ABSTRACT

JOHNSON, KIERSTEN LAINE. Overlap of Community Violence Perpetration and Violent Victimization among Adults with Mental Illnesses. (Under the direction of Dr. Sarah L. Desmarais).

Compared to the general population, adults with mental illnesses are at heightened risk of violent outcomes, including violence perpetration and violent victimization. Review of the empirical literature shows that there are many shared risk factors for perpetration and victimization in this population, including static and dynamic factors, and evidence points towards the co-occurrence of violent outcomes. However, there have been few investigations of the overlap between violence perpetration and violent victimization in adults with mental illnesses. Indeed, only a handful of papers have examined perpetration and victimization within the same sample and during the same time frame. Though studies have consistently observed an overlap of these outcomes, generalizability of findings is restricted by several limitations, including small, non-representative samples and heterogeneity in operational definitions and measurement of perpetration and victimization.

These gaps in the research literature limit our present understanding of the relationship between perpetration and victimization in adults with mental illnesses, and adversely affect the ability of clinicians to identify and effectively treat those at high risk of one or both outcomes. The manuscripts included in this dissertation aim to address these issues using a large pooled sample of adults with mental illnesses (N = 4,484).

In the first manuscript, I examine the prevalence and associated characteristics of four classifications of violence – namely, non-victim/non-perpetrator, victim only, perpetrator only, and victim-perpetrator. Findings indicate that adults with mental illnesses are a heterogeneous population with regard to violence risk and provide evidence for a victim-

perpetrator overlap. Indeed, participants were unlikely to report any violent outcomes but, when they did, were more likely to report perpetration *and* victimization rather than either outcome alone. Bivariate and multivariable analyses showed that age, sex, race/ethnicity, and primary diagnosis differed across violence classification.

In the second manuscript, I assess the prevalence of each these classifications, as well as transitions between classifications, over time, and consider the effects of proximal, clinical indicators on those transitions. Results showed that many individuals did transition between classifications over time, illustrating that one's classification as a perpetrator and/or victim is not fixed. These distinct pathways towards, and away from, violent outcomes were, in part, a function of recent violence perpetration and/or violent victimization, as well as substance use, psychiatric symptoms, and suicidal behaviors.

In the third manuscript, I examine how proximal risk factors, including recent victimization, predict short-term community violence. Multivariable analyses demonstrated proximal indicators contribute to the prediction of short-term community violence above and beyond distal characteristics; the addition of variable clusters of substance use, clinical functioning, recent violence perpetration, and recent violent victimization resulted in improved prediction at each step in the model. When all variables were entered, alcohol use, recent violence perpetration, and recent violent victimization were positive predictors of subsequent violence, even after controlling for distal characteristics.

Together, the manuscripts included in this dissertation advance our understanding of how violence perpetration and violent victimization relate to one another among adults with mental illnesses and inform clinical assessment and management of violence risk. Evidence of a victim-perpetrator overlap among adults with mental illnesses illustrates the need for research on and clinical consideration of perpetration *and* victimization in this population, as well as the factors associated with one or both outcomes. With knowledge of the risks and needs related to violence perpetration and violent victimization identified herein, clinicians will be better able to identify adults with mental illnesses at higher risk of violent outcomes and provide them with targeted treatment, which, ultimately, will lead to improved individual and public safety.

Overlap of Community Violence Perpetration and Violent Victimization among Adults with Mental Illnesses

by

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DEDICATION

To Eve.

BIOGRAPHY

Kiersten Laine Johnson (née Jeske) was born on August 25, 1989, to Kathleen Overman and Jeff Jeske. She was raised in Greensboro, North Carolina with her older sister, Colleen, and a number of pets, which included cats, gerbils, chicks, and a much-loved Keeshond, Mel. Early on, Kiersten's parents and sister fostered a love for learning through reading books and exploring outside. Kiersten went to Western Guilford High School and met her now-husband in homeroom on the first day of freshman year. She graduated from high school in 2008 and enrolled at the University of North Carolina at Chapel Hill, where she graduated in 2011 with a Bachelor of Science in Psychology. In 2012, Kiersten continued her education under the advisement of Dr. Sarah Desmarais in the Applied Social and Community Psychology program at North Carolina State University. She completed her Master's degree in 2014; her thesis, entitled *A Latent Class Analysis of Concordance and Discordance between Results of Drug Use Assessments among Adults with Schizophrenia*, won the College of Humanities and Social Sciences annual thesis award. Kiersten lives in Raleigh with her husband, Brant, daughter, Eve, and golden retriever, Link.

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CHAPTER 1

Introduction

Compared to the general population, adults with mental illnesses are at heightened risk of violent outcomes, including violence perpetration (Corrigan & Watson, 2005; Swanson, Holzer, Ganju, & Jono, 1990; Van Dorn, Volavka, & Johnson, 2012) and violent victimization (Goodman, Thompson, & Weinfurt, 1999; Teplin, McClelland, Abram, & Weiner, 2005). Past research has estimated that rates of violence perpetration among adults with mental illnesses are two to eight times greater than in the general population (Corrigan & Watson, 2005). Rates of victimization are higher, estimated to be 23 times greater than in the general population (Teplin et al., 2005). The increased risk of violent outcomes in this vulnerable population represents a substantial public health burden (Choe, Teplin, & Abram, 2008; Desmarais et al., 2014). Accordingly, there is a need for research examining factors associated with violence perpetration and violent victimization, as well as efforts to develop and implement strategies to identify and effectively treat those at greater risk of violent outcomes.

Review of the empirical literature shows that there are many shared risk factors for violence perpetration and violent victimization in adults with mental illnesses. Studies have identified static factors (e.g., sex, race/ethnicity, and childhood victimization) and dynamic factors (e.g., homelessness, substance use, and psychiatric symptoms) as predictors of both outcomes (Goodman et al., 2001; Silver, Piquero, Jennings, Piquero, & Lieber, 2011; Teplin et al., 2005; Van Dorn et al., 2012; Witt, Van Dorn, & Fazel, 2013). Additionally, violence perpetration and violent victimization act as risk factors for each other; prior victimization has been identified as one of the most robust correlates of perpetration among adults with mental illnesses (Swanson et al., 2002; Witt et al., 2013). Likewise, prior violent offending has been shown to increase risk for violent victimization in this population (Silver, 2002). All told, findings from prior research suggest that preventive measures intended to decrease risk for one violent outcome may serve to reduce risk for the other in adults with mental illnesses. The overlap between violence perpetration and violent victimization in this population, thus, merits further investigation.

Though many studies have shown a victim-perpetrator overlap in the general population, there have been very few investigations of the overlap of these outcomes in adults with mental illnesses (Jennings, Piquero, & Reingle, 2012). Indeed, only a handful of papers have examined violence perpetration and violent victimization within the same sample of adults with mental illnesses and during the same time frame (Brekke, Prindle, Bae, & Long, 2001; Havassy & Mericle, 2013; Hiday, Swanson, Swartz, Borum, & Wagner, 2001; Roaldset & Bjørkly, 2015; Silver et al., 2011). Overall, these studies have consistently observed co-occurrence of perpetration and victimization in a subset of individuals, suggesting that there is an overlap of violence perpetration and violent victimization among adults with mental illnesses. Brief descriptions of these five studies and their results are provided below.

In a sample of 419 adults entering short-term residential treatment, nearly half of all participants reported perpetration or victimization in the preceding 30 days; of those, over one-third reported both outcomes (Havassy & Mericle, 2013). Similar findings were reported in a sample of 345 discharged psychiatric patients over a 12-month period; of those reporting any violence, roughly one-third reported both perpetration and victimization (Roaldset & Bjørkly, 2015). Another study assessed 331 adults with mental illnesses who were under outpatient commitment orders. Each incident of victimization was associated with a 1.76 increase in the odds of violence (Hiday et al., 2001). A 3-year study of 172 adults with schizophrenia found that 34.0% of the sample reported being victimized (violent and non-violent), while only 6.4% were charged for violence against others (Brekke et al., 2001). The authors did not report on the association, if any, between perpetration and victimization. Another study followed 826 psychiatric patients 10 weeks after discharge and found that 19.4% of respondents reported victimization only, 13.0% reported perpetration only, and 5.6% reported both perpetration and violence. The association between perpetration and victimization in this sample was significant and large in size (r =.46, p < .05; Silver et al., 2011).

Though these studies advance our understanding of the association between perpetration and victimization in adults with mental illnesses, generalizability of their results is restricted in five ways. First, samples are often relatively small: of the five studies, four included fewer than 500 participants (Brekke et al., 2001; Havassy & Mericle, 2013; Hiday et al., 2001; Roaldset & Bjørkly, 2015). Second, samples are not representative of the population of adults with mental illnesses, as participants ranged from patients entering residential treatment (Havassy & Mericle, 2013) to those who had been recently discharged

(Roaldset & Bjørkly, 2015; Silver et al., 2011) or were under outpatient commitment orders (Hiday et al., 2001). Third, there is considerable heterogeneity in operational definitions and measurement of perpetration and victimization across – and even within – these studies. In one study, for instance, the violence perpetration was operationalized as a prior criminal charge against persons or property, whereas the operational definition of victimization included self-reported incidents that were not reported to the police (Brekke et al., 2001). Fourth, prior studies have not consistently reported on the association between perpetration and victimization, even when both outcomes are measured. For example, the prevalence and predictors of perpetration and victimization were examined separately in the Brekke et al. study of adults with schizophrenia. Fifth, research has focused primarily on static factors (e.g., age, sex, and race/ethnicity) associated with violent outcomes, which have relatively limited clinical utility. When clinically-relevant factors have been considered, they often are distal in nature (e.g., childhood victimization, history of substance use) and may not be representative of current functioning. Yet, some evidence suggests that proximal factors – that is, factors that are currently present or occurred in the recent past – may play an important role in predicting and preventing violence risk (McNiel, Gregory, Lam, Binder, & Sullivan, 2003; Webster, Nicholls, Martin, Desmarais, & Brink, 2006).

Overview of the Research Chapters

These gaps in the research literature limit our present understanding of the relationship between and risk factors of violence perpetration and violent victimization in adults with mental illnesses, which, in turn, limit the ability of clinicians to identify and effectively treat those at high risk of one or both outcomes. To address these limitations of the extant research, the manuscripts included in this dissertation examine the overlap between and factors associated with violence perpetration and violent victimization in a heterogeneous sample of adults with mental illnesses (*N* = 4,484).

Longitudinal data were pooled from five studies of adults with mental illnesses which used the same measures of violence perpetration and violent victimization: (1) Facilitated Psychiatric Advance Directive Study (*n* = 473; Swanson et al., 2006a); (2) MacArthur Mental Disorder and Violence Risk Study (*n* = 1,136; Steadman et al., 1998); (3) Schizophrenia Care and Assessment Program (*n* = 404; Swanson, Swartz, & Elbogen, 2004); (4) MacArthur Mandated Community Treatment Study (*n* = 1,011; Monahan et al., 2005); and (5) Clinical Antipsychotic Trials of Intervention Effectiveness Study (*n* = 1,460; Lieberman et al., 2005). The data were pooled using integrative data analysis, a state-of-the art practice that involves scaling data to a common metric in order to use all raw data in one single dataset (Curran & Hussong, 2009). Sampling and inclusion criteria for each data source are described briefly below.

Facilitated Psychiatric Advance Directive Study (F-PAD). A random sample of clients prescreened for eligibility was obtained from two North Carolina mental health systems. Inclusion criteria were: (a) 18-65 years of age; (b) schizophrenia-spectrum or major mood disorder; and (c) in treatment at the time of the study. Data were collected between 2003 and 2007; assessments were conducted at baseline, 1-, 6-, 12-, and 24-months.

MacArthur Mental Disorder and Violence Risk Study (MacRisk). Eligible participants were sampled from three acute inpatient facilities, with recruitment adjusted to maintain a consistent distribution of age, sex, and ethnicity across sites. Inclusion criteria were: (a) English-speaking White, Black, or Hispanic patients; (b) 18-40 years of age; and (c) schizophrenia-spectrum, depression, mania, brief reactive psychosis, or delusional disorder. Data were collected through participant and collateral interviews and hospital abstractions from 1992 to 1995; assessments were conducted at baseline and every ten weeks thereafter for the following year.

Schizophrenia Care and Assessment Program (SCAP). Participants were recruited from treatment facilities across North Carolina using both sequential inpatient admissions and a random selection of outpatients, with eligibility limited to: (a) 18 years of age or older; (b) schizophrenia; and (c) current service use. Data were collected between 1997 and 2002; assessments were conducted at baseline and every six months thereafter for the following three years.

MacArthur Mandated Community Treatment Study (MacMandate). Participants were recruited through both sequential and random selection across sites, with eligibility limited to: (a) 18-65 years of age; (b) English- or Spanish-speaking; (c) current outpatient treatment; and (d) first service occurred at least six months prior. Data were collected between 2002 and 2003 through baseline interviews.

Clinical Antipsychotic Trials of Intervention Effectiveness (CATIE). Participants were recruited from 57 sites (16 university clinics, 10 state mental health agencies, 7

Veteran's Affairs Medical Centers, 6 private nonprofit agencies, 4 private practice sites, 14 mixed system sites) across the United States. Inclusion criteria were: (a) 18-65 years of age; (b) schizophrenia; and (c) ability to take oral antipsychotics. Data were collected between 2001 and 2004. Perpetration and victimization were assessed at baseline and every six months for a total 18 months; substance use and psychiatric symptoms were assessed at baseline and every three months thereafter.

A total of 4,484 participants were recruited across studies (59.8% male) and included in the pooled data set. In terms of race/ethnicity, 51.4% were White, 37.7% Black, 7.1% Hispanic, and 3.8% other race/ethnicity. Participant age ranged between 18 and 77 years (*M* = 39.09; *SD* = 11.34). Schizophrenia was the most common primary diagnosis (63.4%), followed by major depression (18.4%), bipolar disorder (9.5%), substance use disorder (6.2%), and other (e.g., anxiety) disorders (2.4%). Parent studies enrolled a range of participants, from exacerbated inpatients to partially remitted outpatients; together, the pooled sample approximates a usual care, non-interventional population in its characteristics.

Specific Aims

Aim 1. Examine the prevalence and correlates of the overlap of violence perpetration and victimization among adults with mental illnesses. The first manuscript (Chapter 2) evaluates four classifications of perpetration and victimization in the pooled sample – namely, non-victim/non-perpetrator, victim only, perpetrator only, and victim-perpetrator. The prevalence of each of these classifications is calculated at baseline assessment. Additionally, participant characteristics of age, sex, race/ethnicity, and primary diagnosis are assessed in and across violence classifications using bivariate and multivariable analyses.

Aim 2. Assess prevalence and transitions between violence classifications over time among adults with mental illnesses. The second manuscript (Chapter 3) examines how the likelihood of being a victim and/or perpetrator of violence changes over time, as well as how clinically-relevant, proximal indicators affect transitions between the four violence classifications. Specifically, latent transition analysis (LTA) is conducted to determine prevalence of classifications at baseline, 3-month, and 6-month assessments and to estimate the likelihood that adults with mental illnesses will remain in or transition between these classifications over time. Multivariable analyses assess the effects of recent substance use, psychiatric symptoms, and suicidal behaviors on transitions between classifications.

