster of its own, and, step by step, grouped together into larger clusters until an optimal number of groups is achieved. The other approach starts with all cases in one large cluster, gradually split into smaller clusters (Sclove, 2008). Before a *k*-means cluster analysis is performed, a desired number of clusters is specified. Each cluster has a centroid around which cases will be grouped. During the process, cases are assigned to the most likely cluster one by one. At any step, the centroid may be recalculated and the previously assigned cases will be re-assigned if necessary (Basu et al., 2004). There are no “statistical rules” as to what method should be used. It has been suggested that both be used (Sclove, 2008). In the present study, *k*-means cluster analysis was used to create the Type I/A – Type II/B typology and the three cluster solution of paper II. The choice to use *k*-means cluster analysis was justified by the exclusive use of this method in the studies reviewed. Thus, this study would be comparable to previous studies. As is the case for multiple regression, cluster analysis is sensitive to the combinations of variables included.

To quantify the level of inter-rater agreement, two statistical methods were used. Intra-class correlation (*ICC*, Shrout & Fleiss, 1979) is a method used for continuous data. In the present study, *ICC* was used to measure the degree of agreement between raters on PCL-R scores and PANSS scores. When data are dichotomous, a widely used method of choice is the Kappa coefficient, κ . In the present study, κ was used as an estimate of agreement of raters on SCID diagnoses. Values of *ICC* and κ usually take on measures between 0 and 1; the closer to 1, the better agreement. For the present study, *ICC* and κ were calculated as weighted means for each of the sites. (Sweden was excluded due to few inter-reliability ratings, $n = 3$).

The statistical analyses for papers I and II were performed using SPSS 12.0; for papers III and IV SPSS 15.0 was the choice. Before conducting statistical analyses, SPSS REGRESSION and SPSS FREQUENCIES were used for evaluation of assumptions. In case of skewed distributions, log transformations and non-parametric methods were used. Results were considered to be significant if $p < .05$. Two-tailed tests were applied. Missing data were reported.

3.4 ETHICAL CONSIDERATIONS

Research always involves ethical considerations. Research in the field of forensic mental health may be particularly challenging. First, collecting and storing data on sensitive information is a potential threat to the integrity of the studied individuals. Second, the results achieved may in some cases be harmful for mentally ill offenders in general. While the researcher's aim may be to improve forensic mental health, information on the associations between mental disorder and crime may lead to public fear and rejection of individuals with psychiatric problems, and also to public demands for more repressive sanctions for criminal offence.

Reflections on ethics should include the potential damage caused by research but also the usefulness of new knowledge. The aim of the present study was to advance knowledge on risk factors for criminal offence among males with schizophrenia. More knowledge may lead to better treatment programmes for identified patients with schizophrenia, but also, on a societal level, to programmes for targeted prevention and early intervention. The long-term benefits include a more humane care for individuals with schizophrenia, lower costs for society, and a decreased crime rate.

Before included into the present study, all patients in CSPCMIP gave their written informed consent to participate, authorised access to medical and criminal records, and also named a family member to provide information on them. In case of no consent, approval had been obtained to acquire a small amount of information. This was done to understand possible biases of the sample due to refusals.

To protect the integrity of the individual, all data were stored in a data file with names and personal identification numbers of the participants removed. A special study identification number was used throughout all stages of data analysis. All written material (e.g., forms, test material) was kept securely at the sites. The analyses did not focus on specific participants and the results were not presented in a way that would make it possible to identify a certain participant.

The CSPCMIP was approved by the ethics committees on the different sites (Lund University, Sweden, LU 171-98; Kuopio University, Finland; Giessen, Germany; Simon Fraser University, British Columbia, Canada).

The ethical considerations were different for the Swedish conscription data of 1969-1970. Informed consent was not acquired from the participants for two reasons. First, tracking and contacting 50 000 men would have been costly and time-consuming. Second, the procedure itself would have been a threat to the integrity of the participants.

Instead, conscription data, data from the Patient register, and data from the Register on persons found guilty of offences were linked by officials at Statistics Sweden (Statistiska Centralbyrån) and made anonymous before handed over to the researchers.

Ethical approval of the studies in papers III and IV was acquired from the Karolinska Institute Research Ethics Committee, 2007/174-31.

To summarise the discussion on ethical considerations, it should be emphasized that the researcher has a responsibility to discuss the achieved results in public and to present findings to policy-makers. This is to ensure that research findings will be used in a way that will be beneficial for persons with major mental disorders but also for the society as a whole.

4 RESULTS

4.1 PAPER I

The study aimed at investigating the associations between low verbal intelligence and criminal offending and between low verbal intelligence and early-onset persistent offending among men with schizophrenia.

In line with previous research, the mean verbal intelligence score (VIQ score) for the participants of the study was lower than the mean VIQ score of the general population ($M = 92.18$, $SD = 15.25$; $M = 100$, $SD = 15$, respectively), $t(169) = -6.687$, $p = .000$, $CI = -10.13 - -5.51$. Also, one third of the participants (33.5%) had a VIQ score of 85 or below. This is to compare with the estimated proportion of individuals from the general population with a VIQ score of 85 or below, which is sixteen percent.

There were few significant differences between the participants with $VIQ \leq 85$ and the participants with $VIQ > 85$ in the study. About half of the participants had been convicted of a non-violent crime regardless of VIQ group (52.6%; 51.3%, respectively), $\chi^2(170) = .026$, $p = .872$. Two thirds of them had been convicted of a violent crime, again regardless of VIQ group (68.4%; 67.3%, respectively), $\chi^2(170) = .023$, $p = .87$.

The number of crimes was also similar between the participants with $VIQ \leq 85$ and the participants with $VIQ > 85$, non-violent crimes ($M = 7.46$, $SD = 13.92$; $M = 9.71$, $SD = 2.16$, respectively), $t(168) = -1.764$, $p = .08$, violent crimes ($M = 3.21$, $SD = 7.31$; $M = 2.16$, $SD = 3.04$, respectively), $t(167) = -1.316$, $p = .190$. A multiple regression revealed that two predictors were associated with the number of non-violent crimes: institution before age 18 ($\beta = .257$, $p = .003$) and substance abuse before age 18 ($\beta = .186$, $p = .032$).

Post-hoc analyses revealed that participants with $VIQ \leq 85$ had been hospitalised twice as long as the participants with $VIQ > 85$ ($M = 101.02$ months, $SD = 111.02$; $M = 55.6$ months, $SD = 54.81$, respectively), $t(168) = -3.576$, $p = .000$:

We found an association between VIQ and age at first non-violent conviction ($r = .410$, $p < .000$) and to further investigate this association and to control for confounding variables, a multiple regression was conducted. As shown in Table 5, VIQ and substance abuse before age eighteen were two large, independent predictors of age of first non-violent conviction.

To conclude, among men with schizophrenia spectrum disorders, low VIQ did not increase the risk of criminal offending, but among those who did offend it was associated with a younger age at first conviction for a non-violent crime.

