

NORA BECKER

# Social Cognitive Skills in Schizophrenia

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Impact of Substance Use Disorder and Violence

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Supervisor: Georg Riemann

Applied Psychology

Academie Mens & Arbeid

Saxion Deventer

## **Preface**

This paper is written after passing an internship in a forensic psychiatric hospital in Germany. There I got in contact with the tasks of a forensic psychiatrist who is treating patients with several personality and schizophrenic disorders. I, as prospective psychologist, am interested in how the treatment can be adapted to the special needs of the patients.

The present study is the result of collaboration between the LWL-Maßregelvollzugsklinik Herne and Saxion Hogeschool. Therefore I would like to thank my supervisors Prof. Boris Schiffer and Georg Riemann for giving me the opportunity to write this paper about my favorite topic.

I would also like to thank Sven van Heuveln for reviewing this paper and giving feedback.

Special thanks to Daniel Kasel who inspired me a lot. Without him I would not have been able to finish this paper. I hope that his inspiration will lead me to become a good psychologist.

Finally I would like to thank my dearest mother helping me to keep focused and concentrated.

## List of Abbreviations

APA	American Psychiatric Association
ASPD	Antisocial Personality Disorders
CI	Confidence Interval
DAST-20	Drug Abuse Screening Test -20
DSM-IV	Diagnostic and Statistical Manual of Mental Disorders IV
LHA	Lifetime History of Aggression Scale
MAST	Michigan Alcoholism Screening Test
MWT-B	Mehrfachwahl-Wortschatz Test B
PANSS	Positive and Negative Syndrome Scale
PCL: SV	Psychopathy Checklist: Screening Version
PCL-R	Psychopathy Checklist Revised
RMET	Reading Mind in the Eyes Test
SUD	Substance Use Disorder
SCID I	Structured Clinical Interview for DSM-IV

## **Abstract**

A quasi-experimental research was used to examine the impact of violence and substance use disorder on social cognitive skills on patients with schizophrenia. A sample of 46 male patients was tested with the Reading Mind in the Eyes Test to assess their social cognitive skills. The present study does not show significant impacts with regard to violence, whereas a trend towards significance was found in the impact of substance use disorder on social cognitive skills. Patients who suffer from substance use disorder achieve better scores on the Reading Mind in the Eyes Test than those individuals who do not use substances. An interaction-effect of substance use disorder in violent and non-violent patients was not found. As patients with comorbidity with substance use disorder perform better in social cognition further research is prospected. Adaption of treatment should be assessed.

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# 1 Introduction

## 1.1 Issue of the present study

About 505.000 court decisions, excluding traffic incidents, were made in Germany in 2014 (Statistisches Bundesamt, 2015). Due to offences related to mental illness 10.000 people are placed in forensic hospitals; offences such as: bodily harm, (attempted) homicide, sexual offences, fire raising and larceny.

Forensic psychiatric institutions in Germany have four different aims of treatment. The first aim is custody. Just as in prison, the patient is not able to decide to leave the clinic. The second aim is the treatment of the disease which led to the crime. If the disease is successfully treated, the next step is rehabilitation. The patients will be trained to manage a non-violent life in society. The last and most important aim, which is part of all these steps, is the reduction of harmfulness. Contrary to the inhabitation in prison, the accommodation in a forensic psychiatric hospital is not terminated. Basically, patients may leave the institution when they are successfully treated and rehabilitated.

Patients in forensic hospitals may suffer from disorders, affiliated to axis 1 of Diagnostic and Statistical Manual of Mental Disorders (DSM; APA, 2000) whereas personality disorders and/or psychotic disorders occur most frequently. About 50% percent of these patients are diagnosed with a schizophreniform disorder (Habermeyer, Wolff, Gillner, Strohm & Kutscher, 2010). In the last decade, there has been a threefold increase in the number of patients with schizophrenia, whereas the number of in-patients with other diagnoses has nothing but doubled (Kutscher, Schiffer & Seifert, 2009).

When taken into custody the mean age of a patient with schizophrenia is 32,9years old, but more than 50% of them have a criminal record (before admittance into a forensic institution) before the age of 21 years.

The majority of patients in forensic psychiatric hospitals have multiple psychiatric diagnoses. The most common comorbidity is substance use disorder (SUD), which occurs in up to 80% in forensic psychiatric individuals (Zarkovic Palijan, Mužinić & Radeljak, 2009).

In connection to their disorder, forensic psychiatric patients have several deficits in social competencies. Impairments in social functioning are highly pronounced in schizophrenia, due to the nature of the disease (Pinkham, Penn, Perkins & Lieberman, 2003). In this study social functioning refers to social cognitive skills, which can be defined as the ability to decode and interpret emotions through facial (bodily) expressions (Baron-Cohen, Wheelwright, Hill, Raste & Plumb, 2001). Social cognitive skills contain competencies like perceiving and distinguishing the own and others' feelings. These skills are also related to other social competencies such as empathy, stress tolerance and motivation (Checa & Fernandez-Berrocal, 2015).