Aim 3. Examine how distal and proximal indicators, including recent victimization, predict short-term community violence. The third manuscript (Chapter 4) assesses the role of distal and proximal indicators in the prediction of short-term community violence. A hierarchical linear regression is conducted to assess the incremental validity of a series of variable clusters in the prediction of violence risk over a 6-month period: distal characteristics (i.e., age, sex, race/ethnicity, primary diagnosis); substance use (i.e., alcohol use and drug use at baseline); clinical functioning (i.e., psychiatric symptoms at baseline, recent hospitalization); recent violence; and recent victimization.

The manuscripts included in the dissertation advance our understanding of how violence perpetration and violent victimization relate to one another in adults with mental illnesses and hold important implications for future research and clinical practice with this population. Specifically, the first manuscript marks an initial step in considering the overlap of perpetration and victimization in adults with mental illnesses through a typology of non-victim/non-perpetrators, perpetrators only, victims only, and victim-perpetrators. The second manuscript implements a novel methodology in longitudinal data to assess whether the likelihood of belonging to one of these four violence classifications changes over time, and if any clinical characteristics are associated with that change. The third manuscript is among the first studies to consider individual and combined effects of distal and clinical indicators, including recent victimization, on short-term violence risk.

CHAPTER 2

A Typology of Community Violence Perpetration and Victimization among Adults with Mental Illnesses

The primary objective of this paper was to evaluate the overlap between community violence perpetration and victimization in a large, heterogeneous sample of adults with mental illnesses (*N* = 4,474). We also explored participant characteristics differentiating four categories of perpetration and victimization: non-victim/non-perpetrators, victims only, perpetrators only, and victim-perpetrators. Results indicated that adults with mental illnesses were unlikely to report violent outcomes but, when they did, were more likely to report perpetration and victimization, rather than perpetration alone. Additionally, bivariate and multivariable analyses showed that sex, age, race/ethnicity, and primary diagnosis differed across categories. Victim-perpetrators, for example, were more likely to be young, black, and have a primary diagnosis of bipolar disorder, major depressive disorder, substance use disorder, or "other." Altogether, our findings provide evidence for a victim-perpetrator overlap in this population and suggest that preventive measures targeting perpetration and victimization may be more effective than those with separate strategies for each.

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Introduction

Many view adults with mental illnesses as potentially violent and a threat to public safety (Corrigan & Watson, 2002). Though evidence indicates that there is a modest increased risk of violence associated with mental illness compared to the general public (Corrigan & Watson, 2005; Swanson et al., 1990; Van Dorn et al., 2012), adults with mental illnesses also are more likely to be victimized than the general public (Goodman et al., 1999; Teplin et al., 2005). However, research examining community violence perpetration and violent victimization in adults with mental illnesses has typically focused on only one of these outcomes. In the present study, we examine the overlap between community violence perpetration and violent victimization, as well as identify participant characteristics that differentiate individuals across four categories: non-victim/non-perpetrators, victims only, perpetrators only, and victim-perpetrators.

Community Violence Perpetration and Victimization in Adults with Mental Illnesses

Only a handful of papers have examined community violence perpetration and victimization within the same sample during the same timeframe. One study, for example, assessed 419 adults entering short-term residential treatment (Havassy & Mericle, 2013). Close to half of the sample (40.8%) reported violence in the past 30 days, with 84.2% of these incidents including victimization. Another study assessed 331 adults with mental illnesses (53.8% male) who were under outpatient commitment orders. Prevalence of violence was 50.4% and of victimization (violent and non-violent), 27.2%. Multivariable regression analyses indicated that each incident of victimization was associated with a 1.76

increase in the odds of violence (Hiday et al., 2001). A 3-year study of 172 adults (73.8% male) with schizophrenia measuring incidence of perpetration and victimization found that 34.0% of the sample reported being victimized (violent and non-violent), while only 6.4% were charged for violence against others. Associations between perpetration and victimization were not reported (Brekke et al., 2001). A fourth study examined community violence perpetration and victimization 10 weeks after discharge in a sample of 826 discharged psychiatric patients (58% male), finding that 19.4% of respondents reported victimization only, 13.0% reported perpetration only, and 5.6% reported both perpetration and violence. There was a significant association between perpetration and victimization (r =.46, $p < .05$; Silver et al., 2011).

Together, findings of prior studies show lower rates of perpetration than victimization among adults with mental illnesses and consistently show that perpetration and victimization occur among the same individuals within the same timeframes. Though results are informative, they also are limited in several ways. Generalizability of some studies is restricted by small, non-representative samples, as well as heterogeneity in operational definitions and measurement of perpetration and victimization across, but also within, certain studies. Moreover, prior studies have not always focused on the association between perpetration and victimization, nor have they examined correlates within a given period of time.

Even though violence perpetration and victimization are not often measured within the same sample and/or timeframe, extant research demonstrates that prior violence or victimization increases risk of the other. For example, victimization has been identified as one of the most robust correlates of perpetration among adults with mental illnesses (Swanson et al., 2002; Witt et al., 2013). Likewise, prior violent offending has been shown to increase risk for violent victimization in this population (Silver, 2002). This trend is mirrored in the general population (Wittebrood & Nieuwbeerta, 1999). All told, findings from prior research suggest that preventive measures intended to decrease risk for one violent outcome may serve to reduce risk for the other in adults with mental illnesses. Thus, the overlap between violence perpetration and victimization in this vulnerable population merits further investigation.

Victim-Perpetrator Overlap in the General Population

In contrast with the scant research conducted with adults with mental illnesses, there have been many studies on the association between perpetration and victimization in the general population. A recent review of 37 studies found that the majority (83.8%, $n = 31$) showed a significant statistical association between perpetration and victimization (Jennings et al., 2012). Specifically, the two were positively and significantly related across a variety of settings, age groups, and types of outcomes (e.g., nonviolent, violent). Indeed, the association was stronger for violent offenses (e.g., homicide) compared to non-violent offenses (e.g., property crime), but was nonetheless present for the latter.

Though most prior studies dichotomized violent offending and victimization, a handful grouped participants as a function of outcomes. For example, one study of 9,421 adolescents and young adults categorized participants as nonviolent (71.3%), perpetrators only (4.7%), victims only (12.0%), and victim-perpetrators (11.9%; Reingle, Staras, Jennings, Branchini, & Maldonado-Molina, 2011). Another multi-wave study of 1,138 Puerto Rican youth found that non-victim, non-offenders represented from 31.3% to 36.6% of the sample, victims from 32.4% to 43.8%, offenders from 4.3% to 9.1%, and victim-offenders from 15.3% to 27.4% (Maldonado-Molina, Jennings, Tobler, Piquero, & Canino, 2010). Findings of these studies further suggest that participant characteristics may distinguish between groups. To demonstrate, male and black youth in the Reingle et al. sample were significantly more likely than their counterparts to be victims of intimate partner violence. Similarly, repeat victim-offenders in the Maldonado-Molina et al. sample were more likely to be male and older compared to the rest of the sample.

The Present Study

Few studies have examined the overlap between community violence perpetration and victimization in adults with mental illnesses, despite evidence that these two outcomes have shared associations (Daday, Broidy, Crandall, & Sklar, 2005; Wittebrood & Nieuwbeerta, 1999) and act as risk factors for each other (Swanson et al., 2002; Witt et al., 2013). To that end, our primary research objective was to evaluate the overlap between community violence perpetration and victimization in adults with mental illnesses. Our secondary objective sought to identify participant characteristics (i.e., sex, age, race/ethnicity, primary diagnosis) that differentiated categories of violence perpetration and victimization.

Methods

Data

Baseline data were pooled from five studies of adults with mental illnesses: (1) Facilitated Psychiatric Advance Directive Study (*n* = 469; Swanson et al., 2006a); (2) MacArthur Mental Disorder and Violence Risk Study (*n* = 1,136; Steadman et al., 1998); (3) Schizophrenia Care and Assessment Program (*n* = 404; Swanson et al., 2004); (4) MacArthur Mandated Community Treatment Study (*n* = 1,011; Monahan et al., 2005); and (5) Clinical Antipsychotic Trials of Intervention Effectiveness Study (*n* = 1,460; Lieberman et al., 2005). A total of 4,474 adults with mental illnesses are included in the present analyses. We briefly describe each data source below.

Facilitated Psychiatric Advance Directive Study (F-PAD). This randomized clinical trial examined the implementation of a facilitated PAD program. A random sample of clients prescreened for eligibility was drawn from a de-identified list from two mental health systems in North Carolina. Upon providing informed consent, participants were randomly assigned to either the intervention or control group and administered a semi-structured interview regarding PADs prior to and following the intervention. Inclusion criteria were: (a) 18-65 years of age; (b) schizophrenia-spectrum or major mood disorder; and (c) currently in treatment.

MacArthur Mental Disorder and Violence Risk Study (MacRisk). This study assessed violence risk of civil psychiatric patients. Eligible participants were sampled from three acute inpatient facilities, with recruitment adjusted to maintain a consistent distribution of age, sex, and ethnicity across sites. Inclusion criteria were: (a) English-speaking white, black, or Hispanic patients; (b) 18-40 years of age; and (c) schizophrenia-spectrum, depression, mania, brief reactive psychosis, or delusional disorder. Data were collected through participant and collateral interviews and hospital abstractions from 1992 to 1995.

Schizophrenia Care and Assessment Program (SCAP). This study assessed clinical, functional, and service utilization outcomes for adults with schizophrenia. Participants were recruited from treatment facilities across North Carolina using both sequential inpatient admissions and a random selection of outpatients, with eligibility limited to: (a) 18 years of age or older; (b) schizophrenia; and (c) current service use. Data were collected through in-person interviews at 6-month intervals and medical record abstraction over a 3-year period.

MacArthur Mandated Community Treatment Study (MacMandate). This study collected data regarding lifetime experience of leverage (e.g., housing, criminal justice, and outpatient commitment) from outpatients through structured interviews and clinic charts between 2002 and 2003. Participants were recruited through both sequential and random selection across sites, with eligibility limited to: (a) 18-65 years of age; (b) English- or Spanish-speaking; (c) current outpatient treatment; and (d) first service occurred at least six months prior.

Clinical Antipsychotic Trials of Intervention Effectiveness (CATIE). This randomized clinical trial examined the effectiveness of second generation antipsychotic medication in adults with schizophrenia. Participants were recruited from 57 sites (16 university clinics, 10 state mental health agencies, 7 Veteran's Affairs Medical Centers, 6 private nonprofit agencies, 4 private practice sites, 14 mixed system sites) across the United States. Inclusion criteria were: (a) 18-65 years of age; (b) schizophrenia; and (c) ability to take oral antipsychotics. Data were collected through self-report, individual/collateral interviews, and clinician ratings in monthly visits over an 18-month period.

Measures

Dependent Variables. Prevalence of community violence perpetration and victimization was assessed in all studies using the MacArthur Community Violence Screening Instrument (MCVSI; Steadman et al., 1998). The MCVSI is comprised of eight questions each for perpetration and victimization, derived from the Revised Conflict Tactics Scale (CTS2; Straus, Hamby, Boney-McCoy, & Sugarman, 1996). The questions assess: (a) pushing, grabbing, or shoving; (b) kicking, biting, or choking; (c) slapping; (d) throwing an object; (e) hitting with a fist or object; (f) sexual assault; (g) threatening with a weapon in hand; and (h) using a weapon. Total administration time is approximately 5-7 minutes. For the present analyses, we dichotomized responses of "violence" and "other aggressive acts" to obtain prevalence of violent outcomes (yes/no) in the past six months.

Independent Variables. Participant *sex* is measured dichotomously with 1 representing *female* and 0 representing *male. Age* is a measured continuously (in years) and reflects age at baseline. *Race/ethnicity* is captured with four indicator variables: white, black, Hispanic, and other race/ethnicity, with 1 representing *group membership* and 0 representing *non-membership*. *Primary diagnosis* is measured with five indicator variables: schizophrenia, bipolar disorder, major depressive disorder, substance use disorder, and other diagnosis, with 1 representing *primary diagnosis* and 0 representing *absence or secondary diagnosis*. Diagnoses were obtained through a combination of clinician diagnoses and medical records, with recent diagnoses by a psychiatrist in a medical record taking precedence over any prior diagnoses. We controlled for differences across studies by modeling study effects with a series of indicator variables.

Data Analysis

All analyses were conducted with SPSS, v.19. Descriptive statistics were calculated for all variables. To address our primary research objective, we identified participants' group membership based on their responses to the MCVSI (e.g., those who responded "yes" to violent outcomes in both perpetration and victimization scales were classified as victim-perpetrators). Across categories, we computed frequencies and percentages for categorical variables (sex, race, diagnosis), and means and standard deviations for age. Our secondary objective was addressed through bivariate and multivariable analyses. Specifically, to examine bivariate associations between categorical variables and groups, we conducted chi-square tests; *post hoc* pairwise comparisons were conducted using Bonferonni adjusted *z*-tests. For age, we conducted a one-way ANOVA with group membership as the independent variable; *post hoc* pairwise comparisons were conducted using Bonferonni adjusted *t*-tests. We additionally ran pairwise comparisons to examine if prevalence of experiencing *both* perpetration and victimization in cases where at least one violent outcome was reported differed as a function of participant characteristics. Multivariable analyses were conducted using multinomial logistic regression. Odds ratios show probability of membership in each group, as compared to the non-victim, non-perpetrator group. For primary diagnosis and race/ethnicity, schizophrenic and white participants, respectively, served as reference groups. For the study covariate, the CATIE study served as the reference group.

Results

Descriptive Statistics

Table 1 presents participant characteristics overall and across the perpetration and victimization categories. In the sample, the majority of participants were male and white. Participant age ranged between 18 and 71 years. Schizophrenia was the most common primary diagnosis, followed by major depression, bipolar disorder, substance use disorder, and other (e.g., anxiety) disorders. Table 1 also shows the prevalence of violent outcomes. Participants were more likely to report no victimization or violence than any other category. Victim-perpetrators comprised the next largest group, but represented less than one-fifth of the sample, followed by victims only and perpetrators only. Distribution of categories differed across studies, reflecting the variation in patients sampled across study sites.

Bivariate Analyses

Bivariate analyses showed that the distribution of male and female participants differed significantly across categories. *Post hoc z*-tests indicated that the perpetrator-only group deviated significantly from the 2:1 male-to-female ratio present in the other categories, and, in fact, had a greater representation of women than men. Race/ethnicity also differed across categories. Specifically, Hispanic participants were less likely to identify as victim-perpetrators compared to white and black respondents. Age also differed significantly across categories. *Post hoc* comparisons showed that mean age for each category differed in all cases except between victims only and perpetrators only. On average non-victim/non-perpetrators were the oldest, while victim-perpetrators were the youngest.

Primary diagnoses differed across categories. Participants with schizophrenia were more likely to identify as non-victim/non-perpetrators and less likely to identify as victim-perpetrators than those with any other diagnosis. They were less likely to identify as victims only than participants with bipolar or substance use disorder; furthermore, they were less likely to identify as perpetrators only than participants with major depressive or “other” disorders. Conversely, participants with substance use disorder were less likely to identify as non-victim/non-perpetrators and more likely to identify as victim-perpetrators than any other diagnosis.