Table 5. Multiple regression analysis predicting age at first conviction for a non-violent crime.

Age at first conviction for a non-violent crime				
<i>n</i> = 60				
Independent variable	<i>B</i>	<i>SE B</i>	β	<i>p</i>
VIQ	.247	.073	.377	.001
Behaviour problem index	-.938	.890	-.128	.296
Substance abuse before age 18	-5.464	2.036	-.324	.010
Parental problem index	-.446	1.023	-.050	.665
Institutionalisation before age 18	-3.234	2.088	-.177	.127
Test of model	$F(5,54) = 6.995, p = .000, R^2 = .427$			

(2 outliers were removed)

4.2 PAPER II

The aim of the study was to validate uni-dimensional typologies and the Type I/II-Type A/B typology of alcohol use disorders in a sample of men with schizophrenia. Another aim was to explore other possible modes to subtype individuals into a valid and clinically useful typology.

Four uni-dimensional typologies were formed. The participants were classified to either subtype of each of the typologies, alcohol abuse/alcohol dependence ($n = 65$; $n = 65$), presence/absence of antisocial personality disorder ($n = 41$; $n = 98$), early onset (< 18 years)/late onset (≥ 18 years) of alcohol use disorder, ($n = 45$, $n = 65$), and presence/absence of a parent with a substance use disorders ($n = 56$, $n = 67$).

All uni-dimensional typologies showed at least some degree of concurrent validity across the domains of pre-morbid risk factors, drug use disorders, criminality, symptoms, and personality, although different typologies showed better or poorer validity in different domains. However, the predictive validity was less impressive.

To form the Type I/II - Type A/B typology, *k*-means cluster analysis was used. Two clusters were requested. The clusters derived were similar to the subtypes of the Type I/II - Type A/B typology (Table 6). The Type I/A drinkers were characterised by fewer childhood risk factors, fewer first-degree relatives with substance abuse, and less severe alcohol use disorder.

Additional analyses on concurrent validity revealed that a larger proportion of Type II/B drinkers as compared to Type I/A drinkers had at least one criminal family member (Type I/A, 21.1%; Type II/B, 44.0%, respectively), $\chi^2(1, N = 96) = 4.898$, $p = .027$, or a family member with a mental disorder (Type I/A, 39.4%; Type II/B, 68.0%, respectively), $\chi^2(1, N = 96) = .6058$, $p = .014$. Type II/B drinkers were also more likely to have a life-time diagnosis of drug abuse/dependency as compared to Type I/A drinkers (Type I/A, 53.5%; Type II/B, 80.0%, respectively), $\chi^2(1, N = 96) = 5.421$, $p = .020$ and they reported having used a larger number of drugs

Table 6. Construct validity of the Type I/II – Type A/B typology

	Type I/A <i>n</i> = 65	Type II/B <i>n</i> = 39	
Number of conduct disorder symptoms	1.34 <i>SD</i> = 1.843	3.92 <i>SD</i> = 3.662	<i>t</i> (94) = 4.550 <i>p</i> = .000
Proportion of first-degree relatives with substance abuse	.10 <i>SD</i> = .1484	.47 <i>SD</i> = .2971	<i>t</i> (94) = 7.998 <i>p</i> = .000
Sum of SCID symptoms of abuse/dependency	12.31 <i>SD</i> = 5.961	22.32 <i>SD</i> = 6.524	<i>t</i> (94) = 7.045 <i>p</i> = .000
Age of onset of alcohol use disorder	19.63 <i>SD</i> = 3.979	17.80 <i>SD</i> = 6.657	<i>t</i> (94) = -1.295 <i>p</i> = .198

(Type I/A, $M = 2.48$, $SD = 2.500$, Type II/B, $M = 4.44$, $SD = 3.477$, respectively), $t(94) = 3.030$, $p = .003$. No differences were found between the two subtypes in the domains of illness (PANSS scores), or personality (the facets of anxiety, depression, impulsiveness, and excitement-seeking from the NEO-PI-R, and the PCL-R). Neither were there any differences between subtypes as to the follow-up variables of alcohol/drug use, and non-compliance to medication during the follow-up.

Of special interest for the present study, were variables of criminal behaviour. No differences were found between subtypes as to age at first conviction (Type I/A, $M = 24.69$, $SD = 8.696$, Type II/B, $M = 23.20$, $SD = 8.514$, respectively), $t(79) = -.668$, $p = .506$, or number of crimes (Type I/A, $M = 13.58$, $SD = 22.234$, Type II/B, $M = 15.52$, $SD = 33.834$, respectively), $t(92) = -.757$, $p = .451$. Neither were there any significant differences found between the subtypes as to aggressive behaviour during the follow-up (Type I/A, 19.0%; Type II/B, 25.0%, respectively), $\chi^2(1, N = 82) = .376$, $p = .540$.

To explore other modes to subtype the participants, additional *k*-means cluster analyses were conducted. A three-cluster typology was judged to be the best solution. The subtypes were 1) “Less severe alcohol use disorder” ($n = 61$), 2) “Antisocial” ($n = 13$), and 3) “Family history of substance abuse and severe alcohol use disorder” ($n = 22$). The validity of the three-cluster solution was not superior to that of the two-cluster solution. It may, however, be of clinical utility.

To summarise, the main finding of the study was that widely used uni-dimensional and multi-dimensional typologies of alcohol use disorders, developed in settings with non-mentally disordered individuals, showed at least some degree of concurrent validity in a sample of men with schizophrenia and alcohol use disorders. The predictive validity was, however, weak.

4.3 PAPER III

The overall aim of the study was to investigate possible risk factors for lifetime criminal offending among males with a diagnosis of schizophrenia as compared to males with no diagnosis of schizophrenia. A second aim of the study was to predict lifetime severe violent offending among males with a diagnosis of schizophrenia based on risk factors present in childhood or early adulthood.

Twelve items from the conscription questionnaires had been chosen as possible risk factors for future criminality along with low intelligence, which was rated on the basis of an intelligence test. The items were related to antisocial behaviour (truancy, lowered marks for conduct in school, contact with police or social services, ever run away from home, shoplifting), low socioeconomic status (low social class, poor family economy, crowded living), problematic substance use (high alcohol consumption, ever taken an eye-opener, arrest for public drinking, ever used drugs, intravenous use), and, as mentioned, to low intelligence.

A first finding of the study was that only two of the possible risk factors for criminal offending were equally or nearly equally distributed between the participants with a diagnosis of schizophrenia and the participants with no diagnosis of schizophrenia, namely lower social class (54.5%; 51.5%, respectively), $\chi^2(1, N = 46\,980) = 1.192, p = .275$, and high alcohol consumption (5.1%; 3.3%, respectively), $\chi^2(1, N = 47\,751) = 3.511, p = .061$. All of the other possible risk factors chosen for the study were more common among the participants with a diagnosis of schizophrenia as compared to the participants with no diagnosis of schizophrenia.