The amount of research done on schizophrenia and its impairments on social cognitive skills has increased in recent years. As social cognitive skills are investigated as disrupted in several disorders such as autism (Baron-Cohen, Wheelwright, Hill, Raste, & Plumb, 2001), alcoholism and schizophrenia (Gizewski et al., 2013), there is a lack in research on social cognitive skills in schizophrenia in combination with SUD and violence. However; research pertaining to the training of social cognitive skills to the upper limit in patients with schizophrenia is done (Davis et al., 2014; Bowie, McGurk, Mausbach, Patterson & Harvey, 2012), but still insufficient. Admittedly, the training has not been specifically adapted to schizophrenic patients with SUD with a history of violence. Therefore, the aim of the present study is to clarify whether the combination of schizophrenia, SUD and violence causes' greater impairment in social cognitive skills than schizophrenia does by itself. If social cognitive skills are even more threatened through comorbidity and a history of violence, treatment should be adapted to this special group of patients. Moreover, contribution to the financial effort and treatment duration can be made based on whether the treatment is adapted or not.

## **1.2 Research questions**

The present study focuses on the impact that violence and SUD have on social cognitive skills in patients with schizophrenia. In order to clarify if treatment should be adapted, further research is needed to prove a difference in social cognitive skills of schizophrenic patients with SUD and violence.

The following research questions will be answered to reach the formulated aim of this study.

To what extent are social cognitive skills in patients with schizophrenia affected by past violent behavior?

To what extent are social cognitive skills in patients with schizophrenia affected by the age of first crime proceeding?

To what extent are social cognitive skills in patients with schizophrenia affected by SUD?

To what extent are social cognitive skills in patients with schizophrenia affected by the duration of SUD?

What impact does SUD have on social cognitive skills in violent and non-violent patients with schizophrenia?

### **1.2.1 Concept explanations**

In the following section all concepts that are used in the present study will be described.



The present study aims to contribute to adapt treatment of patients with schizophrenia. The term patient refers to all people who are diagnosed with schizophrenia, that have attended in-patient or ambulant care at one point in life. The term schizophrenia is used for all schizophreniform disorders according to the DSM-IV (APA, 2000), see Appendix 1 A.

Furthermore, the present study will have a closer view on the impact on social cognitive skills by SUD. In the present study, the term substance use disorder (SUD) is used to describe the abuse of, or the addiction to alcohol and drugs such as: cannabis, opiate, cocaine, stimulants and medicine. The term substance use disorder is based on the criteria for substance use disorder as presented in DSM-IV (APA, 2000); see Appendix 1 B.

Moreover the present study will focus on the impact that is caused by violence. In the present study, violence, violent behavior and crime offence(s) are used synonymously. These concepts refer to the following offences: attempted homicide, homicide and grievous bodily harm.

### **1.3 Aim of the present study**

The treatment of schizophrenia as well as the treatment of SUD calls for intensive care. If violent behavior is an additional effect, treatment gets even more challenging. Adaptation of the treatment on the individual level would be needed (Mullen, 2006). This makes the association of schizophrenia, SUD and violence clinically and socioeconomically relevant.

The present study aims to clarify if violence and SUD may have a greater impact on social cognitive skills in patients with schizophrenia than that schizophrenia by itself has. Additionally, if the impact on social cognitive skills in this group of patients is found, the following research may have a contribution to determine an adaption of treatment. The present study can also help to decide whether existing social cognitive skills training should be modulated to schizophrenic patients with a history of violence and/or SUD. If special treatments for violent and non-violent patients with schizophrenia comorbid with SUD are needed, this will lead to a higher financial effort. As stated earlier, residency of treatment in forensic psychiatric hospitals is not terminated and will be prolonged if patients are not compliant to the therapy. Compliancy to skill training as part of psychotherapy might lead to a short-time stay in forensic institutions. It can be concluded, that if there is no difference in social cognitive skills with patients without SUD and history of violence, there will be no adaption of treatment, so duration and costs of treatment will be reduced.

The present study is commissioned by the leading psychologist of a forensic psychiatric hospital in Germany, where patients with several personality disorders or psychotic disorders are treated. If the present study influences the statement of social cognitive skills training, the leading psychologist can choose to adapt these trainings to the patients' treatment.

## **2 Theoretical framework**

The following chapter illustrates the associations between schizophrenia, SUD and violence based on research findings. Additionally, the impairments in social cognitive skills caused by the relation between SUD and violence with regards to schizophrenia will be highlighted.

### **2.1 Schizophrenia and SUD**

Several researchers found a remarkable association between schizophrenia and SUD. Green, Drake, Brunette and Noordsy (2007) give some statements concerning the relationship between schizophrenia and SUD. First they state that patients with schizophrenia in particular have a heightened vulnerability to the effects of substance abuse, which is a result of neurobiological determinants and environmental stressors. Their second statement includes the risk factors that patients with schizophrenia have: poor cognitive, social, educational and vocational functioning. In addition, patients with schizophrenia are exposed to deviant environments such as substance-using familial and social networks. The third declaration refers to the most common hypothesis: self-medication. Some patients with schizophrenia use substances in order to reduce the symptoms of the disorder.

