MODELING OF FORENSIC POPULATION CURRENT CRIME SEVERITY, BASED ON PAST CRIME SEVERITY

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Predicting recidivistic severity in forensic populations would prove useful to tribunals deciding on sentence length, deciding on determinate versus indeterminate sentences, and applying "significant risk" statutes. In an exploratory study, we combine actuarial and self-report data to "predict" current severity of offending, in a forensic population in which all individuals are past offenders. Current criminal charges against a group of inmates (participants) in a Canadian, forensic psychiatric unit, were related to basic demographic and diagnosis information from psychiatric files, past offenses, and a few easily administered and scored pencil-and-paper tests. Many participants previously held Not Criminally Responsible due to Mental Disorder for at least one criminal offense. The collected information "predicted" current offense(s), producing R's of .60, .57 and .89 for N = 171 males and 28 females. Limitations include the need for replication with prospective designs and a better scale to measure severity of violence. Implications for practice and policy are discussed.

Great strides have been made in risk assessment for violent recidivism over the last two decades (for review, see [1]). The existing literature, however, focuses overwhelmingly on predicting solely the likelihood, and not also the severity, of future violence. Some authors have addressed this consideration explicitly, if in passing (2, 3), but see (4), or implicitly (5). Since sentence length, to at least some degree, reflects judicial and societal concerns about extent of future harm, it would be heuristic if risk assessments commented reliably on violence recidivism severity as well as likelihood. Severity considerations manifest themselves in determinate and indeterminate sentencing contexts. Arguably, one would not want to incarcerate indefinitely an individual

for spitting at passers-by on a sidewalk, even if virtually certain such behavior, and a criminal assault charge, would recur. Regardless of likelihood of violent recidivism (occurring at all), reliable differentiation between recidivist spitters and mass schoolyard or shopping mall shooters would conceivably play a major role in recommendations for incapacitation.

This article seeks to examine this issue that, in the opinion of the authors, has been neglected for a number of possible reasons. First, many may assume that if the likelihood of violent recidivism (VR) is sufficiently high and the issue has been raised in court, any VR would exceed an accepted severity threshold. This rests, however, on a number of assumptions including the existence of an objective, conventionally accepted severity threshold, and the assumption that a relationship exists between severity of previous and subsequent violence severity. To the best of our knowledge, this empirical assumption has not been explicitly examined previously. A more pertinent issue may be that prediction of violence severity could be more difficult and elusive than prediction of mere likelihood, suggesting that researchers focus their efforts elsewhere. Clinicians, however, are obligated to uphold and promote human rights, in this instance entailing providing information ensuring that both the interests of the individual (to not be incarcerated excessively) and society (to ensure it is protected from those likely to recidivate most severely) are protected. This article provides initial evidence suggesting that prediction of violent severity (VS) may be possible at levels commensurate with prediction of VR on its own.

PRACTICAL RELEVANCE OF SEVERITY OF VIOLENCE

Since the beginning of the previous decade, the number of accused with mental disorders increased by at least ten percent annually in Canada despite overall decreases in rates of arrests and prosecutions (6) (7). Following *Winko* (8) in 1999, numbers of absolute discharges granted by Review Boards increased significantly (9). Although cur-

rent risk instruments fail to detect a minority of violent recidivists (1, 10), it is of critical importance that false negatives are limited to the extent possible to those who will commit relatively minor violent re-offenses.

LEGAL RELEVANCE OF SEVERITY OF VIOLENCE: GENERAL SENTENCING GUIDELINES AND IMPLICIT CONSIDERATION OF SEVERITY OF FUTURE RECIDIVISM[1]

In Canada, incarceration is to be applied only when other options cannot be expected to confer safety to society via appropriate change in the offender, and to inform other potential offenders of expected negative consequences for similar behavior (11). Lengthier sentences should be applied to deter more serious crimes. We now turn to some specific examples from Canadian law before providing examples from U.S., British, and Norwegian law.