In a next step of the study, logistic regressions were conducted to analyse associations between childhood and early adulthood risk factors for criminality and life-time criminal offending. As shown in table 7, among the participants with a diagnosis of schizophrenia, associations were found between four of the possible risk factors and criminal offending.

Table 7. Associations between possible risk factors of criminal offending and convictions among participants with and without a diagnosis of schizophrenia.

	Schizophrenia (n = 264)		No schizophrenia (n = 39 928)	
	Ever convicted of an offence	Ever convicted of a major violent offence	Ever convicted of an offence	Ever convicted of a major violent offence
	OR (95% CI)		OR (95% CI)	
Lowered marks for conduct in school	3.972 (1.810 - 8.715), $p = .001$	2.219 (1.085 - 4.537), $p = .029$	1.775 (1.684 - 1.870), $p = .000$	2.227 (2.018 - 2.456), $p = .000$
Contact with police or social services	3.140 (1.394 - 7.076), $p = .006$	2.489 (1.130 - 5.484), $p = .024$	2.148 (2.037 - 2.264), $p = .000$	2.695 (2.419 - 3.004), $p = .000$
Crowded living conditions	1.029 (.439 - 2.413), $p = .948$	2.579 (1.099 - 6.055), $p = .030$.979 (.909 - 1.054), $p = .566$	1.055 (.918 - 1.211), $p = .456$
Arrest for public drinking	1.016 (.345 - 2.990), $p = .978$	2.862 (1.157 - 7.079), $p = .023$	1.677 (1.534 - 1.833), $p = .000$	2.139 (1.903 - 2.404), $p = .000$

To explore the predictive validity of the risk factors, all participants of the study were classified as either high risk participants (three or four of the risk factors) or low risk participants (less than three risk factors). There were more high risk participants among the participants with a diagnosis of schizophrenia as compared to the participants with

no diagnosis of schizophrenia (11.7%; 5.7%, respectively), $\chi^2 (1, N = 47\ 201) = 22.570$, $p = .000$.

Among the high risk participants, a larger proportion of the participants with a diagnosis of schizophrenia was convicted of a major violent offence as compared to the participants with no diagnosis of schizophrenia (55.0%; 27.4%, respectively), $\chi^2 (1, N = 2\ 710) = 14.985$, $p = .000$. Also, among the low risk participants, a larger proportion of the participants with a diagnosis of schizophrenia was convicted of a major violent offence as compared to the participants with no diagnosis of schizophrenia (19.9%; 4.5%, respectively), $\chi^2 (1, N = 44\ 491) = 160.847$, $p = .000$.

4.4 PAPER IV

The aim of the study was to describe lifetime patterns of criminal offending and lifetime patterns of inpatient psychiatric treatment, inpatient substance abuse treatment, and imprisonment among men with a diagnosis of schizophrenia as compared to men with no diagnosis of schizophrenia, and also to investigate the role of inpatient treatment for lifetime criminal offending among men with a diagnosis of schizophrenia.

The results of the analyses on lifetime criminal offending revealed that the proportion of participants with a diagnosis of schizophrenia convicted of a criminal offence was larger as compared to participants with no diagnosis of schizophrenia for each five-year period of the entire 35-year follow-up period. In total, 65.8% of the participants with a diagnosis of schizophrenia had been convicted at least once during the follow-up period as compared to 31.3% of the participants with no diagnosis of schizophrenia, $\chi^2 (1, N = 49\ 398) = 114.305$, $p = .000$.

Also, exploring the patterns of inpatient treatment and imprisonment, a finding of the study was that the participants with a diagnosis of schizophrenia had spent a larger number of days per participant in inpatient psychiatric treatment and in inpatient substance abuse treatment as compared to the participants with no diagnosis of schizophrenia, again for each five-year period of the entire 35-year follow-up period. Unexpectedly, the participants with a diagnosis of schizophrenia had also spent a larger number of days per participant in prison as compared to the participants with no diagnosis of schizophrenia. However, that was only the case for the period between 1971 and 1980, i.e., when the participants were in their 20's. In absolute numbers, the participants with a diagnosis of schizophrenia ($n = 377$) had spent 302 313 days in inpatient psychiatric treatment while the participants with no diagnosis of schizophrenia ($n = 49\ 021$) had spent 161 848 days in inpatient psychiatric treatment.

It had been hypothesized that inpatient treatment would prevent future offending and also that it would restrain from concurrent offending. The hypotheses were tested with logistic regressions.

To test the hypothesis that inpatient treatment would prevent future offending, six separate logistic regressions were conducted. The first logistic regression explored the associations between inpatient treatment (and prison) in 1971-1975 and criminal offending in the next five-year-period, 1976-1980. The logistic regression included three predictors: having been admitted to inpatient psychiatric treatment 1971-1975 (yes/no), having been admitted to inpatient substance abuse treatment 1971-1975 (yes/no), and having been convicted to prison 1971-1975 (yes/no). The outcome was having been convicted 1976-1980 (yes/no). Also, to adjust for previous criminal

offending, in a second step a covariate, having been convicted 1971-1975 (yes/no) was added.

Contrary to our hypothesis, there were no associations between inpatient psychiatric treatment during one five-year period and convictions for a criminal offence during the next five-year period, neither in the unadjusted nor in the adjusted models. In other words, inpatient psychiatric treatment was not associated with a subsequent reduction of criminal offending.

On the other hand, inpatient substance abuse treatment was associated with subsequent criminal offending for all the five-year periods of the follow-up, both in the non-adjusted and the adjusted models. However, the associations were in the opposite direction of our hypothesis. Inpatient substance abuse treatment during one five-year period was associated with an increased risk of a conviction for a criminal offence during the following five-year period (*OR*'s shown for the adjusted models); 1976-1980, *OR* 9.944 (*CI*95%, 2.732-36.195); 1981-1985, *OR* 3.012 (*CI*95%, 1.369-6.628); 1986-1990, *OR* 3.720 (*CI*95%, 1.436-9.639); 1991-1995, *OR* 9.454 (*CI*95%, 3.429-26.065); 1996-2000, *OR* 7.300 (*CI*95%, 2.392-22.280); 2001-2005, *OR* 3.124 (*CI*95%, 1.020-9.568).

Finally, there were only few associations between sentence to prison and subsequent convictions for a criminal offence and only for the unadjusted models.

To test the hypothesis that inpatient treatment would restrain from concurrent offending, a similar procedure was followed. This time the predictor variable was the number of months in institution (inpatient psychiatric treatment, inpatient substance abuse treatment, prison) during one five-year period. The outcome was having been convicted (yes/no) during the same five-year period. In the adjusted model, having been convicted (yes/no) during the previous five-year period was added as a covariate.