The last statement supports a unidirectional causality. This was not found by Hambrecht and Häfner (1996). They assessed a sample of 232 first-episode patients with schizophrenia to investigate if there might be a causal relationship between schizophrenia and SUD. Drug abuse prior to the first schizophrenic symptoms was found in 27.5% and was found afterwards in 37.9% of the participants. Alcohol abuse followed the first-episode symptoms more often than that it preceded the symptoms.

### **2.2 Social cognitive skills in schizophrenia and SUD**

In the study of Carey, Carey and Simons (2008) the connection of SUD and schizophrenia is presented, they also focus on the impact on social cognitive skills. Both substance use and schizophrenia cause cognitive deficits, including impairments in attention, memory, abstract thinking, problem solving and tasks involving effortful processing. Carey et al. (2008) recruited 56 outpatients diagnosed with schizophrenia (71%) or a bipolar disorder (29%) from a psychiatric hospital. The outpatients were divided in three groups, depending on their substance abuse: 'current abuse' (met the diagnosis criteria within the last six months), 'former abuse' (diagnosed with a lifetime abuse, but did not meet the criteria within the last six months) and 'never abuse'. All three groups were assessed on social functioning and cognitive functioning. The researchers found that there was no difference in social and cognitive functioning between current and former abusers. Carey et al. (2008) assign the absence of difference to the extent of abstinence. Furthermore, they found that performance on non-verbal cognition tests in substance users was better compared to the control group that did never abuse substances. Other researchers do not agree with this result. For example, Valmas, Mosher Ruiz, Gansler, Sawyer and Oscar-Berman (2014) used an experimental group (n=77) and control group (n=59) to investigate social cognition deficits in alcoholic men and women. Their results showed that

alcohol abusers perform significantly worse than non-alcoholics. Among the difference between alcoholics and non-alcoholics, they found a difference in gender, with alcoholic men performing worse than female alcohol abusers. Valmas et al. (2014) stated that impairments in social cognition persist through a longer period of abstinence.

Gizewski et al. (2013) also used this connection of substance use disorder and schizophrenia in their study. They focused on impairments in social cognition and brain structural differences in schizophrenic patients with and without alcohol addiction. They found related disabilities in social cognitions in schizophrenic and also in alcoholic participants. Moreover, there was an interaction-effect, indicating an association where alcohol abuse brought up worse performance in non-schizophrenic participants but better performance in schizophrenic participants. This result is in accordance with the findings of Carey et al. (2008).

### **2.3 Schizophrenia and violence**

Furthermore, Gizewski et al. (2013) stated that schizophrenic patients with SUD have been associated with some negative prospects such as: a generally reduced quality of life, more frequent and longer periods of hospitalization, lower treatment compliance and an increased risk of committing violent offences. This association with violence is supported by an analysis of Swanson, Holzer, Ganju and Jono (1990). They compared 10,059 participants with regards to psychiatric disorder and violent behavior. They found that violence is carried out by 2% of the participants without a disorder, whereas participants with schizophrenia had a violence rate of 12%. This analysis showed significant interaction effects with SUD. So the rate of violence increased up to 24.5% in patients with a dual diagnosis with alcohol use. The violence rate increased even more up to 34.7% in patients' comorbid with drug use disorder. Schizophrenia and SUD have the highest association with violence, as Swanson et al. (1990) reported violence in 5% of patients with phobia, in 10.6 % of patients with OCS and in 11.6% of patients with depression.

Several researchers have tried to explain the relationship between violence and schizophrenia. Cheung, Schweitzer, Crowley and Tuckwell (1997) showed that the nature of hallucinations and delusions in patients with schizophrenia can predict violence. They found that violent participants, diagnosed with schizophrenia, felt angry in delusions while the non-violent comparison group experienced more positive emotions during hallucinations and delusions. They suggest the use of clinical assessments to determine the likelihood of violence as a result of hallucinations and delusions.

Furthermore, the meta-analysis by Reinharth, Reynolds, Dill and Serper (2014) reveals that cognitive impairment related to schizophrenia exerts a significant risk for aggression.

### **2.4 Social cognitive skills in violence**

Bennett, Farrington and Huesman (2005) describe the connection between violence and social cognitive skills as following: "It is not necessarily suggested that deficiencies in cognitive capabilities cause crime, but rather that certain ways of processing social information and certain social cognitive

memory structures help to protect the individual from personal, social, environmental, or situational pressures towards criminal behavior”.

## 2.5 Conceptual model

Several associations of the factors schizophrenia, SUD, violence and social cognitive skills are found in empirical science. But none of them includes all four factors that are named. The following conceptual model will present the associations that will be investigated with the present study.