Table 2 presents the prevalence of experiencing both perpetration and victimization when least one has been reported. Overall, results demonstrate that across all participants, nearly half of those reporting any violence or victimization experienced both in the 6-month timeframe. Pairwise comparisons revealed some differences in the proportion of participants reporting both perpetration and victimization as a function of participant characteristics. Specifically, of participants reporting any instance of violence or victimization, Hispanic participants were less likely than white participants to experience both in the 6-month time frame. Additionally, compared to participants with major depressive or “other” disorders, those with schizophrenia were significantly less likely to experience both. The percentage of men and women who reported both perpetration and victimization in the 6-month time frame did not differ significantly.

Multivariable Analyses

Table 3 presents the results of our multinomial logistic regression. Overall, there was adequate discrimination among categories on the basis of the four correlates, -2 LL = 5,383.65, χ^2 (39, N = 4,455) = 816.38, p < .001, Nagelkerke R^2 = .19. In the sections that follow, we describe factors associated with membership in each category.

Perpetrator-only. All four variables - age, sex, race/ethnicity, and primary diagnosis - significantly distinguished perpetrators only from non-victim/non-perpetrators. Younger participants were more likely to be in this group. Male participants were less likely than female participants to identify as perpetrators only than as non-victim/non-perpetrators. Black, Hispanic, and "other" race/ethnicity participants were nearly twice as likely as white participants to identify as perpetrators only than as non-victim/non-perpetrators. Similarly, compared to participants with a primary diagnosis of schizophrenia, participants with major depressive disorder or "other" disorders were more likely to identify as perpetrators only.

Victim-only. Only age and race/ethnicity distinguished between non-victim/non-perpetrator and victim-only groups. Specifically, younger age significantly increased the likelihood of being in the victim-only group. Compared to white participants, participants belonging to "other" racial/ethnic groups were more than twice as likely to identify as victims only than as non-victim/non-perpetrators.

Victim-perpetrator. Age, race/ethnicity, and primary diagnosis significantly distinguished between non-victim/non-perpetrators and victim-perpetrators. Younger age significantly increased the likelihood of identifying as a victim-perpetrator. Compared to white participants, black participants were more likely to identify as victim-perpetrators than as non-victim/non-perpetrators. Compared to participants with a primary diagnosis of schizophrenia, those with bipolar disorder, major depressive disorder, substance use disorder, and "other" diagnosis were more likely to identify as victim-perpetrators. Specifically, participants with primary diagnoses of substance use disorder and "other" diagnosis were roughly three times more likely to identify as victim-perpetrators than those with schizophrenia.

Discussion

Adults with mental illnesses are at heightened risk for violence, both perpetration (Corrigan & Watson, 2005; Van Dorn et al., 2012) and victimization (Goodman et al., 1999; Teplin et al., 2005); however, few studies have had the capability and/or objective to identify an overlap between the two violent outcomes. Thus, the present study's primary objective was to examine the victim-perpetrator overlap in a large, pooled sample of adults with mental illnesses. We additionally identified characteristics associated with non-victim/non-perpetrators, victims only, perpetrators only, and victim-perpetrators. Below, we summarize these findings.

Summary of Findings

Overall, and contrary to public opinion, our findings indicate that the majority of adults with mental illnesses were neither victims nor perpetrators of violence during the reference period. Specifically, almost two-thirds of the sample (62.9%) reported no violent incidents. In fact, only 6.3% of participants reported violence perpetration but not victimization. This rate is less than half the rate seen for victimization only (13.3%). Notably, participants were more likely to report experiencing both violent perpetration and victimization in the 6-month period (17.6%) than they were to report either perpetration or victimization alone. These rates are consistent with a prior analysis of the MacArthur Violence Risk Study data that examined both perpetration and victimization (Silver et al., 2011) and lend support to the existence of a victim-perpetrator overlap in this population. Furthermore, our findings indicate that adults with mental illnesses experience violence – both perpetration and victimization – at rates higher than reported in the general population, as has been previously suggested (Steadman et al., 1998, Teplin et al., 2005). As such, continued emphasis on violence without acknowledgement of the increased risk of victimization presents an incomplete picture of the data.

Findings of our bivariate and multivariable analyses help to address our secondary research objective and to add additional clarity to previous research findings. Overall, participant characteristics distinguished between groups in meaningful ways. For example, analyses demonstrated that younger age is consistently associated with violent outcomes – both perpetration and victimization, alone or together – as has been seen in prior research conducted with the general population (Maldonado-Molina et al., 2010; Reingle et al., 2011) and adults with mental illnesses (Swanson et al., 1990; Teplin et al., 2005). This study is one of few to show the association vis-à-vis victim-perpetrators, whether in adults with mental illnesses (Silver et al., 2011) or other populations (e.g., Maldonado-Molina et al., 2010; Reingle et al., 2011).

Our analyses also showed that white participants were more likely to be in the non-victim, non-perpetrator group than any other group. Conversely, non-white participants were more likely to be victims and/or perpetrators, though associations and group membership differed by specific racial/ethnic minority group. However, of participants reporting any instance of violence or victimization, Hispanic participants were less likely than white participants to experience both perpetration and victimization in the 6-month time frame. These results are consistent with some prior research in which black (Silver et al., 2011) and Hispanic (Corrigan & Watson, 2005) adults with mental illnesses are more likely than their white counterparts to be perpetrators of violence. Black adults with mental illnesses additionally are more likely to be victims of violence (Silver, 2002; Teplin et al., 2005). That said, results of other studies of adults with mental illnesses have been mixed in terms of the risk of violence perpetration and victimization associated with minority racial/ethnic status (e.g., Brekke et al., 2001; Hiday et al., 2001; Silver et al., 2011). Herein we show that not only are racial and ethnic minorities at increased risk for violent outcomes, but also that they are at increased risk for both perpetration and victimization during the same period of time.

As with age and race/ethnicity, primary diagnosis was significantly related to group membership in our bivariate and multivariable analyses. Specifically, participants with a primary diagnosis of schizophrenia were significantly *less* likely than participants with other primary diagnoses to commit violence, either as perpetrators only or victim-perpetrators.

Adults with major depressive disorder and "other" primary diagnoses, however, were at heightened risk of violence, both as perpetrators only and victim-perpetrators; they were also more likely than those with a primary diagnosis of schizophrenia to experience both outcomes if either was reported.

Though most studies find co-occurring substance use disorder increases risk for violence perpetration (Swanson et al., 1990; Swanson et al., 2006b; Van Dorn et al., 2012) and victimization (Goodman et al., 2001) in adults with mental illnesses, a primary diagnosis of substance use disorder was not associated with perpetration only or victimization only. It did, however, increase likelihood of membership in the victim-perpetrator group. These results may reflect an overall increase in adverse outcomes in adults with a primary diagnosis of substance use disorder. Indeed, substance use is widely recognized as a risk factor for adverse outcomes among adults with mental illnesses (Swanson et al., 2006b; Van Dorn et al., 2012).

Sex was significantly related to membership in just one group: perpetration only. Results of the multinomial logistic regression showed that women were more likely than men to be in the perpetrator-only group compared to the non-perpetrator, non-victim group. This finding is generally inconsistent with prior studies of both adults with mental illnesses (Van Dorn et al., 2012; Witt et al., 2013) and the general population (Monahan, 1997; Stueve & Link, 1998). However, the sex differences we found may reflect our operationalization of violence. Specifically, research attributing higher overall rates of violence perpetration to women also reports similar or higher rates of more serious acts of violence among men

(Desmarais et al., 2014; Monahan et al., 2001). Moreover, the higher rates of female violence may reflect our use of self-report rather than official records (e.g., police reports). That said, compared to the general population, the sex difference may be smaller or reversed for adults with mental illnesses (Hiday, Swartz, Swanson, Borum, & Wagner, 1998; Lidz, Mulvey, & Gardner, 1993; Short, Thomas, Mullen, & Ogloff, 2013; Stueve & Link, 1998). Findings also may reflect increased opportunity: women with mental illnesses are more likely to live with family members and men to live alone (Swanson et al., 2006b). Indeed, in another analysis of the present data (Desmarais et al., 2014), the majority of violent incidents were perpetrated in residential settings.

Our identification of the relative prevalence of and individual characteristics associated with categories of violence perpetration and violent victimization guide the interpretation of previously equivocal findings. That adults with mental illnesses are at greater risk for perpetration *and* victimization rather than either individual outcome alone provides evidence for a victim-offender overlap in this population and suggests a new direction in policy and practice. Specifically, interventions and community initiatives targeting violence reduction often have separate strategies for victims and offenders (Daday et al., 2005). However, practitioners and programs may achieve more success by targeting individuals with the shared characteristics of victim-perpetrators, such as substance use disorder. Additionally, our finding that adults with a primary diagnosis of schizophrenia are less likely than those with other primary diagnoses to perpetrate violence contradicts the public and structural stigmas that have been found to lead clinicians to override patients' treatment wishes in cases of perceived violence risk (Swanson, Van McCrary, Swartz, Van Dorn, & Elbogen, 2007), as well as prevent adults with mental illnesses from seeking or fully participating in mental health services (Corrigan, 2004). Overall, our findings contribute to mounting evidence against such stigmas and can thus aid in improving public perceptions of adults with schizophrenia and, furthermore, increase service use in this population. Finally, from an epidemiological point of view, our findings of the characteristics associated with the different categories of violence perpetration and violent victimization can assist in the identification of higher risk populations to be targeted for early intervention.

Limitations and Future Directions

The present study has several limitations. First, we analyzed cross-sectional data. General population research suggests that the overlap between perpetration and victimization may change over time (Maldonado-Molina et al., 2010); however, we did not examine causal or longitudinal effects. Thus, future research should implement a prospective design to assess longitudinal trends, as well as causality among variables. Second, we focused on demographic factors and primary diagnosis, but there are many other factors that may prove useful in differentiating between groups. Future research should incorporate additional factors, such as socioeconomic status, social support, and access to treatment. Third, with our focus on primary diagnoses, we did not include any indication of co-occurring substance use disorders, which are known to heighten risk for both violence perpetration and violent victimization (e.g., Swanson et al., 2006b; Van Dorn et al., 2012). Further exploration of these factors, as well as co-occurring disorders, may add to our understanding the overlap between perpetration and victimization in adults with mental illnesses. Fourth, our data were derived from self-report and may be susceptible to the effects of social desirability, recall bias, and errors. The reconstruction of violent incidents in semi-structured interviews is inherently incomplete (Estroff, Swanson, Lachicotte, Swartz, & Bolduc, 1998), and though self-report is a valid and reliable measure for collecting data on violence perpetration and violent victimization (Huizinga & Elliot, 1986; Van Dorn et al., 2010), additional sources, such as hospital and arrest records, may capture non-self-reported violent events. Fifth, data on interrater reliability is not available, though descriptions of interviewer training are provided elsewhere (Monahan et al., 2001; Stroup et al., 2003).

General Conclusion

This paper marks a first step in understanding the overlap between community violence perpetration and violent victimization in adults with mental illnesses. Findings show that the four categories of perpetration and victimization identified in the general population – non-victim/non-perpetrators; perpetrators only; victims only; and victim-perpetrators – are also seen in adults with mental illnesses at similar rates. Findings additionally indicate that adults with mental illnesses are more likely *not* to report violent outcomes but, when they do, are more likely to report both perpetration and victimization rather than perpetration alone. The distinct characteristics associated with the different groups emphasize that adults with mental illnesses are a heterogeneous population, and that young, non-white adults with primary diagnoses *other* than schizophrenia are particularly vulnerable to violent outcomes.

Table 1. Sample Characteristics Overall and by Violence Perpetration and Violent Victimization Categories

Sample Characteristics	**Total**		**Perpetration and Victimization Categories**								**Comparisons**
			NVNP		PO		VO		VP		
	N	%	*N*	%	*N*	%	*N*	%	*N*	%	χ^2
Overall	4,474	100.0	2,812	62.9	280	6.3	593	13.3	789	17.6	3,536.65***
Categorical Variables											
Sex											13.19**
Female	1,797	40.2	1,104	61.4	141	7.9	234	13.0	318	17.7	
Male	2,677	59.8	1,708	63.8	139	5.2	359	13.4	471	17.6	
Race/Ethnicity											19.83*
White	2,297	51.4	1,430	62.3	129	5.6	310	13.5	428	18.6	6.36
Black	1,683	37.7	1,059	62.9	114	6.8	210	12.5	300	17.8	2.38
Hispanic	317	7.1	216	68.1	25	7.9	40	12.6	36	11.4	10.67*
Other/Mixed	172	3.9	104	60.5	12	7.0	32	18.6	24	14.0	5.56
Primary Diagnosis											448.48***
Schizophrenia	2,833	63.4	2,051	72.4	132	4.7	325	11.5	325	11.5	327.83***
Bipolar	428	9.6	236	55.1	31	7.2	75	17.5	86	20.1	13.48**
Major Depressive	824	18.4	399	48.4	88	10.7	120	14.6	217	26.3	110.06***
Substance Use	272	6.1	73	26.8	15	5.5	52	19.1	132	48.5	224.34***
Other	110	2.5	50	45.5	13	11.8	19	17.3	28	25.5	16.35**
Study Site											594.50***
F-PAD	469	10.5	309	65.9	47	10.0	42	9.0	71	15.1	21.78***
MacRisk	1,136	25.4	403	35.5	90	7.9	240	21.1	403	35.5	534.29***
SCAP	400	8.9	319	79.8	13	3.3	37	9.3	31	7.8	55.96***
MacMandate	1,010	22.6	671	66.4	61	6.0	144	14.3	134	13.3	17.87***
CATIE	1,459	32.6	1,110	76.1	69	4.7	130	8.9	150	10.3	165.58***
Continuous Variable			*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*F*
Age	4,467		41.28	11.22	35.73	10.54	36.80	10.63	33.44	9.71	127.113***

Notes. NVNP = non-victim, non-perpetrator; VP = victim-perpetrator; VO = victim-only; PO = perpetrator-only. % = valid percent. Inconsistencies across cells reflect missing data. *p < .05. **p < .01. ***p < .001.

Table 2. Prevalence of Both Perpetration and Victimization when Any Violent Outcome was Reported

	% Reporting Any Perpetration or Victimization	**% Reporting Both Perpetration and Victimization**	**Comparisons**
			t
Overall	37.1	47.5	
Sex			
Female	38.6	45.9	-
Male	36.2	48.6	1.77
Race/Ethnicity			
White (reference)	37.7	49.4	-
Black	37.1	48.1	0.81
Hispanic	31.9	35.6	4.61***
Other/Mixed	39.5	52.9	0.89
Primary Diagnosis			
Schizophrenia (reference)	27.6	41.6	-
Bipolar	44.9	44.8	1.25
Major Depressive	51.6	51.1	4.84***
Substance Use	73.2	66.3	7.94***
Other	54.5	46.7	1.04

Notes. % = valid percent. $*p < .05$. $**p < .01$. $***p < .001$.