We had expected that there would be negative associations between the predictor variables and the dependent variables; i.e., that the longer a person would have been admitted to an institution during a five-year period, the smaller would the risk be for this person to be convicted of a criminal offence. We found no such associations. There were some positive associations between the number of months spent in institution and the risk of a conviction for a criminal offence, but only in the unadjusted models.

To conclude, inpatient treatment (and imprisonment) did not seem to neither prevent nor restrain from criminal offending among men with a diagnosis of schizophrenia over a 35-year period.

5 DISCUSSION

5.1 RISK FACTORS OF CRIMINAL OFFENDING AND THE ROLE OF TREATMENT

The purpose of this thesis was to advance knowledge of criminal offending among men with schizophrenia. We aimed at studying risk factors of criminal offending from an overview perspective (paper III) and in detail (paper I and II), to describe life time patterns of offending, and to understand the role of treatment for the prevention of crime (paper IV).

From an overview perspective, the findings in paper III demonstrated that risk factors for criminal offending present in childhood or early adulthood were similar for the participants with a diagnosis of schizophrenia as compared to the participants with no diagnosis of schizophrenia. Three risk factors were identical for both groups; two of them related to conduct disordered behaviour and one risk factor related to substance use.

The findings are much in line with meta-analytic studies of the associations between mental disorder and criminality. From one of the most well-known of these studies (Bonta, et al., 1998) it was concluded that the predictors of recidivism among mentally disordered offenders were almost identical to the predictors found among non-disordered offenders (70% of the mentally disordered offenders of the study had a diagnosis of schizophrenia).

The results reported in paper III also suggested that individuals with schizophrenia are disadvantaged already before the onset of their mental disorder. This is firmly supported in research; as compared to mentally healthy individuals, individuals with schizophrenia have less favourable socio-economic backgrounds (Byrne, Agerbo, Eaton, & Mortensen, 2004; Harrison, Gunnell, Glazebrook, Page, & Kwiecinski, 2001; Wicks, Hjern, Gunnell, Lewis, & Dalman, 2005), show more childhood and early adulthood behavioural disturbances (Kim-Cohen et al., 2003; Weiser et al., 2001), have a more problematic early adulthood substance use (Barnett et al., 2007; Van Mastrigt et al., 2004), and, finally, lower intelligence (Cannon et al., 2000; Reichenberg et al., 2002).

While the results of paper III did not reveal any significant associations between low intelligence and criminal offending among the participants with a diagnosis of schizophrenia, it clearly showed an overrepresentation of low intelligence among the participants who later developed schizophrenia as compared to the other participants. This is in concordance with the results of a large number of studies during the last decade (Cannon et al., 2000; Cannon et al., 2002; Davidson et al., 1999; Reichenberg et al., 2002). Results from a more detailed study of low intelligence, specifically low verbal intelligence, as a risk factor for criminal offending were presented in paper I.

Verbal intelligence, assessed at inclusion into the study, but inferred to be stable from childhood, was not found to be associated with the risk of offending *per se*. Participants with $VIQ \leq 85$ were not more likely than participants with $VIQ > 85$ to have been convicted of a non-violent or violent crime. However, among those who had been convicted of a non-violent crime, verbal intelligence was associated with age of onset

of conviction for a non-violent offence; the lower verbal intelligence, the younger age of first conviction.

It had been expected that the participants with $VIQ \leq 85$ would have been more persistent in their offending as the participants with $VIQ > 85$, i.e., they would have committed a larger number of offences. This was not the case. Interestingly, associations were found between two of the confounding variables, substance abuse before age 18 and institutionalisation before age 18, and the number of non-violent crimes. The finding is similar to what was reported in paper III and shows us again the impact of adverse childhood factors for criminal offending among individuals with schizophrenia.

In an effort to understand why low VIQ did not seem to predict persistent offending, we explored previous hospitalisations among the participants. It was revealed that the participants with $VIQ \leq 85$ had been hospitalised twice as long as the participants with $VIQ > 85$. This may have been an effect of risk assessments, in where the participants with $VIQ \leq 85$ were considered to be at higher risk of reoffending. It may also have been out of practical reasons; it may have been more difficult to arrange after care services for the participants with $VIQ \leq 85$. Whatever the reason, longer periods of hospitalisation may have constrained the participants with $VIQ \leq 85$ from committing crimes.

Through the literature on schizophrenia and criminal offending, one of the most robust associations is that between substance abuse and offending. In paper III, among the participants with a diagnosis of schizophrenia early adulthood arrest for public drinking was associated with a three-fold risk of a life-time conviction for a major violent offence.

In paper II, a number of typologies of alcohol use disorders, developed in research among non-disordered individuals, were replicated in a sample of men with schizophrenia. The typologies included the well known Type I/II – Type A/B typology.

While our findings need to be replicated in other and larger samples, it is not premature to conclude that alcohol use among individuals with schizophrenia is a heterogeneous phenomenon. This is parallel to what research on non-mentally ill individuals has told us for decades. It does have implications for our view on the aetiology and treatment of alcohol use disorders within this population. Instead of looking for *the one theory* to explain substance abuse (and to treat it), let us assume that there are subtypes, each with its own aetiology and strategy for treatment. It is still to investigate how many subtypes a clinically relevant typology should include. In paper II, we also explored whether it would be reasonable to subtype our sample into three subtypes, which we considered it to be, at least from a clinical point of view.

Our findings are much in line with a theory on substance abuse among individuals with schizophrenia suggested by Mueser and co-workers (1998). This theory includes two subtypes of abuse, the supersensitive subtype and the antisocial subtype. According to the theory, individuals of the first subtype develop substance abuse/dependency due to a heightened sensitivity to the effects of substances. The second subtype corresponds to the II/B-subtype of paper II.

However, there were also differences between our findings and previous findings on non-mentally ill populations. It was expected that the age of onset of the alcohol use

disorder would differ between the subtypes which it did not. This, however, supports assumptions on supersensitivity among individuals with schizophrenia. A heightened sensitivity to substances leads to a much faster development from use to abuse/dependency. Thus, individuals of the Type I/A subtype will acquire a diagnosis of substance abuse/dependency as early as individuals of the Type II/B subtype.

It had also been expected that the Type II/B-participants, with their conduct disordered background and their higher drug use, would comply less well with treatment, would show more aggressive behaviour, and would use drugs to a higher extent than the Type I/A-participants during the follow-up after discharge. This was not the case. It may have been an effect of risk assessments made by the clinicians at discharge from hospital; in comparison with the Type I/A-participants, the small group of Type II/B-participants may have been considered to be in higher need of close supervision as a part of the outpatient treatment.

Thus, the results from the CSPCMIP in paper I and II gave rise to reflections on the impact of treatment on criminal offending. In paper IV we turned directly to this theme. We found very high inpatient psychiatric treatment consumption among the participants with a diagnosis of schizophrenia. Unfortunately, we found no association between inpatient psychiatric treatment and subsequent criminal offending. In other words, it did not seem as if inpatient psychiatric treatment helped to prevent further criminal offending, at least not when investigated through the methods used in the paper.