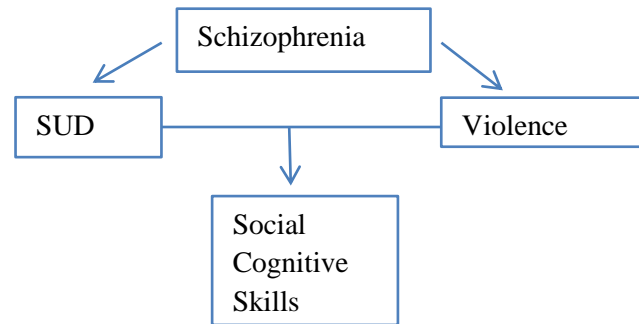


Figure 1. Conceptual model of impacts on Social Cognitive Skills

Schizophrenia is the main subject of this present study. As shown in the previous section, schizophrenia seems to have a connection with SUD and violence. In the present study, the focus will be on SUD, violence and their interaction with regard to the impairments these variables have on social cognitive skills. Therefore, several hypotheses have been formulated.

Firstly, it is expected that violent behavior and/or the presence of SUD has a negative influence on social cognitive skills. Furthermore, it is expected that the duration of substance abuse will predict bad social cognitive skills. Finally, patients that committed crime at a younger age are expected to have lower social cognitive skills than individuals who committed crime at an older age.

## 3 Method

### 3.1 Research design

In order to answer the research questions the present study uses a quasi-experimental design. In a quasi-experiment, the participants do not have an equal chance to be part of the experimental group or the control group. In the present study, randomizing is not possible due to the assignment of the patients to one of four groups. A quantitative research model is chosen to get a systematic view of the characteristics of the sample which are measured by several instruments. Through quantitative research all characteristics are operationalized into measurable values.

The study aims to identify a possible causal relationship between the independent variable of SUD and violence and the dependent score of the Reading Mind in the Eyes Test. Disrupting factors are excluded to avoid random errors (Baarda, de Goede & Teunissen, 2012). The excluded factors are named in the following chapter. In order to take part in this study the participants had to be diagnosed with schizophrenia.

### 3.2 Sample

The participants are recruited of patients from (forensic) psychiatric hospitals spread over North Rhine-Westphalia, Germany. In Germany, people that commit crime, due to a mental disease or addiction problems, are placed in forensic psychiatric hospitals. There, patients receive therapy, which should enable them to manage a nonviolent life.

The present study has a sample (n=46) which includes male patients between 23 and 55 years old. All patients are diagnosed with schizophrenia by a psychologist according to the DSM-IV. The participants are divided in four groups, depending on their history of violence and SUD. For detailed demographic variables see Table 1 in the appendix.

Each participant was assigned to one of four groups according to two factors: history of violence and comorbid SUD. The first group comprised 22 violent offenders with schizophrenia (vSZ). Offences included grievous bodily harm, attempted homicide and homicide. The comparison group comprised 24 participants diagnosed with schizophrenia, but without a history of violence (nvSZ). Both these groups were subdivided into two subgroups, one group with participants comorbid with SUD and another one with patients without such comorbidity. Nicotine does not refer to the substances that have been consumed for diagnosis of SUD. This research comes up to a 2 x 2 design with four groups in total: vSZ (n=11), vSZ+ SUD (n=11), nvSZ (n=12) and nvSZ + SUD (n=12).

There are some exclusion criteria chosen to reduce the risk of errors. First, patients with inadequate knowledge of the German language are excluded to avoid mistakes based on a lack of comprehension during the assessment. Furthermore, participants with loss of consciousness of more than 30 minutes are excluded because it indicates a permanent injury of the central nervous system (Gizewski et al., 2013). Finally, participants with below average intelligence (IQ<80) are excluded. An IQ-score of 90

points corresponds to average intelligence while an IQ-score beneath 90 points refers to mental retardation; as it is known that patients with schizophrenia have deficits in mental processing skills (intelligence; Aylward, Walker & Bettes, 1984), the exclusion border is set down to an IQ-score of 80 points to get a better representability of the sample.

### **3.3 Materials**

Several instruments are used for the clinical research:

The diagnosis of schizophrenia and SUD are based on the SCID I (First, Gibbon, Spitzer, & Williams, 1996), assessed by an experienced psychiatrist. Furthermore, the Positive and Negative Syndrome Scale (PANSS) is used to evaluate the severity of schizophrenia symptoms (Kay, Flszbein & Opfer, 1987).

The Michigan Alcoholism Screening Test (MAST; Selzer, 1971) as well as the Drug Abuse Screening Test -20 (DAST-20; Skinner, 1982) are used to assess the alcohol and drug abuse.