Table 3. Multinomial Logistic Regression Analysis of Group Membership as a Function of Participant Characteristics

	POs vs. NVNPs			VOs vs. NVNPs			VPs vs. NVNPs		
Variable	Estimate	SE	Odds (95% CI)	Estimate	SE	Odds (95% CI)	Estimate	SE	Odds (95% CI)
Intercept	-1.383***	0.929	-	-1.643***	0.680	-	-0.402	0.205	-
Age	-0.037***	0.007	0.964 (0.951-0.977)	-0.016**	0.005	0.984 (0.974-0.993)	-0.045***	0.005	0.956 (0.947-0.965)
Sex									
Female	-	-	-	-	-	-	-	-	-
Male	-0.308*	0.135	0.735 (0.564-0.957)	0.043	0.099	1.044 (0.860-1.267)	0.027	0.092	1.027 (0.857-1.230)
Race/Ethnicity									
White (reference)	-	-	-	-	-	-	-	-	-
Black	0.442**	0.147	1.556 (1.167-2.074)	0.200	0.107	1.222 (0.991-1.507)	0.359***	0.098	1.432 (1.182-1.736)
Hispanic	0.533*	0.245	1.704 (1.054-2.754)	0.215	0.193	1.240 (0.850-1.809)	-0.101	0.201	0.904 (0.609-1.341)
Other race/ethnicity	0.656*	0.331	1.927 (1.007-3.686)	0.750**	0.221	2.118 (1.373-3.267)	0.437	0.244	1.548 (0.959-2.498)
Primary Diagnosis									
Schizophrenia (reference)	-	-	-	-	-	-	-	-	-
Bipolar disorder	0.456	0.252	1.577 (0.963-2.584)	0.198	0.168	1.219 (0.877-1.695)	0.405*	0.166	1.499 (1.083-2.075)
Depression	0.942***	0.206	2.566 (1.715-3.840)	-0.191	0.148	0.826 (0.618-1.105)	0.517***	0.139	1.677 (1.278-2.200)
Substance use disorder	0.587	0.348	1.799 (0.909-3.560)	0.166	0.220	1.181 (0.767-1.819)	1.154***	0.193	3.171 (2.174-4.625)
Other diagnosis	1.432***	0.365	4.186 (2.045-8.568)	0.415	0.294	1.515 (0.852-2.693)	0.995***	0.274	2.705 (1.580-4.631)

Notes. NVNP = non-victim, non-perpetrator; PO = perpetrator-only; VO = victim-only; VP = victim-perpetrator. NVNP served as reference group in the analyses. Study site was included as a covariate. *$p < .05$; **$p < .01$; ***$p < .001$

CHAPTER 3

A Longitudinal Analysis of the Overlap between Violence and Victimization among Adults with Mental Illnesses

Prior research suggests considerable overlap of violence perpetration and victimization among adults with mental illnesses. However, there has been no examination of how the likelihood of being a victim and/or perpetrator of violence may change over time, nor consideration of clinically-relevant factors affecting these transitions. In a pooled sample of adults with mental illnesses (N = 4,484) we employed latent transition analysis to: (a) determine prevalence of four perpetration and victimization classifications (i.e., non-victim/non-perpetrator, victim only, perpetrator only, and victim-perpetrator) over a 6-month period; (b) calculate the likelihood that adults with mental illnesses will remain in or transition between these classifications over time; and (c) assess the effects of recent substance use, psychiatric symptoms, and suicidal behaviors on transitions over time. At each time point, the majority of participants identified as non-victim/non-perpetrators, followed by victim-perpetrators, victims only, and perpetrators only. Analyses also revealed many individuals transitioned between classifications over time. These distinct pathways towards, and away from, violent outcomes were, in part, a function of recent violence and/or victimization, as well as substance use, psychiatric symptoms, and suicidal behaviors. Findings inform the identification of adults with mental illnesses at risk of perpetration and victimization and highlight points of intervention.

Psychiatry Research, in revision.

Introduction

Compared to the general population, adults with mental illnesses are at heightened risk of violent outcomes, including violence perpetration (Corrigan & Watson, 2005; Swanson et al., 1990; Van Dorn et al., 2012) and violent victimization (Goodman et al., 1999; Teplin et al., 2005). Review of the empirical literature in this population shows that there are many common risk factors for perpetration and victimization, such as substance use and psychiatric symptoms (e.g., Goodman et al., 2001; Silver et al., 2011; Van Dorn et al., 2012), and evidence points towards the co-occurrence of violent outcomes (e.g., Johnson, Desmarais, Van Dorn, & Grimm, 2015; Swanson et al., 2002; Van Dorn et al., under review); however, there have been few investigations of the overlap between perpetration and victimization in adults with mental illnesses (Jennings et al., 2012). Consequently, whether some individuals are at greater risk of both perpetration and victimization compared to only one outcome – or neither – at any given time is unknown. Moreover, no research has assessed if any characteristics distinguish adults with mental illnesses at higher risk of experiencing both violent outcomes, nor if the likelihood of being a perpetrator and/or victim of violence changes over time.

The few studies investigating perpetration and victimization in the same timeframe among adults with mental illnesses have consistently observed an overlap of violent outcomes (Brekke et al., 2001; Havassy & Mericle, 2013; Hiday et al., 2001; Roaldset & Bjørkly, 2015; Silver et al., 2011). For example, secondary data on 4,474 adults with mental illnesses were examined to identify the baseline prevalence and characteristics of a typology of perpetration and victimization defined by four groups: non-victim/non-perpetrator, victim only, perpetrator only, and victim-perpetrator (Johnson et al., 2015). Results showed that the majority of the sample reported neither violence nor victimization in a 6-month time period. The remaining participants were more likely to report both perpetration and victimization than either outcome alone. Similar analyses conducted on a sample of 345 discharged psychiatric patients over 12 months also identified a robust overlap between outcomes: of those reporting any violence, over one-third reported both perpetration and victimization (Roaldset & Bjørkly, 2015).

Taken together, findings of extant research support an association between perpetration and victimization in adults with mental illnesses. However, these studies typically have been cross-sectional in nature, thus defining their intersection as static; participants are classified as victim and/or perpetrator at only one point in time. In fact, these roles likely are dynamic in nature and may change in response to variations in clinical functioning. Research conducted with other populations, primarily adolescents and young adults, supports the dynamic nature of victim and/or perpetrator roles (e.g., Jennings, Higgins, Tewksbury, Gover, & Piquero, 2010; Maldonado-Molina et al., 2010; Williams, Van Dorn, Hawkins, Abbott, & Catalano, 2001). Indeed, across these studies there are reports of varied involvement in violent outcomes over time, sometimes reporting both violence perpetration and victimization, and other times reporting one or neither outcome. However, these studies have employed group-based analytic strategies, such as latent curve analysis, and identify characteristics associated with overarching trajectories of perpetration and victimization (e.g., early onset, late onset) rather than transitions between states (Jennings et al., 2010). Moreover, characteristics related to adolescent and young adult development, such as parental monitoring and school commitment, do not necessarily generalize to adults.

If adults with mental illnesses do transition across classifications of victim and/or perpetrator, identifying characteristics associated with these transitions will be key to the development of risk management strategies and treatment plans. Proximal factors – that is, those that are currently present or occurred in the recent past – may be of particular relevance, as transitions between classifications of violence likely reflect changes in clinical functioning. Specifically, alcohol and drug use are known correlates of violence (Swanson et al., 2006b; Van Dorn et al., 2012; Witt et al., 2013) and victimization (Goodman et al., 2001; Hiday, Swartz, Swanson, Borum, & Wagner, 1999) among adults with mental illnesses, and recent findings support their association with both outcomes in the same sample (Johnson et al., 2015; Roaldset & Bjørkly, 2015). Similarly, although the empirical evidence regarding strength and direction of associations is somewhat mixed, psychiatric symptoms are widely regarded as relevant to risk of perpetration and victimization in this population (Bjørkly, 2002; Douglas, Guy, & Hart, 2009; Fazel, Gulati, Linsell, Geddes, & Grann, 2009; Roaldset & Bjørkly, 2015; Van Dorn et al., under review). Finally, suicidal behaviors, including ideation and attempts, have been linked to increased risk of violence (Hillbrand, 2001; Witt et al., 2013; Witt, Hawton, & Fazel, 2014) and victimization (Brown, DuMont, MacDonald, & Bainbridge, 2013) in adults with mental illnesses; recent findings additionally have demonstrated associations with perpetration *and* victimization stronger than that observed with either outcome alone (Roaldset & Bjørkly, 2015).

The Present Study

The goals of the present study were threefold. First, we sought to examine the overlap between perpetration and victimization over time in a large, heterogeneous sample of adults with mental illnesses (*N* = 4,484). Second, we sought to determine whether adults with mental illnesses transitioned between classifications of victim and/or perpetrator of violence over time. Third, we sought to identify whether proximal, clinically-relevant indicators are associated with transitions between or persistence in these classifications over time. To that end, we employed latent transition analysis (LTA) to: (1) determine the prevalence of perpetration and victimization as defined by four classifications – namely, non-victim/non-perpetrator, victim only, perpetrator only, and victim-perpetrator – over the 6-month study period; (b) calculate the likelihood that adults with mental illnesses will remain in or transition between these classifications over 3-month and 6-month periods; and (c) assess the effects of recent substance use, psychiatric symptoms, and suicidal behaviors on transitions over 3-month and 6-month periods.

Methods

Data

Longitudinal data were pooled from five studies of adults with mental illnesses: (1) Facilitated Psychiatric Advance Directive Study (*n* = 473; Swanson et al., 2006a); (2) MacArthur Mental Disorder and Violence Risk Study (*n* = 1,136; Steadman et al., 1998); (3)

Schizophrenia Care and Assessment Program (*n* = 404; Swanson et al., 2004); (4) MacArthur Mandated Community Treatment Study (*n* = 1,011; Monahan et al., 2005); and (5) Clinical Antipsychotic Trials of Intervention Effectiveness Study (*n* = 1,460; Lieberman et al., 2005). These studies enrolled a range of participants, from exacerbated inpatients to partially remitted outpatients. A total of 4,484 adults with mental illnesses are included in the present analyses. Sampling and inclusion criteria for each data source are described briefly below.

Facilitated Psychiatric Advance Directive Study (F-PAD). A random sample of clients prescreened for eligibility was obtained from two North Carolina mental health systems. Inclusion criteria were: (a) 18-65 years of age; (b) schizophrenia-spectrum or major mood disorder; and (c) in treatment at the time of the study. Data collection began in 2003; assessments used in the present study were conducted at baseline and 6-month follow-up.

MacArthur Mental Disorder and Violence Risk Study (MacRisk). Eligible participants were sampled from three acute inpatient facilities, with recruitment adjusted to maintain a consistent distribution of age, sex, and ethnicity across sites. Inclusion criteria were: (a) English-speaking White, Black, or Hispanic patients; (b) 18-40 years of age; and (c) schizophrenia-spectrum, depression, mania, brief reactive psychosis, or delusional disorder. Data were collected through participant and collateral interviews and hospital abstractions beginning in 1992; the present study used assessments conducted at baseline, 3-month, and 6-month follow-ups.

Schizophrenia Care and Assessment Program (SCAP). Participants were recruited from treatment facilities across North Carolina using both sequential inpatient admissions and a random selection of outpatients, with eligibility limited to: (a) 18 years of age or older; (b) schizophrenia; and (c) current service use. Data collection began in 1997; we include assessments from baseline and 6-month follow-up in the present analyses.

MacArthur Mandated Community Treatment Study (MacMandate). Participants were recruited through both sequential and random selection across sites, with eligibility limited to: (a) 18-65 years of age; (b) English- or Spanish-speaking; (c) current outpatient treatment; and (d) first service occurred at least six months prior. Data were collected between 2002 and 2003 through baseline interviews.[1]

Clinical Antipsychotic Trials of Intervention Effectiveness (CATIE). Participants were recruited from 57 sites across the United States. Inclusion criteria were: (a) 18-65 years of age; (b) schizophrenia; and (c) ability to take oral antipsychotics. Data collection began in 2001. The present study includes assessments from baseline and 6-month follow-up, as well as any end-of-phase assessments conducted prior to 6-month follow-up.

The current study protocol was approved by IRBs from North Carolina State University, RTI International, and Arizona State University. All participants gave written informed consent.

[1] The MacMandate Study is cross-sectional in design. Participant data were used in the calculation of factor scores for psychiatric symptoms but were excluded from latent transition analyses.

Measures

Outcome variables. Prevalence and severity of community perpetration and victimization was assessed in all studies using the MacArthur Community Violence Screening Instrument (MCVSI; Steadman et al., 1998). The MCVSI is comprised of eight questions each for perpetration and victimization, derived from the Revised Conflict Tactics Scale (CTS2; Straus et al., 1996). The questions assess: (a) pushing, grabbing, or shoving; (b) kicking, biting, or choking; (c) slapping; (d) throwing an object; (e) hitting with a fist or object; (f) sexual assault; (g) threatening with a weapon in hand; and (h) using a weapon. For each item, participants are first asked if someone did this to them, then if they did this to someone else. For the present analyses, we dichotomized responses of "violence" and "other aggressive acts" to obtain prevalence of violent outcomes by 3- and 6-month follow-ups.[2]

Covariates. *Alcohol* and *drug use* were assessed at baseline with multiple measures across studies, including the CAGE questionnaire (Mayfield, McLeod, & Hall, 1974), urine drug screens, self-report, the Alcohol and Drug Use Scales (Drake et al., 1990), and the Structured Clinical Interview for DSM-IV (SCID; First, Gibbon, Spitzer, & Williams, 1996). We harmonized data across studies with 3-level summary variables (0 = abstinence, 1 = non-problematic use, 2 = problematic use).

Psychiatric symptoms were assessed at baseline with the Positive and Negative Syndrome Scale (Kay, Flszbein, & Opfer, 1987) in the CATIE and SCAP, and the BPRS in the F-PAD and MacRisk. The MacRisk additionally used the MacArthur-Maudsley

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[2] Due to varied assessment schedules across parent studies, only CATIE and MacRisk participant data were available for inclusion in 3-month analyses.

Delusions Assessment Schedule (Appelbaum, Robbins, & Roth, 1999). Briefly, a factor analytic cross-validation approach was employed with exploratory factor analyses conducted on a random subsample of data where four factors were retained: *affective, positive, negative,* and *disorganized cognitive processing (DCP)*. This model was then evaluated and supported using a confirmatory factor model with the remainder of the data. Factor scores for each latent variable were then created from unidimensional factor models using expected a posteriori (EAP) estimates. EAP estimates are calculated as the mean of the posterior predicted distribution of scores for an individual based on his/her response pattern and the estimated model parameters. The factor scores account for incomplete data and are based on the items to which the individual responded (Van Dorn et al., under review).

Indicators of *suicidal ideation* and *suicide attempt* were harmonized across studies. For each outcome, we created a dichotomous variable (yes/no) of any ideation or attempt in the six months prior to baseline.

Data Analysis

Descriptive statistics were calculated for all covariates at baseline using SPSS v.22. Subsequent analyses were conducted with Mplus 7.31 (Muthén & Muthén, 1998-2014). Model specification for the LTA was informed by prior work identifying a typology of perpetration and victimization among adults with mental illnesses (Johnson et al., 2015); accordingly, two parameter restrictions were imposed. First, groups were specified using fixed thresholds, such that group membership was directly derived from reported perpetration and victimization (e.g., an individual reporting victimization, but not violence, was identified as a victim only at the corresponding time point). Second, these thresholds were held to be equal over time, signifying measurement invariance.