From a symptom-focused perspective on criminal offending, successful treatment of psychotic symptoms such as hallucinations and paranoid delusions should reduce criminal offending. The Swedish National Board on Health and Welfare has stated that the aim of forensic psychiatric treatment is to treat the severe mental disorder that has caused the crime and by this reduce the predisposition for recidivism (Socialstyrelsen, 2002). From this perspective, it may be tempting to conclude from the results of paper IV that in-patient services were not sufficient in their efforts to help reduce symptoms of schizophrenia.

However, this may be a premature conclusion. When applying a risk factor perspective on criminal offending among individuals with schizophrenia it may be argued that risk factors other than psychotic symptoms may have been more closely related to criminal offending. One of those risk factors is substance abuse.

Quite ominously, in paper IV there was a positive association between inpatient substance abuse treatment and subsequent criminal offending. This means that inpatient substance abuse treatment was followed by increased offending. A malicious interpretation would be that inpatient substance abuse treatment is a risk factor for criminal offending. While this may be a far-reaching conclusion, the finding indicates that inpatient substance abuse treatment failed in its efforts to reduce substance use among the participants with schizophrenia and thus to prevent criminal recidivism associated with, or perhaps caused by, the substance use.

Most certainly it may have been that a number of admissions to inpatient substance abuse treatment were brought about for emergency reasons such as overdoses, DT's etc., and that they were not followed by substance abuse treatment programmes or similar. Thus, a proportion of the admissions may be viewed as markers of on-going

substance abuse rather than actual treatment episodes. This is in line with numerous studies on the associations between substance abuse and criminal offending (Cuffel et al., 1994; Räsänen et al., 1998; Tengström et al., 2004).

If inpatient treatment does not prevent people from committing crimes after discharge, it should at least keep them off the streets, thus making it more difficult to offend (Mulvey, Blumstein, & Cohen, 1986). This issue was also addressed in paper IV. It had been expected that there would be negative associations between the time spent in institution and offending during the same five-year period. This was not the case; instead there were actually a few small but positive associations.

This finding is not easy to interpret. It may be an effect of criminal activity *per se*; people are usually criminally active during a limited time period, in which they may commit crimes both before and after institutionalisation. It may also be that some of the crimes were committed either at the institution or during permission from inpatient treatment or conditional release from prison. The Swedish National Board on Health and Welfare reported from a follow-up study of individuals in forensic psychiatric treatment that more than one fourth of them (27%) were convicted of crimes that they had committed during ongoing inpatient treatment (Socialstyrelsen, 2002).

The follow-up period of the study reported in paper IV, 1971-2005, covers the process of deinstitutionalisation in Sweden almost entirely. It may be suggested from the results that inpatient treatment did not reduce criminal offending among the participants of the study. Similar findings have been reported from other parts of the world (Mullen et al., 2000; Rosenheck et al., 2000; Wallace et al., 2004). Taken together, they form an important argument against returning to old-age institutions as a means of crime prevention among people with severe mental disorders.

5.2 LIMITATIONS

The major draw-back of paper I is the use of retrospectively acquired data. The participants and their families have provided information on for example childhood behaviour problems and parental problems, for some participants dating decades back. For reasons of social desirability, or pure recall problems, there may have been a risk of underreporting. Over-exaggerating adverse circumstances in the past due to a present, perhaps unhappy, situation is another possibility. To minimise recall bias, multiple sources of information were used as well as national registers of criminality and records from medical agencies.

For paper II, retrospective data were used only to some extent. The major draw-back here was that data that would have been valuable were not obtainable. Data for paper II were acquired from the CSPCMIP, aimed at the study of treatment and its relations to the needs of the patients, but not specifically designed to suit researchers with an interest in alcohol use typologies. Useful information on drinking habits, personality styles, and adverse consequences of alcohol use, used by Cloninger and co-workers (1981) and Babor and co-workers (1992) was thus missing. Despite this, it was considered that the information available was sufficient for the study, essentially explorative in nature.

The generalisability of papers I and II may be limited. First, all participants of the study were discharged from hospitals, many of them from forensic hospitals. They were most likely not representative of the population of males with schizophrenia. Second, there

was a high refusal rate (167 persons out of the 475 persons originally invited to participate in the CSPCMIP). Analyses revealed that the refusal rate was higher among the persons, discharged from general psychiatric hospitals as compared to persons, discharged from forensic hospitals (42.2%; 29.5%, respectively), $\chi^2(1, N = 475) = 8.212, p < .01$. Third, individuals *not* discharged from hospitals were not invited to participate in the CSPCMIP. With regard to treatment policies, they most likely constituted a sub-population of individuals in very high risk of reoffending.

The results in paper III relied heavily on self-report data from the non-anonymous self report questionnaires at the conscription. Since the conscription procedure resulted in a future position in the Swedish army, some young men may have decided to leave out presumably negative information.

The use of register data introduces other types of biases. First, there may be quality problems as to the input of data. Data on minor offences were not registered in the National Crime register before 1973. In the case of the Patient register, a few regions did not deliver data for certain periods. Also, data reported to the psychiatric inpatient register (previously a separate register) before 1973 have been removed.

Second, register data often underestimates a true prevalence of a phenomenon. This is especially true for crime registers and the reason why many clinical studies use multiple sources for data on criminal offences such as interviews with patients and informants along with register data. Thus the number of crimes committed by the participants of the study highly exceeds the number of convictions reported to the National Crime register.

In papers III and IV we identified individuals with a diagnosis of schizophrenia by including all participants with at least one discharge from hospital with a diagnosis of schizophrenia as registered in the Patient register. This procedure may be questioned. It may, on one hand, be over inclusive, counting some individuals who were incorrectly diagnosed at a single occasion. In a register study of eight million Swedish inhabitants, only those individuals with at least two inpatient hospitalisations were considered, thus reaching a prevalence of schizophrenia of .4% (Lichtenstein et al., 2006). On the other hand, from a recent Swedish evaluation, it was found that a proportion of individuals diagnosed with schizophrenia through interviews and medical records were not registered under this diagnosis in the Patient register (Ekholm et al., 2005). However, a recent review of 188 prevalence studies from 46 countries demonstrated a median lifetime morbid risk for schizophrenia of .7% (McGrath, Saha, Chant, & Welham, in press) to be compared with the lifetime prevalence of .8% found in this study.

It is important to hold out that generalisations made from the results presented in this thesis are valid for males only. Males are in general heavily overrepresented in official crime statistics as compared to females (BRÅ, 2008b). However, results from the few studies on the prevalence of offending among individuals with schizophrenia that have included both males and females suggest a somewhat different pattern. The results consistently show that in comparison with same-sexed individuals with no mental disorder, the risk of committing a criminal offence is larger for females with schizophrenia as compared to males with schizophrenia (Brennan et al., 2000; Lindqvist & Allebeck, 1990; Wessely et al, 1994).