The assessment of the Lifetime History of Aggression scale (LHA; Coccaro, Berman, & Kavoussi, 1997) determines the history of violence of the participants. The Psychopathy Checklist: Screening Version (PCL: SV; Hart, Cox, & Hare, 1995) and the Psychopathy Checklist-Revised (PCL-R; Hare, Black, & Walsh, 2013) are used to gain insight into the participants personality and his psychopathic traits.

Additionally, the premorbid intelligence of the participants is measured by the Mehrfachwahl-Wortschatz Test (MWT-B; Lehrl, Triebig, & Fischer, 1995). This was done in order to test the participants with regards to the aforementioned exclusion criteria. The social cognitive functions were assessed by using the Reading Mind in the Eyes Test (RMET), constructed by Baron-Cohen in 1997 (Bölte, 2005). The RMET is an instrument to figure out social cognitive skills. In this test, the participants have to identify emotions in the eyes of adult men and women, displayed on a picture. The test has 36 items; each item has two response options (binominal test). The RMET was assessed with the help of a computer. The participants gave a response by pressing a button (either with the index or middle finger of the right hand). The score for this test consists of the sum of the wrong answers. The test scores are handled as followed: more than 14 mistakes show low, mistakes between 6 and 13 show average and less than 6 mistakes show high social cognitive skills (Baron-Cohen et al., 2001).

Validity and reliability were assessed as follows: the Italian version of the test was assessed with an internal consistency of .605 and a test-retest reliability of .833 (CI= .745 - .902; Vellante et al., 2013). This is similar to the Spanish version, with intraclass correlation of .63 (Fernandez-Abascal, Cabello, Fernandez-Berrocal, Baron-Cohen, 2013). Furthermore, the Turkish version of the RMET has test-retest reliability ( $p = .815$ ; Yildirim et al. 2011).

### **3.4 Procedure**

Five forensic hospitals and three psychiatric hospitals were contacted for the study. In protection of data privacy the patients were informed by a folder, which was publicly available in the institution. Patients who were interested in participation should report to the clinic employees. Before the procedure took place all participants were provided with a detailed description of the research conditions and a written consent was obtained. Effectively 90% of the patients who were interested in participation gave consent.

As mentioned in the previous sections, participants are assigned to one of four groups. Each participant was tested individually. The data was analyzed with SPSS version 23.

### **3.5 Analyses**

With the analysis, some assumptions were tested. The sample could be considered as normally distributed, as assessed from Shapiro-Wilk's test ( $p > .05$ ) and the Normal Q-Q Plots of the dependent variable (see Figure 1 in Appendix). The homogeneity of variances, as assessed by Levene's test for equality of variances (as used in independent-sample t-test) was given for the analysis of substance use disorder ( $p = .197$ ), though not for the analysis of violence ( $p = .009$ ). The independent sample t-test was used to analyze research questions 1 and 3, the Pearson Correlation test was used to analyze questions 2 and 4, and finally an ANOVA test was performed to analyze the fifth research question.

## 4 Results

To investigate whether social cognitive skills are affected by various variables, SPSS analyses were used. The variables that were analyzed in combination with the Reading Mind in the Eyes Test (RMET) scores are: violence, age of first criminal proceeding, comorbid SUD and the duration of SUD. The analysis refers to four main-effects and one interaction-effect that were expected.

### 4.1 Main-effect: Violence

There were 22 violent and 24 non-violent patients. An independent sample t-test was performed to determine if there are differences in RMET- scores between violent and non-violent patients. It was expected that patients with a violent history would achieve lower scores on the RMET than patients without a violent history.

The difference in test scores between violent patients ( $M=8.45$ ,  $SD=3.89$ ) and non-violent patients ( $M=8.38$ ,  $SD=2.37$ ) is not statistically significant,  $t(34.16) = 0.083$ ,  $p = 0.934$ .

### 4.2 Main-effect: Age of first criminal proceeding

A regression analysis was performed to determine if the age of first crime offence or the age of a first criminal proceeding correlates with the test scores on the RMET. Patients who committed crime at younger age were expected to make more mistakes on the RMET than older patients.

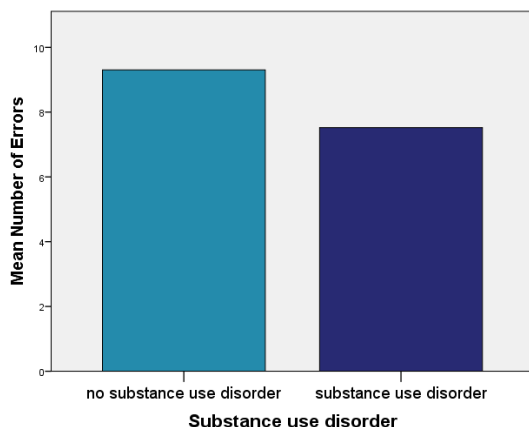
A Pearson correlation analysis showed no correlation between the age of first criminal proceeding and the RMET score,  $F(1) = 0.452$ ,  $p = 0.508$ .