We conducted an initial model in LTA to obtain prevalence of the four groups at baseline, 3-month follow-up, and 6-month follow-up and calculate probabilities of transitioning between these groups from baseline to 3-month follow-up and from baseline to 6-month follow-up. We then ran a series of LTA models to calculate multinomial logistic regression coefficients linking baseline covariates to transitions between groups over the 3-month and 6-month periods. Specifically, we assessed the predictive effects of baseline measures of recent substance use, psychiatric symptoms, and suicidal behaviors on transition probabilities. Separate models were conducted with each violent event classification used as reference class. Mplus uses full information maximum likelihood assuming data are missing at random (MAR).

Results

Frequencies and means for covariates are reported in Table 1. At baseline, the majority of the sample indicated abstinence from alcohol and drugs. Problematic use of alcohol was reported by approximately one-fourth of participants; problematic use of drugs, by about one-fifth. Roughly one-third of the sample reported suicidal ideation, and over one-tenth reported an actual attempt.

Results of the first LTA model (without covariates) are presented in Table 2. Specifically, the top section shows the prevalence of classifications at baseline, 3-month follow-up, and 6-month follow-up. The majority of participants identified as non-victim/non-perpetrator at all three time points, followed by victim-perpetrator, victim only, and perpetrator only.

The bottom section of Table 2 shows transition probabilities between baseline and 3-month follow-up and baseline and 6-month follow-up. The bolded, diagonal values represent stability in a group from one time point to the next. For example, 89.9% of those who were classified as non-victim/non-perpetrator at baseline maintained that classification through three months. Off-diagonal values indicate movement across groups. For example, 4.5% of those classified as non-victim/non-perpetrator at baseline were re-classified as victim only by three months. Estimates for both transition periods (i.e., from baseline to 3-month follow-up and from baseline to 6-month follow-up) indicated that non-victim/non-perpetrators at baseline were likely to persist in that role over time. In contrast, victims and/or perpetrators were more likely to move across groups than to remain stable; these participants were most likely to report no violent outcome at follow-up assessments or, less frequently, both perpetration and victimization.

Table 3 presents odds ratios for the effects of covariates on transitions between baseline and 3-month follow-up. When non-victim/non-perpetrator at baseline served as reference in regression analyses, all covariates (with the exception of affective and positive symptoms) demonstrated significant predictive effects over time. As shown in the leftmost columns, alcohol use increased the risk of victimization or perpetration *and* victimization by 3-month follow-up; drug use increased the risk of victimization only. Increased negative symptoms were associated with a decreased likelihood of experiencing both perpetration and victimization, whereas increased DCP symptoms were associated with a decreased likelihood of perpetration only. Reports of suicidal behaviors at baseline were associated with increased risk of victimization only, as well as perpetration and victimization, by 3-month follow-up.

The innermost columns of Table 3 show effects when victims only and perpetrators only served as baseline reference groups. For both classifications, only one covariate was identified as a significant predictor of transitions up to 3-month follow-up. Suicidal ideation was associated with transitions from victim only to victim-perpetrator classification. Drug use was associated with transitions from perpetrator only to victim only.

When the baseline reference group included victim-perpetrators, alcohol use, positive, and DCP symptoms were associated with transitions from baseline to 3-month follow-up. Alcohol use significantly decreased the likelihood of violence in the absence of victimization. Increased positive symptoms were associated with reports of only victimization by 3-month follow-up, and increased DCP symptoms were associated with reporting no perpetration nor victimization.

Table 4 presents odds ratios for the effects of covariates on transitions between baseline and 6-month follow-up. When participants identified as non-victim/non-perpetrator at baseline, increased DCP symptoms lessened the odds of reporting both perpetration and victimization at 6-month follow-up. As was the case with 3-month analyses, suicidal ideation and suicide attempt increased the risk of victimization as well as perpetration and victimization from baseline to 6-month follow-up. Notably, baseline alcohol and drug use did not demonstrate significant predictive effects in increasing the risk of someone moving from the non-violent/non-perpetrator classification to one of the violence classifications by 6-month follow-up.

For victims only, suicidal ideation and suicide attempt lowered the odds of transitioning to the non-victim/non-perpetrator classification by six months. Increased positive symptoms lessened the likelihood that participants would perpetrate violence. For perpetrators only, alcohol and drug use decreased the likelihood of transitioning to victim only or non-victim/non-perpetrator classifications, respectively; increased negative symptoms, in contrast, were associated with transitions to both classifications.

When victim-perpetrators at baseline served as reference group, all covariates demonstrated varying degrees of significant predictive effects. Specifically, alcohol use decreased the likelihood that participants would transition to another classification over the 6-month period. Similarly, drug use decreased the likelihood of transitioning to non-victim/non-perpetrator or victim only classifications. There was an inverse relationship between affective symptoms and transitioning to non-victim/non-perpetrator or victim only by 6-month follow-up when someone started as a victim-perpetrator; conversely, increased negative symptoms were associated with transitioning from victim-perpetrator at baseline to non-victim/non-perpetrator and victim-only by six months. Heightened positive and DCP symptoms both increased the likelihood of moving from the victim-perpetrator classification at baseline to the non-victim/non-perpetrator classification by six months. Suicidal behaviors significantly decreased the likelihood that participants would move to any other classification by 6-month follow-up.

Discussion

Adults with mental illnesses are at increased risk of violence perpetration (Corrigan & Watson, 2005; Swanson et al., 1990; Van Dorn et al., 2012) and victimization (Goodman et al., 1999; Teplin et al., 2005). However, prior research on the overlap of these two outcomes is limited, particularly in whether some individuals evince risk of experiencing both violent outcomes, compared to either or no violent outcome. Moreover, there has been no examination of how the likelihood of being a victim and/or perpetrator of violence may change over time, nor consideration of effects of proximal, clinically-relevant factors on these transitions. Using a pooled dataset of 4,484 adults with mental illnesses, the present study sought to fill these gaps in the literature. Specifically, we assessed prevalence of a typology of perpetration and victimization during a 6-month time frame; estimated the likelihood of transitioning between victim and/or perpetrator over time; and examined effects of substance use, psychiatric symptoms, and suicidal behaviors on transitions between or persistence in these classifications over 3- and 6-month follow-ups.

Summary of Findings

The majority of participants identified as non-victim/non-perpetrators at baseline, followed by those victim-perpetrators, victims only, and perpetrators only. Though this ordering remained unchanged at 3- and 6-month follow-up, transition probabilities yielded by LTA demonstrated that many individuals did transition between classifications of victim and/or perpetrator. Notably, perpetrators or victims at baseline were more likely to transition to some other classification than were non-victim/non-perpetrators. Observed transitions between classifications – and differences in factors related to those transitions, as will be discussed below – highlight potential intervention points for this population. Prior research has demonstrated heterogeneity in violence risk for this population (Johnson et al., 2015; Roaldset & Bjørkly, 2015); we additionally show that risk changes over time, and in estimable ways. Moreover, substance use, psychiatric symptoms, and suicidal behaviors were associated with these transitions.

For non-victims/non-perpetrators at baseline, results showed that alcohol and drug use and suicidal behaviors increased the risk of experiencing one or both violent outcomes by 3-month follow-up, whereas increased negative and DCP symptoms lessened the risk of violent outcomes. For other classifications at baseline, fewer significant predictors emerged. Namely, for victim-perpetrators, alcohol use decreased the likelihood of transitioning to perpetrators only, and increased positive and DCP symptoms were associated with transitions to victims only and non-victim/non-perpetrators, respectively.

For non-victim/non-perpetrators at baseline, increased DCP symptoms lowered, and suicidal behaviors heightened, risk of violent outcomes by 6-month follow-up; substance use variables were not predictive of any transitions. In contrast, all covariates demonstrated predictive effects at 6-month follow-up for victim-perpetrators at baseline: alcohol and drug use, increased affective symptoms, and suicidal behaviors were associated with a decreased likelihood of transitioning away from the victim-perpetrator classification; increased positive, negative, and DCP symptoms heightened the likelihood that participants would transition to a less violent classification.

Prior research has examined correlates of perpetration and victimization, albeit often as separate outcomes. Our findings are novel in regard to sample and methodology, and add clarity to some previously equivocal findings. Specifically, alcohol and drug use have been identified as correlates of violence (Swanson et al., 2006b; Van Dorn et al., 2012; Witt et al., 2013) and victimization (Goodman et al., 2001; Hiday et al., 1999); our analyses confirm recent findings of their effects on both outcomes in the same sample (Roaldset & Bjørkly, 2015). Prior research has also considered the role of psychiatric symptoms in predicting violence (Johnson et al., 2016), and perpetration and victimization (Roaldset & Bjørkly, 2015; Silver et al., 2011), though the operational definitions of perpetration and victimization differed in the latter studies; our study investigates the predictive validity of a confirmed 4-factor model of psychiatric symptoms on both outcomes over six months. Finally, prior research has observed associations of suicidal behaviors with violence (Hillbrand, 2001; Witt et al., 2013; Witt et al., 2014) and victimization (Brown et al., 2013). The present study is among the first to assess predictive validity of suicidal ideation and attempt on both outcomes in the same sample (see Roaldset & Bjørkly, 2015).

Overall, our findings underscore the heterogeneity in violence risk among adults with mental illnesses over time, and suggest that substance use, psychiatric symptoms, and suicidal behaviors are involved in transitions across violence classifications. Specifically, results indicate that these factors are associated with varying pathways towards, and away from, perpetration and victimization. In the three months following baseline, nearly all variables predicted transitions among those initially identified as non-victim/non-perpetrators, whereas for victims and/or perpetrators, fewer significant predictors emerged. In contrast, all variables demonstrated significant effects on transitions in the six months following baseline for those classified as victim-perpetrators at baseline; fewer influenced the movement of participants who reported neither or only one outcome. These differences suggest there are distinct pathways to violent outcomes, each subject in varying ways to the effects of dynamic clinical characteristics.

Implications

Our findings build upon evidence contradicting public and structural stigmas that view adults with mental illnesses as dangerous (Corrigan & Watson, 2002; Desmarais et al., 2014), and offer an alternative perspective in which members of this population vary widely in their risk for perpetration and victimization. Notably, the majority of our sample did not report violence or victimization; those who did were more likely to transition over the 6-month study period, and thus illustrate that one's classification as a victim and/or perpetrator is not fixed. This enhanced perspective on the "dangerousness" of adults with mental illnesses – or rather, the diversity of their risk – may translate to improved public perceptions and an increase in service use in this population (Corrigan, 2004). Furthermore, modifiable, clinically-relevant factors are associated with transitions to more or less violent states; clinicians can use these associations as points of leverage in treatment.

Results of the present study also show that the timeframe to optimally minimize risk through preventive treatment differs depending on recent experiences of perpetration and victimization. Specifically, associations observed across 3- and 6-month follow-ups support the growing body of research on proximal factors (Johnson et al., 2016). Moreover, our findings suggest that the effects of these factors may be acute and/or persistent in nature depending on recent violent events. For example, for non-victim/non-perpetrators, alcohol use demonstrated acute, time-limited associations with perpetration and victimization whereas drug use exhibited persistent effects. However, these findings also may reflect differences in attrition across substance use variables, such that those who reported alcohol use at baseline were less likely to be present at 6-month follow-up than those who reported drug use. Research on these and other clinically-relevant characteristics, such as adherence to psychopharmacological and routine outpatient interventions, is needed to further understand what heightens risk of violent outcomes, as well as when and for whom.

In showing that recent violence and/or victimization create distinct pathways to future violent outcomes, findings offer important insights for clinical practice. Most notably, non-victim/non-perpetrators and victim-perpetrators exhibited particular susceptibility to violent outcomes as a function of clinical characteristics over 3-month and 6-month follow-ups, respectively. Consideration of these pathways, as well as the differing effects of substance use, psychiatric symptoms, and suicidal behaviors, may assist clinicians in identifying those at risk of future violence and/or victimization, and inform the promotion of transitioning from violence classifications to more stable and lasting non-victim/non-perpetrator classifications. Indeed, there is mounting evidence of the importance of proximal, clinically-relevant factors in routine and ongoing risk assessment and management approaches (Johnson et al., 2016; McNiel et al., 2003; Sadeh, Binder, & McNiel, 2014). To our knowledge, the Short-Term Assessment of Risk and Treatability (START) is the only assessment tool to focus on proximal factors to inform an integrated assessment risk for perpetration *and* victimization (Webster et al., 2006).

Limitations

Findings of the present study should be considered in light of its limitations. First, perpetration and victimization data were derived from self-report and are thus susceptible to effects of social desirability, recall bias, and other errors. Though self-report has been found to be a reliable and valid method in perpetration and victimization research (Huizinga & Elliott, 1986; Van Dorn et al., 2010), other sources (e.g., hospital and arrest records) may capture additional violent events. Second, attrition and variation in assessment times across studies resulted in missing outcome data at 3-month and 6-month follow-ups. LTA does account for missingness through the use of full-information maximum likelihood; however, it is possible that the participants who dropped out prior to 3- and 6-month follow-up assessments are of particular interest to our study aims. Third, we assess the incidence – not the context – of violent outcomes. As a result, we are unable to determine, in the case of victim-perpetrators, if violence preceded victimization, victimization preceded violence, or perpetration and victimization occurred simultaneously. Across studies, however, violence in self-defense was not counted as perpetration. Fourth, the present analyses did not assess potential interactions among factors and instead focused on their main effects at both follow-up assessments. Further research is needed to understand how they may interact with one another to increase or decrease risk.

Conclusions

This paper examines the classification of victims and/or perpetrators over time among adults with mental illnesses, and assesses the effects of proximal, clinically-relevant variables on transitions between classifications over 3- and 6-month periods. Findings point to heterogeneity in risk of violent outcomes. Notably, many individuals transitioned between classifications of victim and/or perpetrator during 3-month and 6-month follow-ups, suggesting that violence risk is dynamic in nature. Indeed, distinct pathways to future violent outcomes emerged as a function of recent violence and/or victimization, as well as modifiable clinically-relevant factors, including psychiatric symptoms, substance use, and suicidal behaviors. Consideration of these pathways and associated factors may assist in the identification of adults with mental illnesses at acute or persistent risk of perpetration and victimization. Furthermore, our findings on the differing effects of substance use, psychiatric symptoms, and suicidal behaviors offer insight into how interventions may be tailored to minimize high or maintain low violence risk and, ultimately, improve outcomes for adults with mental illnesses.

Table 1. Frequencies and Means of Covariates

	Sample at Baseline	
	n	*%*
Alcohol Use		
Abstinence	2,474	55.3
Non-problematic use	858	19.2
Problematic use	1,141	25.5
Drug Use		
Abstinence	3,022	67.7
Non-problematic use	476	10.7
Problematic use	969	21.7
Suicidal Ideation		
No	2,913	65.2
Yes	1,552	34.8
Suicide Attempt		
No	3,928	88.0
Yes	536	12.0
	M (SD)	*Range*
Psychiatric Symptoms		
Affective	0.26 (0.89)	-1.50-3.20
Positive	0.09 (0.93)	-1.35-3.33
Negative	-0.07 (0.92)	-1.72-3.36
DCP	-0.02 (0.88)	-1.63-3.67

Notes. % = valid percent.

Table 2. Prevalence and Transition Probabilities of Observed Class over Time.