5.3 FROM A RISK FACTOR PERSPECTIVE...

When I first came to work within the field of psychiatry, in the beginning of the 1980's, the one and only explanation of criminal offending among individuals with schizophrenia was their psychotic symptoms. Risk assessments, if they were at all conducted, were unsystematic and based upon the doctor's knowledge on the mental state of the patient.

This has gradually changed. During the last two decades, and parallel to the increased research on risk assessment, there has been a large interest in the search of risk factors for criminal offending other than symptoms among individuals with mental disorders. As presented in the introduction, a number of risk factors have been in focus of research. This thesis is one of many works with the same approach.

There are problems with the risk factor perspective, limiting the possibilities to explore the field of schizophrenia and criminal offending in full extent. In the following, I will try to cover some problematic areas.

First, which risk factors are important when investigating criminal offending among individuals with schizophrenia? Who is the one to choose? To some extent, this is decided by our *scientific perspective*. From the introduction of this thesis, it may be clear that symptoms, substance abuse, and personality have drawn more attraction to researchers than has social factors. And yet, we know that after the onset of the disorder some individuals with schizophrenia may experience downward social drift (Aro, Aro, & Keskimäki, 1995), impaired social relationships (Swanson et al., 1998), life in disadvantaged neighbourhoods (Silver, Mulvey, & Monahan, 1999), homelessness (Folsom et al., 2005), and victimisation (Fitzgerald et al., 2005). From a macro to a micro level; during the last ten or fifteen years, studies have been carried out aimed at exploring the associations between brain and violent behaviour. Recently, studies within this field have also been conducted among individuals with schizophrenia (Barkataki et al., 2005; Joyal et al., 2007; Kumari et al., 2006). To summarise, studying criminal offending from the perspective of social psychology, sociology, neuropsychology and neurobiology along with the psychiatric perspective would add valuable knowledge on risk factors of criminal offending.

Second, how do we study criminality from a *life-time perspective*? In their influential paper on the link between criminality and mental disorder, Mulvey and co-workers (1986) suggested that the use of a longitudinal design, in which individual criminal careers were explored, would make it possible to measure the timing of risk factors in relation to offending. Another longitudinal approach has dealt with the observation that different risk factors may have different impacts on subgroups. Hodgins and co-workers (Hodgins & Côté, 1993; Tengström et al., 2001) have subtyped offenders with schizophrenia according to their age of onset of offending and found clearly distinguished subtypes of early-starters and late-starters, each with its own characteristics and developmental trajectory. Thus, longitudinal designs and methods used in developmental psychology should be helpful in the understanding of criminal careers.

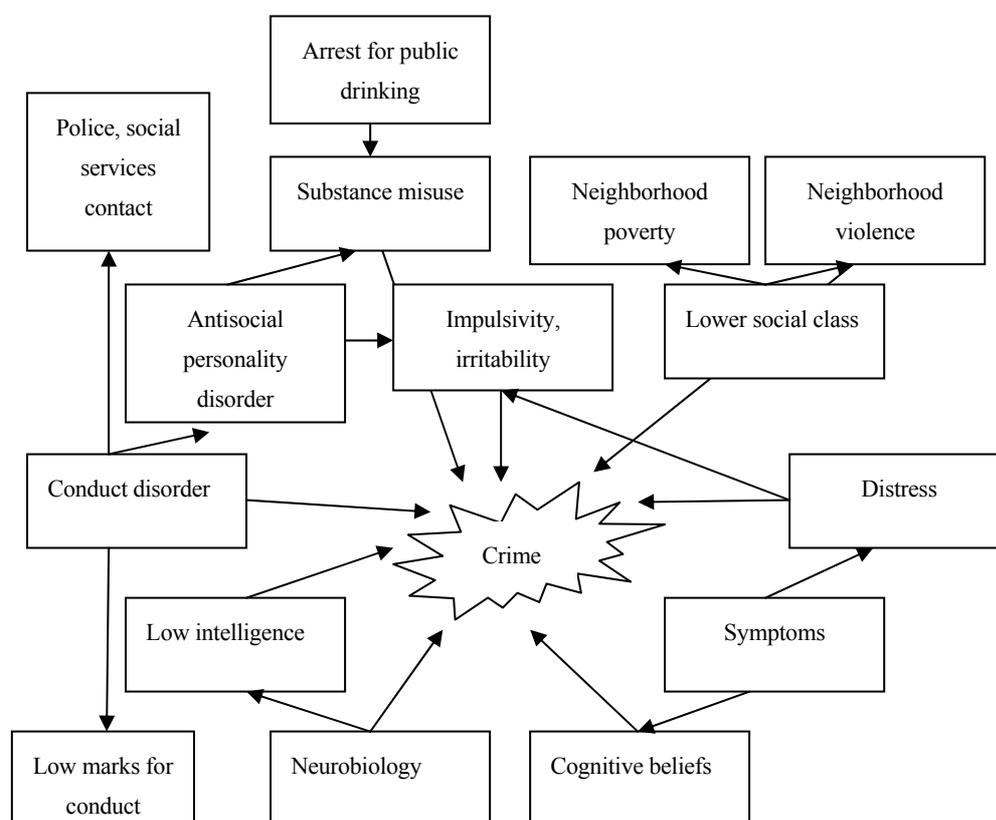
The third problem, and the one that may be the most difficult one to solve, is the problem of *causality*. Knowing that a certain risk factor is associated with criminal offending is only a first step. We may still have to struggle with confounders,

mediators, moderators and other trouble-makers. Strictly, a causal risk factor is one that, when altered, has impact on the likelihood of an outcome (Kazdin et al., 1997). However, it is very unlikely that an ethics committee would allow a researcher to set up an experimental condition to test for the associations between mental disorder and crime. Also, we should not go into search for “the one cause” of criminal offending among individuals with schizophrenia. As Swanson and co-workers (1998) carefully pointed out, a challenge to the development of strategies for risk assessment and management is the causal heterogeneity among offenders.

5.4 ...INTO A CRIMINOLOGICAL FRAMEWORK

The work of this thesis was carried out from a risk factor perspective. Figure 1 shows an effort to capture some of the risk factors discussed in the thesis, either presented in the introduction or investigated in the papers. Along with the risk factors, some of their possible interrelations are shown.