Those Not Guilty on Account of Mental Defect or Similar, and Considerations of Severity of Future Recidivism

Following a 10% annual increase in successful mental health defenses, 1990-1999 (6, 7), the Supreme Court of Canada in *Winko* (8) defined the risk threshold necessary for indeterminate sentencing of the Not Criminally Responsible (NCR) (on account of mental disorder) as occurring when "an NCR poses a significant threat to the safety of the public." Additionally, "…this potential harm must be "serious." Neither a) miniscule risk of a grave harm… (nor a) high risk of trivial harm meet the threshold." *Winko* acknowledged the difficulty on the part of experts to predict whether anyone will offend in the future. Not surprisingly, following this ruling, the numbers of absolute discharges granted by Review Boards increased significantly (9). The word "dangerousness" as used both by the Canadian Parliament in a section of the Criminal Code of Canada (12) concerning dispositions to be given to NCRs, and by the Supreme Court of Canada in the landmark *Winko*

[1] Legal information current to July 14, 2009.

decision, is explicated as "a significant threat to the safety of the public."

Thresholds/Criteria for Prediction of Severity of Recidivism

Generally, canvassing the law of the countries discussed showed that some less-than-certainly-defined threshold of predicted (future) violence severity in each must be met before civil or other commitment on the ground of future dangerousness would be made, for those previously found guilty of an offense.[2]

The Alberta Court of Appeal (a Canadian provincial court of appeal) in *Neve* (13) referenced weaknesses in forensic psychiatric evidence in predicting recidivism in NCRs. The court in *Winko* stated that a trial court or Review Board may use a "broad range of evidence," including the assessments of experts having examined the NCR, in assessing any significant threat to the safety of the public from an NCR. The notion of "serious threat" implies an ability to foretell the severity of the predicted violence.

This perspective is not unique to Canada. In the UK, imposition of Sexual Offenses Prevention Orders requires that the judge be satisfied regarding the defendant's risk of inflicting "serious" sexual injury (*R.* v. *Howell*, 2007 [14], discussing Sexual Offenses Act of 2003 [15]). Since April 4, 2005 in the UK, mandatory sentences applied to anyone who committed "serious crimes against the person", where the court held that the individual posed risk of serious harm to the public by the future commission of such specified crimes. Such offenders may also be called "dangerous" (Criminal Justice Act of 2003 [16], as discussed in *R.* v. *Reynolds*, 2007 [17]). This clearly implies the ability and duty, on the part of the tribunal, to predict severe harm in future. Moving to an associated use of violence prediction, according to the UK Court of Appeal, deportation from the UK requires that a potential deportee's

[2] Though not discussed, note that this additionally appears to be the case in Germany (personal communication, Norbert Nedopil and Thomas Wolf, 6 October 2010).

"potential danger" be ascertained (18). In that case, an assessment tool to estimate risk of additional conviction(s) and of infliction of serious injury was relied upon by the court in coming to its decision. The existence and use of such a tool by the court is strong evidence of a need for the information it predicts (or purports to predict).

At the U.S. federal level an individual found "not guilty only by reason of insanity of an offense involving bodily injury to, or serious damage to the property of, another person, or involving a substantial risk of such injury or damage" has the burden of showing that "his release would not create a *substantial* risk of bodily injury to another person or *serious* damage of property of another due to a present mental disease or defect" (19) (18 U.S.C. § 4243(d), (e): emphasis added). In *Phelps* (1987/1994) (20), "substantial" and "serious" as used in § 4243(e) were held to not be unconstitutionally vague although unquantifiable, and to be for use in guiding the court as to decision to commit. Those in the custody of[3], and deemed "sexually dangerous" by, the Director of Bureau of Prisons or the Attorney General are committed to the custody of the Attorney General (or to the "sexually dangerous" individual's State: § 4248 (a), (d)[4]). In *Abregana* (21), the court held that such commitment was not permissible where there had been no unambiguous and convincing evidence 1) of the seriousness of the respondent's mental disorder, or 2) that the respondent was "sexually dangerous" and would experience a serious struggle to not commit more of the same type of acts from which his original incarceration arose. At the U.S. federal level, then, the hearing official's ability and duty to predict severe harm in future is clearly implied.