Prevalence	Observed Class							
	NVNP		VO		PO		VP	
	n	%	*n*	%	*n*	%	*n*	%
Baseline	2,849	63.7	598	13.4	240	5.4	788	17.6
3-Month Follow-Up	3,805	85.0	228	5.1	98	2.2	344	7.7
6-Month Follow-Up	3,691	82.5	214	4.8	130	2.9	440	9.8

Transition probabilities		3-Month Follow-Up			
		NVNP	VO	PO	VP
Baseline	NVNP	**.899**	.045	.017	.040
	VO	.577	**.211**	.055	.156
	PO	.591	.053	**.193**	.162
	VP	.457	.142	.082	**.319**
		6-Month Follow-Up			
		NVNP	VO	PO	VP
Baseline	NVNP	**.831**	.051	.034	.083
	VO	.533	**.170**	.053	.243
	PO	.547	.052	**.151**	.251
	VP	.422	.115	.069	**.393**

Notes. % = valid percent. NVNP = non-victim/non-perpetrator; VO = victim only; PO = perpetrator only; VP = victim-perpetrator. Bolded transition values represent the probability of staying in the same class

Table 3. Effects of Covariates on Class Transitions between Baseline and 3-month Follow-up

	NVNP at baseline			VO at baseline			PO at baseline			VP at baseline		
3-Month Group Transitioned To	VO	PO	VP	NVNP	PO	VP	NVNP	VO	VP	NVNP	VO	PO
Substance use												
Alcohol use	1.56**	1.31	2.58**	0.68	0.66	1.22	1.01	2.92	1.93	0.75	0.69	0.54*
Drug use	1.46*	1.25	1.35	0.91	1.28	1.37	1.06	4.65*	1.80	0.88	0.93	0.89
Psych. symptoms												
Affective	1.49	1.94	1.22	1.03	0.96	1.27	0.57	0.66	0.61	0.75	1.06	0.96
Positive	0.73	0.59	0.77	0.98	0.85	0.92	1.06	0.50	1.56	1.07	1.54*	1.15
Negative	0.67	0.70	0.63*	1.09	0.89	0.86	1.03	0.63	1.39	1.15	1.18	1.34
DCP	0.68	0.28**	0.70	1.06	0.69	1.01	1.47	0.63	1.44	1.56**	1.35	1.24
Suicidal behavior												
Ideation	2.22*	2.18	2.43**	0.94	2.40	2.91*	0.30	0.84	0.26	0.67	0.96	1.44
Attempt	4.43**	3.47	3.47**	0.45	2.07	1.15	0.46	1.38	0.41	0.66	0.59	0.78

Notes. NVNP = non-victim/non-perpetrator; VO = victim only; PO = perpetrator only; VP = victim-perpetrator.
Top row indicates reference group in multinomial regression; the row below indicates groups at 3-month follow-up.
**p* < .01 ***p* < .001.

Table 4. Effects of Covariates on Class Transitions between Baseline and 6-month Follow-up

	NVNP at baseline			VO at baseline			PO at baseline			VP at baseline		
	VO	PO	VP	NVNP	PO	VP	NVNP	VO	VP	NVNP	VO	PO
Substance use												
Alcohol use	1.08	0.95	1.40	0.58	1.41	1.19	0.54	0.18*	0.85	0.29**	0.48**	0.55*
Drug use	0.91	1.12	1.06	0.52	0.90	1.09	0.32*	0.21	0.50	0.30**	0.53*	0.61
Psych. symptoms												
Affective	1.47	0.99	1.39	0.88	2.33	1.22	0.47	0.56	1.22	0.30**	0.57*	0.69
Positive	0.74	0.72	0.71	0.60	0.18*	0.48	2.08	3.44	0.97	4.17*	1.17	1.39
Negative	0.72	0.68	0.72	1.32	0.50	0.82	3.55*	6.15*	1.49	5.84**	2.84*	2.36
DCP	0.74	0.83	0.59*	1.85	0.40	0.82	2.19	4.75	1.49	7.25**	1.61	2.11
Suicidal behavior												
Ideation	2.88*	1.49	4.85**	0.15**	0.99	1.17	0.40	0.90	2.68	0.05**	0.38*	0.27*
Attempt	3.18*	1.48	10.26**	0.12*	1.48	0.60	1.04	0.56	3.09	0.07**	0.30*	0.24*

Notes. NVNP = non-victim/non-perpetrator; VO = victim only; PO = perpetrator only; VP = victim-perpetrator.
Top row indicates reference group in multinomial regression; the row below indicates groups at 6-month follow-up.
**p* < .01 ***p* < .001.

CHAPTER 4

Proximal Risk Factors for Short-Term Community Violence among Adults with Mental Illnesses

This study examined the role of static, distal indicators and clinically-relevant proximal indicators in the prediction of short-term community violence in a large, heterogeneous sample of adults with mental illnesses. Longitudinal data were pooled from five prospective studies of adults with mental illnesses (*N* = 4,484). Follow-up data were available for 2,579 participants (57.5%). A hierarchical linear regression assessed the incremental validity of a series of variable clusters in the prediction of violence risk at six months: (1) distal characteristics, (2) substance use, (3) clinical functioning, (4) recent violence, and (5) recent victimization. Results demonstrated improved prediction with each step of the model, indicating that proximal indicators contribute to the prediction of short-term community violence above and beyond static, distal characteristics. When all variables were entered, current alcohol use, recent violence, and recent victimization were positive predictors of subsequent violence, even after controlling for participant characteristics. This study provides empirical evidence for three proximal, clinically-relevant indicators in the assessment and management of short-term violence risk among adults with mental illnesses: current alcohol use, recent violence, and recent victimization. Consideration of these indicators in clinical practice may assist in the identification of adults with mental illnesses at heightened risk of short-term community violence.

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Introduction

In light of recent tragedies, including the Newton, CT and Aurora, CO shootings, there is increased attention to the elevated risk for perpetrating violence presented by adults with mental illnesses compared to the general population (Corrigan & Watson, 2005; Steadman et al., 1998; Steadman, Monahan, Pinals, Vesselinov, & Robbins, 2015; Van Dorn et al., 2012), as well as the role of mental health professionals in preventing such violence (Metzl & MacLeish, 2015; Swanson, 2008). Though clinicians are tasked with the identification of risk factors associated with community violence, research efforts to date have focused primarily on static factors (e.g., age, sex, race/ethnicity) with relatively limited clinical utility (Douglas & Skeem, 2005). When clinically-relevant factors are considered, they often are distal in nature (e.g., childhood victimization experiences, history of substance use) and may be not representative of current functioning and, thus, current risk for violence. However, some evidence suggests that proximal factors – that is, factors that are currently present or occurred in the recent past – may play an important role in the assessment of violence risk, particularly vis-à-vis the prediction of short-term violence (McNiel et al., 2003; Webster et al., 2006). Four proximal indicators stand out as potentially relevant to the clinical prediction and prevention of short-term community violence among adults with mental illnesses: current substance use, current psychiatric symptoms, recent violence, and recent victimization.

Alcohol and drug use are widely recognized as robust correlates of violence perpetration among adults with mental illnesses (Swanson et al., 2006b; Van Dorn et al., 2012; Witt et al., 2013). However, research- and clinically-based violence risk assessments often rely upon diagnosis of a substance use disorder or self-reported history of substance use problems, rather than current levels of use (Douglas, Hart, Webster, & Belfrage, 2013; Quinsey, Harris, Rice, & Cormier, 2006). Additionally, alcohol and drug use are often considered together under the umbrella of ‘substance use’, though past research differs as to which evinces a stronger relationship with violence (Dowden & Brown, 2002; Haggård-Grann, Hallqvist, Långström, & Möller, 2006). Thus, information on prior substance use problems, though predictive of long-term violence, provides little in the way of information regarding current functioning, risk for violence in the short-term, and treatment needs.

Like substance use, the increased risk of violence associated with having a psychiatric diagnosis, compared to those with none, is well-established (Van Dorn et al., 2012). However, evidence regarding the role of psychiatric *symptoms* in relation to violence is mixed. Prior reviews have not reached a consensus regarding the strength or even direction of association between psychiatric symptoms and violence (Bjørkly, 2002; Douglas et al., 2009; Fazel et al., 2009). These equivocal findings may reflect, in part, heterogeneity in operational definitions: studies vary in their use of total scores, individual symptoms, and latent factors (Lyne, Kinsella, & O’Donoghue, 2012; Swanson et al., 2006b). Furthermore, the majority of research on the association between psychiatric symptoms and violence has focused on long-term violence (i.e., more than 12 months after assessment) (Bjørkly, 2002; Witt et al., 2013); few studies examine the associations between current psychiatric symptomatology and violence in the coming months. As a result, psychiatric symptoms are often supplanted in assessments of violence risk by distal measures of psychiatric diagnoses or insensitive proximal measures of exacerbated symptomatology (e.g., recent hospitalization).

In addition to perpetration, adults with mental illnesses also experience victimization at rates higher than found in the general population (Corrigan & Watson, 2005; Desmarais et al., 2014; Teplin et al., 2005). Both history of violence and history of victimization have been identified as robust correlates of long-term violence (Silver, 2002; Swanson et al., 2002; Witt et al., 2013), though the latter is attended to less frequently in violence risk assessment. When considered, the focus is typically on distal experiences (e.g., history of childhood abuse) (Sadeh et al., 2014). Though childhood and adult victimization are related in adults with mental illnesses (Meade, Kershaw, Hansen, & Sikkema, 2009), the experiences are qualitatively distinct and, thus, may evince different associations with short-term violence. Indeed, a recent study of 167 justice-involved adults with mental illnesses showed that recent perpetration and victimization predicted violence over a 12-month period, above and beyond static and distal factors, including childhood physical abuse (Sadeh et al., 2014). However, generalizability of findings from this study is limited by the small sample and the authors' decision to collapse 6- and 12-month assessments of violence. To our knowledge, no studies have examined recent victimization as a predictor of short-term violence among adults with mental illnesses more broadly.

The present study seeks to better understand the role of proximal indicators in the prediction of short-term violence through analysis of integrated data. Specifically, we examine current alcohol and drug use, current psychiatric symptomatology, recent hospitalization, recent violence, and recent victimization as predictors of community violence over a 6-month period in a large, heterogeneous sample of adults with mental illnesses.

Methods

Data

Data were pooled from five studies of adults with mental illnesses (*N* = 4,484). The Facilitated Psychiatric Advance Directive Study (F-PAD; *n* = 473; Swanson et al., 2006a) investigated a psychiatric advance directive intervention, conducting interviews between 2003 and 2007. The MacArthur Mental Disorder and Violence Risk Study (MacRisk; *n* = 1,136; Steadman et al., 1998) evaluated violence among civil psychiatric patients; data were collected through participant and collateral interviews and hospital abstractions from 1992 to 1995. The Schizophrenia Care and Assessment Program (SCAP; *n* = 404; Swanson et al., 2004) examined clinical, functional, and service outcomes for adults with schizophrenia from 1997 to 2002. The MacArthur Mandated Community Treatment Study (MacMandate; *n* = 1,011; Monahan et al., 2005) assessed treatment leverage among psychiatric outpatients between 2002 and 2003.[3] The Clinical Antipsychotic Trials of Intervention Effectiveness Study (CATIE; *n* = 1,460; Lieberman et al., 2005) examined the effectiveness of antipsychotic medications in adults with schizophrenia between 2001 and 2004.

The current study protocol was approved by IRBs from North Carolina State University, RTI International, and Arizona State University. All participants gave written

[3] The MacMandate Study is cross-sectional in design. Participant data were used in the calculation of factor scores for violence, victimization, and psychiatric symptoms, but were excluded from predictive analyses.

informed consent. Parent studies enrolled a range of participants, from exacerbated inpatients to partially remitted outpatients; together, the present sample approximates a usual care, non-interventional population in its characteristics. Analyses are conducted on data from 2,579 participants available at 6-month follow-up (74% of the longitudinal subsample).

Measures

Outcome variable. Prevalence and severity of *community violence* was assessed in all studies using the MacArthur Community Violence Screening Instrument (MCVSI; Steadman et al., 1998). The MCVSI is comprised of eight questions each for perpetration and victimization, derived from the Revised Conflict Tactics Scale (CTS2; Straus et al., 1996). Specifically, the questions assess: pushing, grabbing, or shoving; kicking, biting, or choking; slapping; throwing an object; hitting with a fist or object; sexual assault; threatening with a weapon in hand; and using a weapon. For each item, participants are first asked if someone did this to them, then if they did this to someone else. Factor analyses (not presented here but available upon request) showed that the perpetration and victimization items each mapped onto a unidimensional factor in the current sample. These findings are consistent with prior psychometric evaluations of the MCVSI (Desmarais et al., 2014; Michie & Cooke, 2006).

For the present analyses, perpetration and victimization factor scores were created from unidimensional factor models using Expected A Posteriori (EAP) estimates. EAP estimates are calculated as the mean of the posterior predicted distribution of scores for an individual based on his/her response pattern and the estimated model parameters. The factor scores account for incomplete data and reflect the items to which the participant responded affirmatively, such that a higher score indicates greater prevalence and/or severity of violence. In the MacRisk study, violence was additionally assessed three months after the baseline interview; to include these data, we averaged 3- and 6-month factor scores.

Distal predictors. Participant *age* was measured continuously (in years) at baseline. *Sex* was coded dichotomously (1 = male, 0 = female). *Race/ethnicity* was captured with four variables: white, black, Hispanic, and other race/ethnicity. *Primary diagnosis* was measured with five dummy variables: schizophrenia, bipolar disorder, major depressive disorder, substance use disorder, and other disorder (e.g., anxiety). Psychiatric diagnoses were obtained through a combination of clinician diagnoses and medical records abstraction.

Proximal predictors. Current *alcohol* and *drug use* were assessed at baseline with multiple measures across studies, including the CAGE questionnaire (Mayfield et al., 1974), urine drug screens, self-report, the Alcohol or Drug Use Scales (Drake et al., 1990), and the Structured Clinical Interview for DSM-IV (SCID; First et al., 1996). For both variables, we harmonized data across studies by creating a 3-level indicator (0 = abstinence, 1 = non-problematic use, 2 = problematic use).

Our indicators of clinical functioning included current psychiatric symptoms and recent hospitalization. Psychiatric symptoms were assessed at baseline with the Positive and Negative Syndrome Scale (Kay et al., 1987) in the CATIE and SCAP, and the Brief Psychiatric Rating Scale (Overall & Gorham, 1962) in the F-PAD and MacRisk. Briefly, a factor analytic cross-validation approach was employed with exploratory factor analyses conducted on a random subsample of data where four factors were retained: *affect, positive,* *negative*, and *disorganized cognitive processing (DCP)*. This model was then evaluated and supported using a confirmatory factor model with the remainder of the data. Factor scores for each latent trait were then created as described above (Van Dorn et al., under review). *Recent hospitalization* was measured in all studies and indicated if a participant was hospitalized in the three months prior to the baseline assessment.

Recent violence and *recent victimization* referred to the baseline factor scores, created as described above.

Data Analysis

All analyses were conducted with SAS 9.4. Descriptive statistics were calculated for all variables and characteristics were compared between participants who were and were not available at follow-up. For bivariate and multivariable analyses, we used all cases with data at baseline and 6-month follow-up (n = 2,579). Bivariate associations of predictor variables with violence at 6-month follow-up were examined using a series of one-way ANOVAs and Pearson correlations; *post hoc* comparisons were conducted using Bonferroni adjusted t-tests. A hierarchical linear regression assessed the incremental validity of several variable clusters in the prediction of violence risk. Variables were entered into the model in five steps: distal characteristics, substance use, clinical functioning, recent violence, and recent victimization. Listwise deletion was used in cases of missing data. We included parent study as a covariate in multivariable analyses to control for differences across studies.