Figure 1. Schizophrenia and criminal offending, risk factors and relationships



Constructing models of risk factors and interrelations may be one way to advance research in the field. In an oft-cited paper, Hiday (1997) demonstrated empirically derived statistical associations between mental illness and violence. From a very simple model (Severe Mental Illness → Violence) other research-based risk factors were added step by step until a very complex model was reached. Among the risk factors added in the paper, were a number of those presented in this thesis, e.g., antisocial personality disorder and substance abuse. The paper also included risk factors related to the individual’s close social context, such as tense situations and stressful events that may occur in relations with family, peers, and other people. Other risk factors were

connected with the larger social environment: social disorganisation, poverty, and victimisation. In a summary of the paper, Hiday stated:

It concludes with a model suggesting that both violence and manifestations of mental illness largely grow from the structural arrangements in which individuals are embedded, and that the paths between mental illness and violence are mainly indirect and contingent. (p. 399-400)

In an interpretation of this statement I suggest that criminal offending among individuals with schizophrenia should be studied in a wider context than may be the case in today's research. While the risk factor perspective has been successful in demonstrating that other factors than psychotic symptoms may drive criminal offending, the limitations of the perspective are now obvious. It is time to find a useful theory in which we may organise findings from various research fields and from various levels of understanding. By doing so, we may understand the paths to criminal offending, the dynamic relations between factors, the social and interpersonal relationships related to offending, and also the triggers of violence.

Where do we find such a theory?

From the present thesis it should be clear that criminal offending among individuals with schizophrenia shares many similarities with criminal offending among individuals with no mental disorder. Many, if not most, of those factors that are associated with criminal offending among individuals with no criminal disorder also predict criminal offending among individuals with schizophrenia. Thus, we do not need to create a specific psychiatric theory of criminal offending. We may as well use well-researched theories developed in research among non-mentally ill individuals. I propose that we use a common criminological framework, as advocated by Silver (2006) in a paper examining the usefulness of criminological theories for the understanding of the relationship between mental disorder and violence.

As discussed by Sarnecki (2003), criminology may be viewed as the study of crime as a social phenomenon but also as an interdisciplinary science. It includes a variety of theories such as social learning theory, strain theory, social bond theory, and interactional theory; all theories that can be tested empirically. There is not one criminological method, but a mixture of methods, quantitative as well as qualitative.

Qualitative methods have not been used to a great extent within the research field of mental disorder and criminality (there are exceptions; Haggård, Gumpert, & Grann, 2001; Haggård-Grann & Gumpert, 2005; Junginger, 1995; Taylor, 1985). This is surprising, since the research field is fairly new. It has been suggested that qualitative methods may help the researcher to generate research questions before theories are firmly established (Patton, 1980). Through this, the risk of conducting research based on presupposed views may be reduced. Starting out a research project by using qualitative research methods may facilitate the formulation of empirically testable hypotheses later on in the project.

Another perspective, adopted from a criminological framework, is to study the offender in his criminal network (Sarnecki, 2001). To my knowledge, this has not been done in the field of schizophrenia and criminal offending. It may, however, be a very useful perspective. As an example, Alverson, Alverson and Drake (2001) used ethnographic method in a study of social patterns of substance-use among people with mental illness and substance abuse. Four different subgroups of substance users were found, each

defined by its specific pattern of social dynamics. The conclusion of the study was that many social functions were upheld by these social patterns. The authors recommended that clinicians treating individuals with mental illness and substance abuse should be aware of these social patterns and also take action to replace them with healthier social networks. Criminal networks may serve similar purposes among offenders with schizophrenia.

Using a common criminological framework for research does not mean that psychiatry should be thrown out with the bath water. We may have to modify research in some aspects, according to the specific characteristics of the individuals at focus, in this case individuals with schizophrenia. This is not different from modifications made in research on other specific offender groups, e.g., juvenile delinquents or offenders with a substance abuse. We should adopt the strategy of “marrying the mental health services research and criminologic perspectives”, as suggested by Fisher, Silver, and Wolff (2006). An example of such a marriage would be joint research projects shared by for example prison and probation services and forensic mental health services.

Conducting research within a common criminological framework can possibly help us to demystify the role of psychotic symptoms for criminal offending. An unfortunate effect of the previous findings on the higher prevalence of criminal offending among individuals with schizophrenia as compared to individuals with no mental disorder may have been a wide-spread belief that it is schizophrenia only that makes the difference. This has led to unnecessary stigmatisation of individuals with an already demanding situation.

If comparisons of criminal offending are to be made between individuals with schizophrenia and individuals from the general population, it would be valuable to compare individuals living under similar circumstances. As an example, we know that many individuals with schizophrenia experience downward social drift after the onset of the disorder; many are unemployed, have very limited financial resources, and live in unprivileged neighbourhoods. To compare them with non-mentally ill individuals living under the same social circumstances would give us a much more realistic picture of the impact of schizophrenia for criminal offending than we get from comparing them with all non-mentally ill individuals.

A common criminological framework also brings about clinical implications. An important point to be made from this perspective is that criminal offending among individuals with schizophrenia cannot be fully prevented through the efforts of psychiatric services only, be they inpatient or outpatient. As discussed, criminal offending is a very complex phenomenon with many factors involved from a macro to a micro level, some of them out of reach for psychiatric treatment efforts.

So, what can we expect from psychiatric services when it comes to the prevention of criminal offending among individuals with schizophrenia? In the following, I will go through some of the measures that *can* be taken, starting with those that are applicable both for general psychiatric services and forensic psychiatric services.

One of the risk factors with the highest impact on criminal offending among individuals with and without schizophrenia is substance misuse. Early detection and treatment of substance misuse among individuals with schizophrenia is of great importance since the prevalence is high, possibly due to a heightened sensitivity to the effects of substances.

Substance misuse is certainly a risk factor that psychiatric services can and should deal with. For best results, it has been recommended that an integrated treatment approach should be used. Integrated treatment may be described as treatment, targeted at both schizophrenia and substance abuse simultaneously and provided within the same organisational setting (Akerele & Levin, 2002; Tsuang & Fong, 2004; Ziedonis, 2004). In a consensus document, it was recommended that individuals with schizophrenia and substance use disorders may be treated according to a modified form of the transtheoretical model of change, including psychosocial interventions and pharmacotherapy (Ziedonis et al., 2005). It should be noted, though, that research in the field is still under development, and that there is no clear evidence to support one psychosocial method before another (Cleary, Hunt, Matheson, Siegfried, & Walter, 2008).

Other risk factors of criminal offending are related to social circumstances such as inadequate housing, homelessness, and unemployment, all factors that are outside the principal responsibility of psychiatry. However, since many individuals with social problems first show up in the psychiatric emergency room, psychiatric services may serve as an important link to social services and other agencies (Cougnard et al., 2006).

While the treatment of symptoms is the primary focus for psychiatric services, there is inconclusive evidence as to the role of psychotic symptoms as a cause of criminal offending. This is of course not an argument for withholding treatment. Individuals with psychotic symptoms should be provided with psychopharmacological treatment to reduce symptoms. However, to ensure that medication is continued, for many individuals it would also be valuable to through a programme aimed at medication compliance and relapse prevention, based on psycho-educational or cognitive-behavioural principles and including social skills training (Mueser et al., 2002).