[3] Or against whom charges have been dismissed "solely for reasons relating to the mental condition of the person": § 4248 (a).

[4] Note that where an individual is held as above-noted, he or she is to be released where such sexual dangerousness would no longer be predicted, based on recovery and/or anticipated submission to a treatment regimen, which may be the subject of a court-approved order: § 4248 (e).

In Norway, criminal or civil commitment on the ground of dangerousness for those convicted of a crime comes from The Criminal Act (The General Civil Penal Code) (22)[5]. This states that where a sentence is "insufficient to protect society…*preventative* detention…may be imposed" (emphasis added: see sub-ss. 39c[1] and [2]). It is available under sub-section 39c(1) where an offender is guilty of a list of "serious" crimes "…impairing the life, health or liberty of other persons…In addition, there must be deemed to be an imminent risk that the offender will again commit such a felony.…" Sub-section 39c(2) employs a more stringent standard ("close connection" between former and current felony, as well as committing a serious felony as in s. 39c[1] in future being "particularly imminent") for commitment of repeat offenders of less serious but analogous crimes. (Note "imminent" is apparently a mistranslation: it could mean "in near future but also probability": personal communication, Knut Rypdal, 17 September 2010).

Also under Norwegian law, the state of mind/mental illness of the offender play an important role in assessing his/her recidivism risk. In s. 39 of the just-noted law, the analogous law for offenders found "not liable" under s. 44 of the Act is set out. It is similar, most notably for present purposes, except that in "assessing risk" the decision-maker must take account of "the course of the illness, and mental functioning capacity" rather than "personal functioning capacity." Thus, also under Norwegian law the duty and ability of the criminal legal decision-maker to predict severe recidivism is implied.

In summary, we have presented evidence that Canadian, UK, American, and Norwegian law requires evidence speaking to the prediction of future severe or serious harm from those found not guilty due to mental disorder (or similar) accruing to society, before invok-

[5] Note translations are unofficial (personal communication, Ragnar Urheim, 17 September 2010).

ing mandatory or indeterminate sentences. We now examine available literature describing present capacity to accomplish this task.

SEVERITY OF VIOLENCE AND RISK PREDICTION

Risk instruments exist to predict whether an individual is likely to re-offend. For example, the Violent Risk Appraisal Guide (VRAG) (23) is reported to have an AUC of 0.75 (24) and similar levels have been reported for other actuarial and more recent dynamic instruments (e.g., the Self-Appraisal Questionnaire; SAQ) (25). As noted, the subject of re-offense severity has received little attention. The research attention it has received can be organized around four themes: alcohol consumption and the severity of violence (26-28), prediction of domestic violence severity (29-31), personality and motivational factors, and the prediction of institutional violence severity. Only the last two of these will be discussed: the first two are beyond the scope of the current work as no data were collected regarding them.

Personality and Motivational Factors Associated with Severity of Violence

A relationship has been found between psychopathy (as measured by the Psychopathy Checklist–Revised (PCL-R) (32), intelligence, and offending in a sample of child molesters (33). The researchers found psychopathic and sadistic offenders tended to have low intelligence and were more likely to have a subsequent sexual offense than other offenders in the sample ($r = -.14$, $p < .05$, $d = -.28$). This suggests a possible link between low intelligence and severe offending. Further evidence comes from Langevin and Curnoe (34), who found that individuals with learning disorders were over-represented in the sample. Although this finding is not likely due to chance, the associated effect size accounts for just under 2% of the variance.

Another study that linked psychopathy with violence severity was conducted by Porter et al. (35)—psychopathy measured using PCL-R. They looked at the difference between psychopathic and non-psychopathic offenders and the amount of violence used during sexual

homicides (35). They compared the offenses for characteristics of the victim, the relationship between the victim and the assailant, and the type of violence committed. They found that psychopathy was correlated with sexual sadism ($r = .35$, $p < .05$, $d = .75$) and gratuitous violence ($r = .30$, $p < .05$, $d = .63$), suggesting psychopaths are more likely than non-psychopaths to derive sexual and non-sexual pleasures from sadism.