### 4.3 Main-effect: Substance Use Disorder

There were 23 patients comorbid with SUD and 23 patients without this comorbidity. The patients who suffer from SUD were expected to perform worse on the RMET than individuals without SUD.

The results show that participants without SUD achieve a higher mean on mistakes ( $M=9.30$ ,  $SD=3.50$ ) on the RMET than patients comorbid with SUD ( $M=7.52$ ,  $SD=2.54$ ). However, this result is not statistically significant, though it shows a trend towards significance,  $t(44) = 1.98$ ,  $p = 0.054$ .

Figure 1. Mean Number of Errors in Substance Use Disorder





#### 4.4 Main-effect: Duration of Substance Use Disorder

There were 23 patients comorbid with SUD, who were expected to perform worse on the RMET the longer they suffer from SUD.

A linear regression analysis showed that the duration of SUD does not correlate with the Reading Mind in the Eyes Test score,  $F(1) = 0.791, p = 0.104$ .

#### 4.5 Interaction effect: Impact of Substance Use Disorder and Violence

There was an expected interaction effect of SUD on social cognitive skills in violent and non-violent patients with schizophrenia.

No interaction was found between violence and comorbid SUD for RMET scores,  $F(1) = 0.637, p = 0.429$ , partial  $\eta^2 = 0.015$  as shown in table 1.

Table 1. Tests of Between-Subjects Effects  
 Dependent Variable: RMET Number of errors

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Violence	,073	1	,073	,008	,931	,000
SUD	37,787	1	37,787	3,924	,054	,085
Violence * SUD	6,135	1	6,135	,637	,429	,015

Note: Significance at 0.05 level

## **5 Conclusion, Discussion and Prospects**

The aim of the present study was to clarify if violence and SUD have an impact on social cognitive skills. The results of this study might guide future research in this field. Additionally, the results contribute to the improvement and possible retaining of social cognitive skills in violent patients with schizophrenia and SUD.

### **5.1 Conclusion and Discussion**

The results of the present study indicate that participants with a violent history do not have lower social cognitive skills than those individuals without a violent history; this is contrary to the hypothesis. This result does not stand on its own; other researchers pointed out, that violent individuals are not more likely to have impaired social cognitive skills. Richell et al. (2003) assessed psychopathic individuals with the RMET and did not find impairments in their social cognitive skills. A study of Dolan and Fullam (2004) also supports their finding. They tested patients diagnosed with Antisocial Personality Disorders (ASPD; APA, 2000), with and without psychopathy. There were no significant differences in psychopathic ASPDs, non-psychopathic ASPDs and control group in detecting complex emotions. Research shows that violence does not indicate a deficit in social cognitive skills in non-schizophrenic patients. The present study confirms these findings in a sample of patients with schizophrenia.

The effect of substance use on social cognitive skills occurs to a lesser extent than expected. Those participants who suffer from substance use disorder were expected to have less developed social cognitive skills than participants without substance use disorder. However, this hypothesis has been rejected. The results indicate a trend towards significance, whereas participants without substance use disorder make more mistakes on the test than those individuals comorbid with SUD.

This result shares similar characteristics with the study of Carey et al. (2008). They found that groups of substance abusers (with schizophrenia) perform better on non-verbal cognition tests compared to the control group which did not abuse substances.

The present study hypothesized that participants who suffer a longer time from substance use disorder have a deficit in social cognitive skills. This hypothesis was tested with the help of a Pearson correlation test, outcomes were not significant. The duration of substance use is not related to social cognitive skills.

Furthermore, participants who committed crime at younger age were expected to have undeveloped social cognitive skills than participants who came into contact with violence at a later age. This hypothesis has been rejected.

Jones, Forster and Skuse (2007) designed a study to assess whether young offenders have a social-cognition deficit or not. They found that these adolescents performed poorly when recognizing another's eye gaze, but were unimpaired in tasks that demanded social cognitive skills.

So age at which crime was committed seems to have impairments in several social competencies but impairments did not occur in social cognitive skills in the present study nor in other research.

The aim of this study was to investigate whether social cognitive skills are even more threatened by SUD and violent behavior than by the presence of schizophrenia alone. If a difference was shown, social cognitive skills training may need to be revised for violent patients with schizophrenia comorbid with SUD. This adaption seems to be unnecessary in view of the outcomes of the present study. Violent behavior is not a predictor for social cognitive skills. Research shows that highly developed social cognitive skills might prevent violent behavior (Bennett et al., 2005). Thus, patients with schizophrenia need to receive training with regards to social skills before they show violent behavior. This training also should occur after the patient commits a crime, so the patient learns how to prevent violent behavior. Patients who also suffer from SUD perform better on social cognitive tasks, as stated in this and other studies. To conclude, no difference in social cognitive skills in schizophrenic patients with SUD and a history of violence was found, hence there is no need for special training for these individuals.