From research it has been suggested that it is not so much the symptoms *per se* that lead to criminal offending, but mediating factors such as emotional problems (Bjorkly, 2002b) and interpersonal stressors (Haggård-Grann et al., 2006). Psychiatric services are expected to meet up to these needs through psychotherapy and family interventions (Pilling et al, 2002; Pitschel-Walz, Leucht, Bäuml, Kissling, & Engel, 2001; Sellwood, Wittkowski, TARRIER, & Barrowclough, 2007). Another mediating factor between symptoms and offending may be cognitive beliefs (Hacker et al. 2008). Cognitive behavioural treatment programs aimed at cognitive beliefs about hallucinations have recently been developed with promising results (Trower et al., 2004; Wiersma, Jenner, Nienhuis, & van de Willige, 2004).

The above-mentioned treatment recommendations are applicable for both general psychiatric services and forensic psychiatric services. In the following, a few words will be directed specifically to forensic psychiatry, due to its very special population. How we characterise patients in forensic psychiatry does have implications for how we view the treatment and preventive measures that are to be provided. To quote Silver (2006), are we talking about “psychiatric patients with histories of violence, or about violent offenders with histories of mental illness”?

I would rather not use Silver’s straightforward dichotomy. We are neither talking about patients nor offenders - we are talking about individuals with a history of both mental illness and criminal offending. It is not a matter of choice whether they should be treated as psychiatric patients or as offenders; we need to focus on the needs of both.

This can be done in forensic psychiatry. However, the treatment provided within forensic psychiatry must be *both* forensic *and* psychiatric.

In line with this, Howells, Day, and Thomas-Peter (2004) suggested that forensic psychiatric services would benefit from exchanging ideas with correctional services. Forensic psychiatric services should adopt the evidence-based “what works” approach of rehabilitation and treatment, since long used in criminological settings. This approach is based on the principles of “risk”, “needs” and “responsivity” (Bonta & Andrews, 2007). In short, treatment should focus on the medium and high risk offenders, risk factors of offending (“criminogenic needs”) should be targeted in treatment, and finally, treatment should be individually tailored and based on cognitive social learning strategies.

If the “what works” approach should be applied in forensic psychiatric settings, all patients in forensic psychiatric services would have to go through a thorough risk assessment procedure, in which the individual pathways to offending are identified. There are two reasons for this. First, it should be done to decide the risk level of each patient; the higher the risk, the more treatment. Second, the assessment is necessary for the treatment plan that should be developed for each patient. From the risk assessment, the variables of interest are the “dynamic” risk factors, i.e., those risk factors that may be changed. The “what works” approach also stipulates that all treatment efforts are delivered in such a way that each individual can benefit from it. This means that modifications of programmes may be made. As an example, many individuals with schizophrenia have intellectual problems, leading to problems to understand and learn from treatment programmes (Green, 1996). As suggested by Bellack, Gold and Buchanan (1999), it is necessary to take very small steps in training. Training sessions should be held in small groups and be highly structured. All material should be broken down into smaller units and rehearsed extensively.

A common criminological framework for offending among individuals with schizophrenia also bears implications on a societal level. If criminal offending among individuals with schizophrenia also has its roots in phenomena such as disadvantaged families, run-down neighbourhoods and easily accessible drugs, it would be expected that general welfare programmes and programmes aimed at crime-reduction among the general population would have an impact also on criminal offending among individuals with schizophrenia.

This leads back to an important issue. If criminal offending is not exclusively caused by psychotic symptoms and other clinical factors, psychiatry cannot be held totally responsible for each criminal offence conducted by someone with a psychiatric disorder. After all, can we expect psychiatry to make a quick-fix on, say, social disorganisation? Public expectations that additional financial resources to psychiatric services may put a definitive end to violent acts committed by people with mental disorders may lead to disappointments. Researchers within the field have an ethical responsibility to discuss this in public and also to present it to policy-makers.

5.5 CONCLUDING REMARKS

To conclude, risk factors for criminal offending among men with schizophrenia share many similarities with risk factors for criminal offending among non-mentally disordered men. Psychiatric inpatient treatment may not have reduced criminal offending in an optimal way.

To prevent criminal offending among individuals with schizophrenia, a number of measures may be taken in research, in agencies providing psychiatric services, and on a societal level.

- Research on criminal offending among individuals with schizophrenia should be conducted within a common criminological framework. Methods and theories used in criminology may be of value for the field.
- General psychiatric services should provide integrated substance misuse programmes, link patients to social services and other agencies if needed, and develop a variety of programmes aimed at treating psychotic symptoms, emotional problems, and interpersonal stressors.
- Forensic psychiatric services should adopt the “what works” approach from the correctional services. Treatment should focus on the higher risk offenders, target risk factors of offending, be individually tailored, and based on cognitive social learning strategies.
- On a societal level it would be expected that general welfare programmes and programmes aimed at crime-reduction among the general population should have an impact also on criminal offending among individuals with schizophrenia.

6 ACKNOWLEDGEMENTS

This thesis, generously supported by Rättsmedicinalverket, Vårdalstiftelsen, and Bror Gadelius' minnesfond, would never have been written without the help and encouragement from a large number of people.

Research is not a career; it is a way of life. I would like to express my deep gratitude to all you researchers who have helped me to find my way. Thank you

Anders Tengström, main supervisor, for valuable supervision during the six years it took me to complete this thesis, for intellectually demanding scientific discussions, and for all good laughs, *Anders Romelsjö* and *Marlene Stenbacka*, co-supervisors, for showing me the fantastic world of large data sets and epidemiological research, *Sheilagh Hodgins*, co-supervisor, for teaching me the art of scientific writing, *Clara Gumpert* and *Christina Hultman*, mentors, forerunners and role models, for encouragement and practical hints, *Lena Flyckt*, *Gunnar Edman*, *Håkan Nyman*, *Lars Bjerkenstedt*, and *Frits-Axel Wiesel* for guiding my very first steps into the world of science.

Doctoral students also need lots of practical assistance. Thank you

Louise Crona, *Pelle Granström* and *Marianne Kristiansson*, Department of Forensic Psychiatry, for neat arrangements of my clinical duties, *Agne Larsson*, statistician, for invaluable statistical help, *Luki Hagen*, secretary, for help with almost everything.

It is not true that we get by with a little help from our friends. We only get by with a lot of help from our friends. For help through personal and research-related troubles, thank you

friends and colleagues at the Department of Forensic Psychiatry, friends and fellow doctoral students at FORUM Maria Ungdom, friends and colleagues-to-be at the Section of Social and Forensic Psychiatry, and all you dear friends from the world outside that of forensic psychiatry and research.

This thesis was preceded by over twenty-five years of clinical work. Thank you all patients I met for sharing your lives with me, showing me hope, and teaching me so much about human dignity. Without you, this thesis would not have been written.

And, to my wonderful children, may you be as enriched and stimulated in your future careers as I have been in mine. For all our intensive and intellectually challenging conversations around the dinner table, distracting me from everyday matters, thank you

Erik, *Anna Karin* and *Håkan*.

This thesis is dedicated to my parents, both deceased during the winter of 2007. I know you would have wanted to see it. Thank you for believing in me

Karin and *Nils-Gunnar*.

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