This relationship to severity was not mentioned as a possible reason psychopathy, as measured by the PCL-R, is considered the best single predictor of violence (11). It is possible that Psychopathy Checklist score could contribute to the prediction of the severity of future violence, as it has the probability of future violence occurring at all.

Severity of future instrumental violence, it should be noted, may be less predictable because, according to the definition of this type of violence, its extent is in part dependent on whether a victim resists. Motivation and aggression type have also been associated with severity of violence in other instances. In a study conducted on a sample of sex offenders with elderly victims, offenders were classified according to the severity of victim injury and motivation in committing the crime (36). Using the motivation and type of aggression used in a given sexual assault, they were able to strongly "predict" its severity of violence ($R^2 = .41$) in a regression model. They also found that those classified as having pervasive anger and as being vindictive caused the highest level of victim injury, and a diverse range of crimes.

Prediction of Severity of Institutional Violence

Finally, two studies have attempted to find factors associated with institutional violence. Cunningham and Sorensen (37) examined the rates of institutional violence in the first months of incarceration among 136 individuals incarcerated for capital murder. Severity of that violence was found to be inversely related to its frequency. This calls into question the utility, beyond predicting any criminal recidivism, of the instrument used to predict recidivism severity. This, in combina-

tion with the results of the Hilton and collaborators' (31) study, supports our claim that recidivistic severity, per se, is worthy of investigation.

Having said this, it must be noted that a study conducted by Harris and collaborators (3) found that the VRAG's correlation with severity measured by the Akman-Normandeau Severity Index (ANSI) (38) seven-point scale was r = .21 (R^2 = 0.044) and the Sex Offender Risk Appraisal Guide's (SORAG) was r = .18 (R^2 = 0.032), suggesting that current risk instruments may be very modestly informative in predicting severity of violence accounting for less than 5% of the variance in violence severity. These authors, however, also found that neither the Rapid Risk Assessment for Sexual Offense Recidivism (RRASOR) (39), nor the Static-99 (40) significantly correlated with severity or victim injury. It is unknown whether other risk instruments would prove beneficial in predicting violence severity in sex offenders.

Almvik and colleagues (41) examined violent acts performed by psycho-geriatric and nursing ward patients. They found that 32 of the 82 patients committed acts of violence, with injury resulting from these acts only on rare occasions. The most common reason behind these attacks was that the patient had been denied something they had requested, resulting in frustration and resultant anger. The largest number of incidents occurred during personal care tasks. This suggests the majority of these altercations could be classified as irritable aggression, suggesting, in turn, that irritable aggression is the type of greatest concern in clinical settings. While it is true that victim injury occurred on rare occasions, this study ran only for a three-month period and was conducted in a supervised setting.

To the extent institutional violence reflects corresponding mechanisms (although perhaps different triggers) to that which occurs outside of the correctional system, current risk assessment measures may be inappropriate for measuring extent of violence severity associated with individual inmates/patients. To begin filling this gap, a study was

conducted to look at the potential of predicting severity of violence based on a number of different risk factors. Our hypotheses are broadly based on the premise that not-criminally-responsible offenders are more likely to more severely violently recidivate if they perceive environmental threats more realistically. Thus, more particularly, we predict more severely violent recidivism among such individuals who 1) cite with greater frequency they would respond aggressively to threats judged by raters to be realistic in nature, and 2) cite with lesser frequency they would respond aggressively to "threats" judged by raters to be non-realistic in nature, within an eight-item, participant-generated listing of situations that would make him/her violent (Violent Situation Eliciting Inventory: "VESI"). We also anticipated that, since the PCL-R is currently the best, single predictor of violence, psychopathy would be predictive of severity of violent recidivism. Since a PCL-R score will not be present in many or most psychiatric files of those found Not Criminally Responsible, a simple self-assessment scale, the Social Personality Inventory (SPI) (42, 43) was administered. Past offense(s') violent severity, as well as several attitude measures, were also hypothesized to predict violent severity of current offense among such offenders. Those attitude measures were the Tolerance for Law Violations and Identification with Criminal Others sub-scales of the Criminal Sentiments Scale (CSS) (44) and the Aggression Questionnaire (AQ) (45). These attitude measures were anticipated to be (positively) predictive of the severity of violent recidivism due to their logical association with same (see brief discussion of each measure below). Note that all of these, unlike the PCL-R, were also easily administered and scored by non-experts.