## **5.2 Limitations**

The present study does have limitations. Firstly, it is not known if the patients from this sample have participated at one point in their life in therapies where social cognitive skills were trained. If the participants have learned how to deal with deficits in social cognitive skills, this might have had an impact on the results in the present study. In that case, the social cognitive skills of these patients would not be equally comparable with the skills of those patients who did access this therapy. Social cognitive skills training is evidence based; for example Davis et al. (2014) found that oxytocin-augmented social cognitive skills training improves social cognitive skills in patients with schizophrenia. Antipsychotic drugs have an effect on the dopamine levels in the prefrontal cortex (Kuroki, Meltzer & Ichikawa, 1999), which is the same area where social cognition is localized (Amodio & Frith, 2006). In the present study, all participants were medicated, so it was not possible to examine differences in social cognitive skills between medicated and unmedicated patients.

## **5.3 Follow-up and Prospect**

Follow-up studies should address these limitations.

A larger sample size is needed to examine how far the results are representable for the population: higher reliability and validity. With a larger, more representative sample of patients the likelihood of finding significant results is possible.

In follow-up studies the researcher has to assess whether the participants are successfully treated with regard to social cognition through several therapies or training. Participants that have learned how to compensate their deficits in emotional intelligence are expected to perform better on the Reading Mind in the Eyes Test than participants who did not have success in therapy or did not follow this kind of

therapy at all. Therefore, an experimental study with a test- retest design is advised.

Moreover, the present study cannot determine whether medicine has certain impacts on social cognitive skills. That brings up another subject of discussion/subject for further research. Are patients that are compliant to their medication less impaired in social cognitive skills than patients who do not take medical drugs?

Furthermore, research should focus on skills training. What is the possibility of patients relapsing into violent behavior after completing the skills training? No study can be found about the association of evidence based trainings and imprisonment. To accomplish a better understanding, the available skills training and programs should be evaluated. This should determine whether or not these trainings are really necessary for shortening the hospitalization.

Follow-up studies may include the impact of differences in intelligence on social cognitive skills. As intellectual disabilities in autism spectrum disorders impair patients' performances in social cognitive tasks (Cáceres, Keren, Booth & Happé, 2014). Thus, intellectual skills should be taken into account when social cognitive skills in schizophrenia are investigated.

Franklin, Stevenson, Ambady and Adams (2015) studied the mind reading abilities in a cross-cultured sample. The study showed found that participants are accurate in mind reading across cultures, but perform better on mind reading within their own culture. With this outcome and the fact that schizophrenia occurs in all groups throughout the world (Versola-Russo, 2006), it is advised that further research should examine the impact of culture on social cognitive skills in patients with schizophrenia.

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## Appendix 1

### **A. DSM-IV criteria Schizophrenia (APA,2000)**

Presence of two (or more) of the following characteristic symptoms, each present for a significant portion of time during a 1-month period (or less if successfully treated):

- delusions and hallucinations
- disorganized speech (e.g., frequent derailment or incoherence) and behavior
- negative symptoms, i.e., affective flattening, alogia or avolition

Presence of social/occupational dysfunction, such as disturbance in one or more areas of functioning such as work, interpersonal relations or self-care that are markedly below the level achieved prior to the onset

Continuous signs of the disturbance persist for at least 6 months.

The disturbance is not due to the direct physiological effects of a substance (e.g., a drug of abuse, a medication), furthermore schizoaffective and mood disorder are excluded.

### **B. DSM-IV criteria Substance Use Disorder (APA,2000)**

Presence of a maladaptive pattern of substance use leading to clinically significant impairment or distress, as manifested by two (or more) of the following, occurring within a 12-month period:

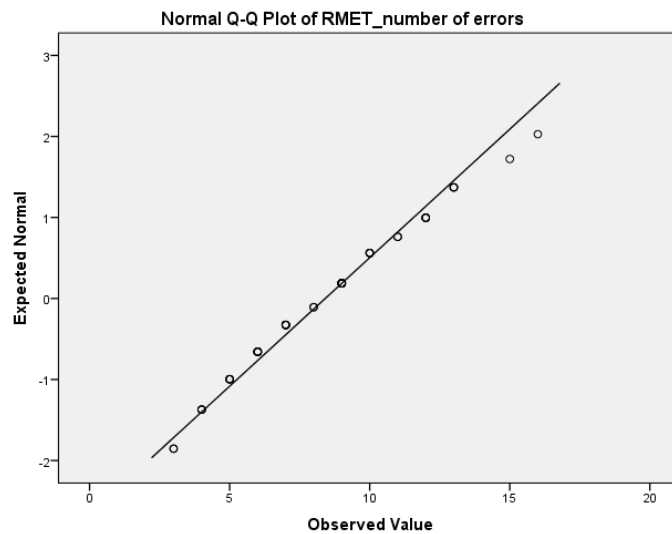
- Recurrent substance use resulting in a failure to fulfill major role obligations at work, school, or home
- Recurrent substance use in situations in which it is physically hazardous
- Continued substance use despite having persistent or recurrent social or interpersonal problems caused or exacerbated by the effects of the substance (e.g., arguments with spouse about consequences of intoxication, physical fights)
- Tolerance, as defined as a need for markedly increased amounts of the substance to achieve intoxication or desired effect or markedly diminished effect with continued use of the same amount of the substance
- Withdrawal, as manifested by: the characteristic withdrawal syndrome for the substance or the same substance is taken to relieve or avoid withdrawal symptoms
- The substance is often taken in larger amounts or over a longer period than was intended
- There is a persistent desire or unsuccessful efforts to cut down or control substance use
- A great deal of time is spent in activities necessary to obtain the substance, use the substance, or recover from its effects
- Important social, occupational, or recreational activities are given up or reduced because of substance use
- The substance use is continued despite knowledge of having a persistent or recurrent physical or psychological problem that is likely to have been caused or exacerbated by the substance
- Craving or a strong desire or urge to use a specific substance.