Results

Participant Characteristics

Frequencies and means for all predictor variables are reported in Table 1. Characteristics of the participants who completed follow-up interviews differed from the full, baseline sample in several ways (see Table 1); in general, those present at follow-up exhibited poorer psychosocial functioning at baseline. These factors were included as predictors in subsequent analyses. Of the 2,579 participants available at 6-month follow-up, almost two-thirds were male. About half were white, one-third black, and the remainder identified as Hispanic or other race/ethnicity. Schizophrenia was the most prevalent primary diagnosis, followed by depression, bipolar disorder, substance use disorder, and other (e.g., anxiety) disorder. Just over half had been hospitalized within three months of baseline. At baseline, the majority of participants reported abstinence from both alcohol and drugs. Approximately one-quarter of participants reported perpetrating at least one violent act and one-third reported experiencing at least one incident of victimization in the six months preceding baseline. At follow-up, 21% of participants (n = 541) reported perpetrating at least one violent act in the past six months. Prevalence of each type of these acts is reported elsewhere (Desmarais et al., 2014).

Bivariate Analyses

The mean, standard deviation, and range of 6-month violence factor scores, overall and across participant characteristics, are presented in Table 2. Results of bivariate analyses showed that all predictor variables were associated with short-term violence, with the exception of race/ethnicity. Age was negatively correlated with violence. Male participants reported less violence at follow-up than female participants. Participants with a primary diagnosis of schizophrenia reported less violence than the rest of the sample. Participants with bipolar disorder were less violent than those with major depression and substance use disorder. Non-problematic and problematic use of both alcohol and drugs were positively associated with violence. Affect was positively associated with violence, whereas all other psychiatric symptoms exhibited negative associations with the outcome variable. Recent hospitalization and baseline perpetration and victimization were positively correlated with violence.

Multivariable Analyses

Diagnostic tests showed tolerance values were all .420 or higher and variation inflation factor values were all below 2.379, indicating no multicollinearity among predictor variables (Tabachnick & Fidell, 2001). Model fit statistics and incremental validity of predictors across steps are presented in Table 3. Overall, results show improved prediction with each step, indicating that proximal indicators contribute to the prediction of short-term community violence above and beyond the distal characteristics included in the regression model.

Table 4 shows the final step of the model. In the final step, young age, female sex, and primary diagnoses of major depression and substance use disorder (compared to schizophrenia) were positive predictors of violence. Alcohol use – but not drug use – was a positive predictor of violence. None of the psychiatric symptoms were significant predictors. Baseline perpetration and victimization each significantly predicted 6-month violence.

Discussion

Clinical assessments of violence risk inform delivery of mental health services, including treatment approaches, risk management strategies, and mandated treatment orders. The present study examined individual and combined effects of distal and proximal, clinically-relevant indicators of violence risk in a large, heterogeneous sample of adults with mental illnesses. Consistent with prior research, we found empirical support for the role of distal characteristics, including age, sex, and primary diagnosis, in predicting community violence; however, alcohol use, violence, and victimization predicted subsequent violence, even after controlling for distal characteristics. These findings add to the empirical evidence supporting the role of proximal factors in the assessment and management of short-term violence risk among adults with mental illnesses (Chu, Thomas, Ogloff, & Daffern, 2013; Haggård-Grann et al., 2006; Wilson, Desmarais, Nicholls, Hart, & Brink, 2013). Below, we discuss the observed effects of these proximal factors and how results may inform the administration of risk assessment instruments and formulation of interventions.

Though there is consensus on the increased risk for violence associated with substance use in adults with mental illnesses, extant findings are mixed regarding which indicator – alcohol use or drug use – is the more robust predictor (DeMatteo, Filone, & Davis, 2015; Grann & Fazel, 2004; Haggård-Grann et al., 2006). In the present study's multivariable models, alcohol use emerged as the better predictor of short-term community violence among adults with mental illnesses. (However, the bivariate relationship between drug use and subsequent violence was significant.) As such, integrated interventions targeting mental health and alcohol use should reduce community-based violence risk in this population. These distinctions between alcohol and drug use become important when clinical efforts are not just broadly focused on improving psychosocial functioning among psychiatric patients, but on reducing dangerousness to others (Metzl & MacLeish, 2015; Swanson, 2008).

Bivariate findings regarding the associations between clinical functioning and short-term violence risk underscore the importance of precise measurement and specification of psychiatric symptoms in research and practice. Though psychiatric symptoms failed to maintain significance in the multivariable model, their individual relationships with short-term violence remain relevant to clinical practice. Prior research on the associations between affect, positive, negative, and DCP symptomatologies and violence perpetration is at times inconsistent (Appelbaum et al., 1999; Swanson, Borum, Swartz, & Monahan, 1996). This may be due, in part, to examination of these symptoms as individual predictors, as well as differences in assessment and follow-up time frames (Bjørkly, 2002); indeed, most significant associations are found in cross-sectional structures, which do not ensure temporality (Van Dorn et al., under review). The present findings suggest that consideration of current psychiatric *symptoms*, instead of psychiatric diagnosis alone, should assist in the identification of those at heightened risk for short-term violence. Furthermore, evidence-based treatment targeting psychiatric symptoms, including cognitive, behavioral, and psychopharmacological interventions, should contribute to reductions in violence risk (Citrome et al., 2001; Glick, Lemmens, & Vester-Blokland, 2001; Volavka, 2008). Beyond these main effects, however, there remains a need for research examining how these symptoms may interact with one another to increase violence risk (Swanson et al., 2006b).

The strong effect for past violence provides further evidence that a history of violence is a key risk factor for future violence, but also suggests that *recent* violence, specifically, should be attended to in clinical assessments of short-term risk. The same is true for victimization; in fact, recent victimization, though rarely examined in research, added to the prediction of short-term violence when controlling for all other factors in the model, including recent violence. This finding, consistent with that of Sadeh et al. (2014) regarding the role of victimization in predicting long-term (i.e., 12-month) violence, provides compelling evidence that recent victimization should be considered in the assessment of both short- and long-term violence risk. However, to our knowledge, only one instrument, the Short-Term Assessment of Risk and Treatability (START; Webster et al., 2006) considers both recent violence and recent victimization. Moreover, there is much discussion and emphasis on trauma-informed care in this population, and among female psychiatric patients in particular, though the focus is typically on childhood victimization experiences (Becker et al., 2005; Gonzalez & Rosenheck, 2014). Findings suggest that trauma-informed approaches should also consider the trauma and sequelae of adult victimization experiences, and that these efforts may reduce risk of violence.

Methodological Limitations

This study had several strengths, including its large, representative sample, inclusion of proximal, clinically-relevant indicators, and prospective data structure. However, findings should be interpreted within the context of the study's limitations. First, our data on perpetration and victimization were derived from self-report and may thus be susceptible to the effects of social desirability, recall bias, and errors. Though self-report is a valid and reliable approach for collecting data on perpetration and victimization (Huizinga & Elliott, 1986; Van Dorn et al., 2010), additional sources of information across all parent studies, such as hospital and arrest records, may have assisted in capturing non-self-reported violent events. Second, attrition across studies over time resulted in missing outcome data for a large portion of the integrated sample (*n* = 1,905, 55%). Despite missingness, the present study remains the largest examination of the effects of proximal indicators on short-term community violence in this population. Third, the assessment periods implemented across parent studies limited our evaluation of even shorter term effects. Specifically, we operationalized recent, current, and short-term variables as occurring within a 6-month time frame; however, the optimal assessment and prediction time frame for these variables is unknown.

Conclusions

This study provides empirical evidence for three proximal, clinically-relevant indicators in the assessment and management of short-term violence risk among adults with mental illnesses: current alcohol use, recent violence, and recent victimization. Though clinicians may never be able to answer the public calls for the absolute prediction – and prevention – of violence by adults with mental illnesses (Swanson, 2008), attending to these indicators in clinical practice should assist in the identification of those at heightened risk of community-based violence. Importantly, there is now a preponderance of evidence demonstrating the superiority of structured over unstructured approaches to assessing violence risk (Grove & Meehl, 1996; Grove, Zald, Lebow, Snitz, & Nelson, 2000). Clinicians should use a validated risk assessment instrument that emphasizes proximal indicators, such as the START or the HCR-20 (Douglas et al, 2013) to reduce violence risk in this population (Belfrage, Fransson, & Strand, 2004; Haque, Cree, & Webster, 2008; Singh et al., 2014).

Table 1. Participant Characteristics

	Full Sample (*N* = 4,484)		Follow-Up Sample (*N* = 2,579)		
	n	%	*n*	%	*p*
Sex					.499
Male	2,681	60	1,554	60	
Female	1,800	40	1,025	40	
Race/Ethnicity					<.001
White	2,300	51	1,353	53	
Black	1,687	38	1,036	40	
Hispanic	317	7	136	5	
Other	172	4	54	2	
Primary Diagnosis					<.001
Schizophrenia	2,837	64	1,687	65	
Bipolar disorder	424	10	218	9	
Major depression	824	18	442	17	
Substance use disorder	277	6	205	8	
Other	106	2	20	1	
Recent Hospitalization					<.001
No	2,704	60	1,274	49	
Yes	1,776	40	1,304	51	
Alcohol Use					<.001
Abstinence	2,474	55	1,311	51	
Non-problematic use	858	19	546	21	
Problematic use	1,141	26	716	28	
Drug Use					<.001
Abstinence	3,022	68	1,665	65	
Non-problematic use	476	11	310	12	
Problematic use	969	22	594	23	
Any Recent Violence					.594
No	3,443	77	1,977	77	
Yes	1,023	23	597	23	
Any Recent Victimization					.303
No	3,082	69	1,760	68	
Yes	1,382	31	812	32	
Age (M±SD)	39.08±11.34		37.71±11.24		<.001
Psychiatric Symptoms (M±SD)					
Affect	.26±.89		.31±.90		.225
Positive	.09±.93		.18±.94		.116
Negative	-.07±.92		.02±.95		<.001
DCP	-.02±.88		.07±.91		<.001
Recent Violence (M±SD)	-.28±.71		-.29±.70		.493
Recent Victimization (M±SD)	-.19±.82		-.18±.82		.356

Notes. % = valid percent. Means were compared by *t* tests, and proportions were compared by chi square tests. Psychiatric symptom scores range from -1.50-3.20 for Affect, -1.35-3.33 for Positive, -1.72-3.36 for Negative, and -1.63-3.67 for Disorganized Cognitive Processing (DCP), with higher scores indicating greater symptomatology. Recent perpetration and victimization factor scores range from -.64 to 2.96 and -.70-2.62, respectively, with higher scores indicating greater prevalence and/or severity of violence.

Table 2. Violence at 6-Month Follow-Up Overall and by Participant Characteristics

	Factor Scores			Comparison		
	M	*SD*	*Range*	*F*	*df*	*p*
Overall	-.39	.57	-.64-3.38			
Sex				15.49	1	<.001
Male	-.42	.53	-.64-3.38			
Female	-.33	.63	-.64-2.64			
Race/Ethnicity				2.02	3	.109
White	-.38	.54	-.64-2.79			
Black	-.38	.61	-.64-3.38			
Hispanic	-.44	.54	-.64-1.98			
Other	-.55	.38	-.64-1.25			
Primary Diagnosis				62.40	4	<.001
Schizophrenia	-.50	.47	-.64-3.38			
Bipolar disorder	-.33	.61	-.64-2.64			
Major depression	-.15	.68	-.64-2.79			
Substance use disorder	-.05	.68	-.64-2.62			
Other	-.16	.57	-.64-1.39			
Alcohol Use				40.21	2	<.001
Abstinence	-.47	.49	-.64-2.62			
Non-problematic use	-.37	.56	-.64-2.62			
Problematic use	-.24	.68	-.64-3.38			
Drug Use				28.83	2	<.001
Abstinence	-.45	.52	-.64-2.64			
Non-problematic use	-.35	.57	-.64-2.24			
Problematic use	-.25	.68	-.64-3.38			
Recent Hospitalization				114.76	1	<.001
No	-.51	.49	-.64-3.38			
Yes	-.27	.62	-64-2.79			
				r		*p*
Age				-.22		<.001
Psychiatric Symptoms						
Affect				.15		<.001
Positive				-.08		<.001
Negative				-.14		<.001
DCP				-.15		<.001
Recent Violence				.40		<.001
Recent Victimization				.32		<.001

Table 3. Hierarchical Linear Regression Predicting Short-Term Community Violence

	Violence at 6-month follow-up			
Step 1. Patient Characteristics[a]	*B*	*SE*	*t*	*p*
Age	-.01	.00	-6.30	<.001
Sex				
Female	–	–	–	–
Male	-.06	.02	-2.67	.008
Race/Ethnicity				
White	–	–	–	–
Black	.07	.02	2.76	.006
Hispanic	.06	.05	1.14	.255
Other	-.02	.08	-.20	.843
Primary Diagnosis				
Schizophrenia	–	–	–	–
Bipolar disorder	.10	.05	2.26	.024
Major depression	.26	.04	7.20	<.001
Substance use disorder	.36	.05	8.03	<.001
Other	.21	.12	1.69	.092
Step 2. Substance Use[b]	*B*	*SE*	*t*	*p*
Alcohol Use	.04	.02	3.02	.003
Drug Use	.04	.02	2. 42	.016
Step 3. Clinical Functioning[c]	*B*	*SE*	*t*	*p*
Psychiatric Symptoms				
Affect	.03	.01	2.17	.030
Positive	.05	.02	3.20	<.001
Negative	.00	.02	-.21	.832
DCP	-.01	.02	-.59	.479
Recent Hospitalization				
No	–	–	–	–
Yes	.01	.03	.17	.868
Step 4. Recent Violence[d]	*B*	*SE*	*t*	*p*
Violence in 6 Months Prior to Baseline	.26	.02	16.42	<.001
Step 5. Recent Victimization[e]	*B*	*SE*	*t*	*p*
Victimization in 6 Months Prior to Baseline	.05	.02	3.00	.003

[a] $F(10) = 31.261$***, $R^2_{adjusted} = .106$.
[b] $F(12) = 28.206$***, $R^2_{adjusted} = .114$; $\Delta F(2) = 11.624$, $p<.001$; $\Delta R^2_{adjusted} = .008$.
[c] $F(17) = 23.157$***, $R^2_{adjusted} = .119$; $\Delta F(5) = 3.966$, $p<.001$; $\Delta R^2_{adjusted} = .005$.
[d] $F(18) = 38.649$***, $R^2_{adjusted} = .204$; $\Delta F(1) = 269.738$, $p<.001$; $\Delta R^2_{adjusted} = .085$.
[e] $F(19) = 37.161$***, $R^2_{adjusted} = .206$; $\Delta F(1) = 9.012$, $p = .003$; $\Delta R^2_{adjusted} = .002$.
***$p<.001$.