## Appendix 2

**Table 1. Demographic Variables**

	Mean ± SD			
	Non-violent / No SUD N=12	Violent / No SUD N=11	SUD / Violent N=11	SUD / Non-violent N=12
Measure				
Age (yrs)	37,83 ± 9,0	36,18 ± 10,36	36,27 ± 5,98	37,17 ± 7,27
Age Diagnosis (yrs)	21,0 ± 5,31	26,82 ± 7,25	23,18 ± 6,46	25,54 ± 4,92
Substance use disorder				
Duration SUD (yrs)	-	-	9,73 ± 4,5	13,0 ± 5,01
Abstinent duration (yrs)	-	-	6,41 ± 3,96	3,23 ± 2,41
Alcohol	-	-	N=10	N=9
Cannabis	-	-	N=2	N=3
Stimulants	-	-	-	N=1
Polytox	-	-	N=8	N=5
Violence				
Age first proceeding (yrs)	-	30,64 ± 7,08	19,18 ± 7,32	-
Time in forensic hospital (yrs)	-	6,55 ± 5,11	7,64 ± 4,39	-

**Figure 1. Normal Q-Q Plots of the Distribution of the Dependent Variable RMET-Scores**



**Table 2. Independent Sample Test Violence**

		Levene's Test for Equality of Variances		t-test for Equality of Means						
								95% Confidence Interval of the Difference		
		F	Sig.	t	df	Sig. (2- tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Number of errors	Equal variances assumed	7,477	,009	-,085	44	,933	-,080	,941	-1,976	1,817
	Equal variances not assumed			-,083	34,163	,934	-,080	,960	-2,031	1,871

Note: Significance at 0.05 level

**Table 3. Regression Analysis Age of First Crime Proceeding**

		Age of first criminal proceeding	Number of Errors
Age of first crime proceeding	Pearson Correlation	1	,136
	Sig. (2-tailed)		,508
	N	26	26
Number of Errors	Pearson Correlation	,136	1
	Sig. (2-tailed)	,508	
	N	26	46

Note: Significance at 0.05 level

**Table 4. Independent Sample Test SUD**

		Levene's Test for Equality of Variances		t-test for Equality of Means						
								95% Confidence Interval of the Difference		
		F	Sig.	t	df	Sig. (2- tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Number of Errors	Equal variances assumed	1,717	,197	1,979	44	,054	1,783	,901	-,033	3,598
	Equal variances not assumed			1,979	40,151	,055	1,783	,901	-,038	3,603

Note: Significance at 0.05 level

**Table 5. Regression Analysis Duration of SUD**

		Duration of SUD in years	Number of Errors
Duration of SUD in years	Pearson Correlation	1	-,243
	Sig. (2-tailed)		,104
	N	46	46
Number of Errors	Pearson Correlation	-,243	1
	Sig. (2-tailed)	,104	
	N	46	46

Note: Significance at 0.05 level

## **Attached Statements**

Name student:           Nora Becker

Studentnr.       :       336472

Subject:                Social Cognitive Skills in Schizophrenia

Statement 1:    Treatment of patients with schizophrenia should be focused on improving social skills.

Statement 2:    Accommodation in forensic hospitals should be temporary.

Statement 3:    Social Cognitive skills training should be included in every forensic treatment.

Statement 4:    Treatment of schizophrenia should always be combined with treatment of substance abuse/substance use disorder.

Statement 5:    Treatment of substance use disorder should include prevention of violence.

## **Declaration of Authorship**

Ondergetekende:

Nora Becker

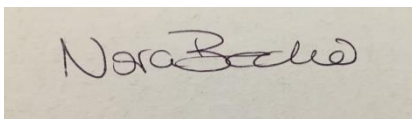
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Plaats: Hattingen

Datum: 14.03.2016

Handtekeningen:

A rectangular box containing a handwritten signature in dark ink. The signature appears to read 'Nora Becker' in a cursive, slightly stylized script.

N.B. Schending van bovengenoemde 'Eigen werkverklaring' wordt als fraude aangemerkt als bedoeld in Art. 19 OER.