Table 4. Full Linear Regression Model Predicting Short-Term Community Violence[a]

	Violence at 6-month follow-up			
	B	*SE*	*t*	*p*
Age	.00	.00	-3.35	<.001
Sex				
Female	–	–	–	–
Male	-.05	.02	-2.41	.016
Race/Ethnicity				
White	–	–	–	–
Black	.04	.02	1.63	.104
Hispanic	.06	.05	1.16	.245
Other	-.02	.07	-.33	.742
Primary Diagnosis				
Schizophrenia	–	–	–	–
Bipolar disorder	.08	.04	1.81	.070
Major depression	.19	.04	4.57	<.001
Substance use disorder	.24	.05	4.77	<.001
Other	.10	.12	.84	.399
Alcohol Use	.03	.01	2.17	.030
Drug Use	.01	.01	.35	.723
Psychiatric Symptoms				
Affect	.01	.01	1.09	.278
Positive	.03	.01	1.92	.055
Negative	.01	.01	.47	.638
DCP	.00	.02	-.14	.885
Recent Hospitalization				
No	–	–	–	–
Yes	-.04	.03	-1.47	.142
Recent Violence	.23	.02	12.72	<.001
Recent Victimization	.05	.02	3.00	.003

[a] $F(19) = 37.161$, $p<.001$ $R^2_{\text{adjusted}} = .206$.

CHAPTER 5

Integrative Review

Compared to the general population, adults with mental illnesses are at heightened risk of violence perpetration (Corrigan & Watson, 2005; Van Dorn et al., 2012) and violent victimization (Goodman et al., 1999; Teplin et al., 2005); however, few studies have investigated the overlap between both outcomes in this population (Jennings et al., 2012). The manuscripts presented in this dissertation sought to further our understanding of how perpetration and victimization relate to one another in adults with mental illnesses. In the first manuscript (Chapter 2), I examined the prevalence and associated characteristics of four classifications of violence – namely, non-victim/non-perpetrator, victim only, perpetrator only, and victim-perpetrator. In the second manuscript (Chapter 3), I assessed the prevalence of and transitions between each of these classifications over time, and consider the effects of proximal indicators on those transitions. In the third manuscript (Chapter 4), I examined how distal and proximal risk factors, including recent victimization, predict short-term community violence. I summarize the findings of each manuscript below.

Summary of Findings

Findings of the first manuscript indicate that adults with mental illnesses are a heterogeneous population with regard to violence risk and provide evidence for a victim-perpetrator overlap. Indeed, participants were unlikely to report any violent outcomes but, when they did, were more likely to report perpetration *and* victimization rather than either outcome alone. Bivariate and multivariable analyses showed that age, sex, race/ethnicity, and primary diagnosis differed across violence classifications. Victim-perpetrators, for example, were more likely to be young, Black, and have a primary diagnosis *other* than schizophrenia (i.e., bipolar disorder, major depressive disorder, substance use disorder, or "other"). Altogether, findings provide evidence for a victim-perpetrator overlap in this population and suggest that preventive measures targeting perpetration and victimization may be more effective than those with separate strategies for each. Limitations include the use of cross-sectional data and focus on static factors; classifications of victim and/or perpetrator are likely dynamic in nature and may change in response to variations in clinical functioning.

The second manuscript built upon the findings of the first by examining the longitudinal overlap between perpetration and victimization, with a corresponding focus on proximal, clinically-relevant indicators. As with the first manuscript, findings underscore heterogeneity in violence risk across adults with mental illnesses; at each time point the majority of participants identified as non-victim/non-perpetrators, followed by victim-perpetrators, victims only, and perpetrators only. Within this consistent ordering, however, many individuals did transition between classifications over time, illustrating that one's classification as a victim and/or perpetrator is not fixed. These distinct pathways towards, and away from, violent outcomes were, in part, a function of recent violence and/or victimization, as well as substance use, psychiatric symptoms, and suicidal behaviors. Consideration of these pathways and associated factors may assist in the identification of adults with mental illnesses at risk of violence and/or victimization. Furthermore, findings on the differing effects of substance use, psychiatric symptoms, and suicidal behaviors offer insight into how interventions may be tailored to minimize high or maintain low violence risk and, ultimately, improve outcomes for adults with mental illnesses. This manuscript is limited in its focus on proximal indicators, as the comparative role of distal indicators was not examined.

To that end, the third manuscript considers distal and proximal indicators together in the prediction of short-term community violence. Just as the first manuscript showed significant associations between distal participant characteristics and violence, findings of this manuscript confirm the role of age, sex, race/ethnicity, and primary diagnosis in the prediction of short-term violence. Furthermore, multivariable analyses demonstrated that proximal indicators contribute to the prediction of short-term community violence above and beyond distal characteristics alone; the addition of variable clusters of substance use (i.e., alcohol use and drug use at baseline), clinical functioning (i.e., psychiatric symptoms at baseline and recent hospitalization), recent violence, and recent victimization resulted in improved prediction of violence at 6-month follow-up at each step in the model. When all variables were entered, alcohol use, violence, and victimization were positive predictors of subsequent violence, even after controlling for distal characteristics. Overall, findings provide empirical evidence for alcohol use, violence, and victimization as proximal, clinically-relevant indicators in the assessment and management of short-term violence risk among adults with mental illnesses. Consideration of these indicators may assist in the identification and treatment of adults with mental illnesses at heightened risk of short-term community violence.

Implications for Research

Research on perpetration and victimization among adults with mental illnesses is a critical precursor for the delivery of effective mental health services. As will be discussed in detail below, findings offer clinicians insight into the risks and needs specific to adults with mental illnesses in relation to perpetration and victimization. The included manuscripts address some of the issues observed in prior research. For instance, whereas prior studies included small, non-representative samples, the current body of work examined perpetration and victimization in a large, heterogeneous sample of adults with mental illness. Also, prior studies were limited by heterogeneity in their operational definitions of perpetration and victimization, but the current work examined these outcomes across five studies that used the same measures of perpetration and victimization. Prior studies additionally were restricted by a cross-sectional design, whereas the present sample was longitudinal. Finally, past research was largely limited to distal factors. In the second and third manuscripts, specifically, proximal characteristics are considered in relation to violent outcomes. However, the novel aspects of the included works – particularly the longitudinal design and focus on proximal characteristics – bring into focus additional issues in measurement and important avenues for future research.

Specifically, the often-overlapping spatial and temporal elements of violent events and associated clinical characteristics makes the disentanglement of variables a challenging task. Clinical decisions regarding supervision and treatment of adults with mental illnesses are informed by a number of short- and long-term considerations. Risk of perpetration and victimization, specifically, is most impactful when viewed in the upcoming days and weeks, rather than years (Doyle & Logan, 2012; Webster et al., 2006). As a result, spatiotemporal contiguity – that is, the proximity and/or sequential occurrence of clinically-relevant characteristics and violent events – becomes especially important (Van Dorn et al., under review). For example, the variables of perpetration and victimization used to create the violence classifications used in the first two manuscripts (Chapters 2 and 3) both reference a 6-month time frame. It is thus not feasible to determine, in the case of victim-perpetrators, if perpetration preceded victimization, victimization preceded perpetration, or perpetration and victimization occurred simultaneously. Understanding the context – not just the incidence – of violent events requires shorter time frames, as well as questions about the nature of the perpetration and/or victimization (Jennings et al., 2012; Van Dorn et al., under review).

Similar spatiotemporal problems exist in the measurement of clinical characteristics. The lagged approach of assessing the associations between clinical variables and violent outcomes, while preferable to a cross-sectional approach, omits important information in the process. For example, in the present body of work, the timing of assessments across parent studies makes it impossible to determine clinical characteristics immediately preceding violent outcomes. This is particularly important in the case of dynamic variables meant to represent current functioning. Psychiatric symptoms, for example, may be fluid from one day to the next (Appelbaum, Robbins, & Vesselinov, 2004; Ben-Zeev, Morris, Swendsen, & Granholm, 2011), and thus, there is limited clinical utility in using an isolated measurement of psychiatric symptoms to inform violence risk over the next six months.

The findings of this body of work, as well as the issues in measurement detailed above, pave the way for several avenues within research on this population. Evidence of a victim-perpetrator overlap among adults with mental illnesses illustrates the need for research on and clinical consideration of perpetration *and* victimization, rather than a continued emphasis on violence perpetration to the neglect of victimization in this population (Choe et al., 2008). Indeed, findings in all three of the included manuscripts point to the importance of victimization in relation to violence perpetration, either as a co-occurring or preceding event. This common thread suggests that a trauma-informed care approach, in which treatment is tailored to mitigate the trauma and sequelae of adult victimization experiences, may reduce risk of future violence. Further research is needed to evaluate the effectiveness of such an approach.

Additionally, the identification of distal and proximal factors associated with perpetration and victimization across the three manuscripts is by no means exhaustive. Violent experiences are precipitated by a vast array of factors, and research to identify additional factors related to subsequent violence plays an important part in the assessment and prevention of future violence. Though the absolute prediction of violent outcomes is an unrealistic goal, there are a number of potentially relevant sociodemographic and clinical variables that remain unexamined. Future research should thus incorporate variables such as socioeconomic status, social support, and access to treatment, as well as adherence to psychopharmacological medication and routine outpatient interventions. Furthermore, there has been limited investigation of how risk factors may interact with one another to increase or decrease risk of violence and/or victimization. For example, interactions among the four psychiatric symptom factors may result in differing levels of risk across individuals. Future research on these interactions will provide a more nuanced understanding of the assessment and management of violence risk.

Implications for Clinical Practice

Findings of the three manuscripts included in this body of work offer important insights for clinical practice with adults with mental illnesses, particularly through the lens of the Risk-Need-Responsivity (RNR) model. The RNR model is part of an evidence-based practices framework developed within the context of the criminal justice system (Andrews, Bonta, & Hoge, 1990; Bonta & Andrews, 2007). The model has demonstrated efficacy in multiple populations and outcomes, including recidivism reduction for adolescent and adult general offenders (Andrews & Bonta, 2006; Landenberger & Lipsey, 2005) and sexual offenders (Hanson, Bourgon, Helmus, & Hodgson, 2009). A recent review of the applicability of the RNR model to adults with mental illnesses found strong preliminary support in the extant empirical literature; for instance, prior research has consistently observed cognitive behavioral programs targeting risk factors to be more effective than psychiatric treatment alone (Skeem, Steadman, & Manchak, 2015). (Yet, to my knowledge, the application of the RNR model within a sample of adults with mental illnesses has not been evaluated to date.)

The core principles of this approach, as applied to perpetration and victimization among adults with mental illnesses, call for consideration of an individual's (1) *Risk*, such that level of services is proportionate to risk of future violence and/or victimization; (2) *Need*, wherein treatment is tailored according to current functioning; and (3) *Responsivity*, so that treatment may be fine-tuned to various characteristics of the individual (e.g., learning style, relevant abilities, etc.). The included manuscripts help clinicians more effectively use the Risk and Need principles in practice through the identification of individuals at greatest risk of violent outcomes, as well as identification of proximal, clinically-relevant factors to be targeted in treatment, respectively.

Specifically, in the first manuscript, findings illustrate heterogeneity in risk of violent outcomes among adults with mental illnesses, and thus highlight the importance of using level of risk to inform the allocation of limited mental health services. Findings additionally suggest that individuals are more likely to experience perpetration *and* victimization rather than either outcome alone. Current interventions and community initiatives targeting violence reduction often have separate strategies for perpetrators and victims (Daday et al., 2005). However, this evidence of an overlap of perpetration and victimization suggests that practitioners and programs may achieve more success by focusing special attention on those individuals at risk of both outcomes. In the manuscript, characteristics linked to victims only, perpetrators only, and victim-perpetrators are outlined in comparison to characteristics of non-victim/non-perpetrators; age, sex, race/ethnicity, and primary diagnosis are identified as characteristics for clinicians to consider as a starting point in their evaluations of perpetration and victimization risk among adults with mental illnesses. Specifically, young, non-White adults with primary diagnoses *other* than schizophrenia are particularly vulnerable to violent outcomes. However, clinical implications of this manuscript should be considered in light of the sole focus on static characteristics; that is, characteristics that cannot be changed through clinical intervention. In this way, applicability of findings is limited to the Risk principle of the RNR model.

The second manuscript extends clinical application to be in accordance with the Need principle. Findings provide further evidence for heterogeneity in violence risk and, moreover, demonstrate that that risk changes over time – in part as a function of recent violence and/or victimization, as well as clinical characteristics of substance use, psychiatric symptoms, and suicidal behaviors. For example, for individuals who reported recent perpetration and victimization, alcohol and drug use, increased affective symptoms, and suicidal behaviors were associated with the co-occurrence of perpetration and victimization in the following six months; increased positive, negative, and disorganized cognitive processing symptoms heightened the likelihood of transitioning to a less violent classification. Beyond identifying some of the proximal characteristics to be considered in the assessment of risk, these findings, perhaps more importantly, provide targets for treatment. In particular, clinicians should integrate evidence-based strategies to reduce substance use, psychiatric symptoms, and suicidal behaviors into treatment planning and risk management to promote transitions from violence classifications to more stable and lasting non-victim/non-perpetrator classifications. However, in contrast with the first manuscript, these implications for clinical practice are limited by the focus on proximal factors, as distal factors were not included in analyses.

The third manuscript considers both distal and proximal factors together to directly inform the assessment and management of short-term violence risk among adults with mental illnesses. Consistent with prior research, findings lend empirical support for the role of distal characteristics of age, sex, and primary diagnosis in the prediction of short-term violence. However, proximal measures of alcohol use, violence, and victimization predicted violence even after controlling for distal characteristics. At present, few instruments include proximal indicators in their evaluation of violence risk (e.g., Short-Term Assessment for Risk and Treatability; Webster et al., 2006). Findings thus provide compelling evidence that consideration of these three indicators in clinical practice may assist in the identification of adults with mental illnesses at heightened risk of short-term community violence. Moreover, the role of proximal indicators guides the formulation of interventions intended to reduce risk of future violence. For example, integrated cognitive, behavioral, and psychopharmacological interventions targeting alcohol use and psychiatric symptoms (associated with short-term violence in bivariate analyses) should contribute to reductions in violence risk (Lehman & Steinwachs, 1998; Volavka, 2008). Moreover, there is much discussion and emphasis on trauma-informed care in this population, though the focus is typically on childhood victimization experiences (Becker et al., 2005; Gonzalez & Rosenheck, 2014). Findings suggest that trauma-informed approaches should also consider adult victimization experiences, and that these efforts may reduce risk of violence.

General Conclusion

Violence perpetration and violent victimization among adults with mental illnesses represents a substantial public health issue. Prior research has estimated that rates of perpetration and victimization are up to 8 and 23 times greater than in the general population, respectively, and has additionally shown evidence of shared risk factors and an association between violent outcomes. Despite indications of an overlap of violence perpetration and violent victimization, there have been few investigations of these outcomes together in this vulnerable population. To that end, the present body of work examined the overlap of violence perpetration and violent victimization in a large, heterogeneous sample of adults with mental illnesses, and investigated distal and proximal risk factors associated with violent outcomes. Together, the manuscripts included in this dissertation advance our understanding of how violence perpetration and violent victimization relate to one another among adults with mental illnesses and inform clinical assessment and management of violence risk vis-à-vis the RNR framework. Consequently, the findings of this body of work have direct implications for research and clinical practice. With knowledge of the risks and needs related to violence perpetration and violent victimization identified herein, clinicians will be better able to identify adults with mental illnesses at higher risk of violent outcomes and provide them with targeted treatment, which, ultimately, will lead to improved individual and public safety.

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APPENDIX

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