METHOD

Participants

Participants were 201 inpatient volunteers recruited from various units within the Law and Mental Health Program of the Centre for Addiction and Mental Health in Toronto, Canada. One hundred and

eighty-four were drawn from the Assessment and Triage Unit (ATU; formerly known as the Metropolitan Toronto Forensic Services) and the remainder from the Medium Secure Unit. In total, 214 patients were approached, resulting in 13 refusals. Typical reasons for declining participation included severe paranoid delusions or the person stating that it was the advice of counsel not to participate with any request while staying on the unit. Patients were excluded if they had difficulty understanding or communicating in English.

The mean current age of the 173 male and 28 female participants was 35.3 years (SD = 10.81), with mean age at time of the index offense of 34.72 (SD = 10.5). Sixty-six percent were single, 13% were married/common-law, 20% were divorced, and 1% were widowed. Mean educational attainment was 11.77 years (SD = 2.82), with 57.2% of participants self-reporting no elementary school maladjustment, 21.4% reporting minor elementary school maladjustment, and 21.4% reporting major elementary school maladjustment. Of the total sample, 28.4% had been separated from at least one of their biological parents prior to the age of 16. Of the 201 participants, 68.7% had an exclusive Axis I chart diagnosis, 17.4% had an exclusive Axis II chart diagnosis, and 13.9% of the participants had both Axis I and Axis II diagnoses on their charts. Unfortunately, data as to whether individual participants had or had not a previous NCR designation were not available, though many of those on the units sampled are known to.

With regard to criminal characteristics, 67% of the sample had been charged with a violent primary index offense. (Those not currently charged with a violent primary index offense were included in order to assess discriminative validity of the model produced, in an exploratory fashion.) 48.6% of participants' arrests were for assault against private citizens and police, 8.5% for murder or manslaughter, 11.4% for sexual offenses (excluding exhibitionism), 4.5% for arson, 3.5% for weapons-related offenses, 6% for property offenses, 6% fraud-related, 5% were for escape attempts/breaches/failure to appear charges, and

8.3% fell under other charges as determined from police records forwarded to the Law and Mental Health Program for assessment purposes. The mean number of previous violent offenses was 2.59 (SD = 3.26), and the mean number of previous non-violent offenses was 7.71 (SD = 11.95). The mean time sentenced was 787.44 days (SD = 1401.94), and mean time incarcerated was 485.64 days (SD = 774.45). 64.7 % of the sample had failed/breached on a prior release. Finally, 60.2% had inflicted no or slight injury to victim(s), 20.4% caused injury requiring treatment with no hospitalization, 15.4% inflicted injuries requiring hospitalization, and 4% caused death.

Materials

Five instruments were used in this study and administered in random order. The first consisted of a personal information sheet to record demographic information associated with predictive validity of violent recidivism in the literature.

Violence Eliciting Situation Inventory. The VESI is a theoretically derived experimental measure designed to classify situations in which a person may respond violently. It asks participants to describe briefly in writing four situations or events in which they would definitely become violent, and four in which they might become violent or become irritated but not violent. Responses are then classified as reflecting Predatory (instrumental), Irritable (anger-related) or Defensive (fear-related) aggression. Given the potentially delusional basis for attacks by individuals suffering from a mental disorder, Defensive aggressive descriptions are further classified into rational or delusional variants. Consequently, 12 possible scores (i.e., four principle aggression types and three levels of probability) were calculable. In light of earlier work (46, Nussbaum et al., 1997) it was also decided to code answers that would put the individual into an excessively favorable light as "pseudo-altruistic" and likely an attempt at a social desirability manipulation (e.g., "I would only become violent if I saw a young defenseless child being attacked") as suggested previously. To evaluate reliability of cod-

ing, a second trained rater reviewed 21 randomly selected VESI protocols consisting of 252 responses. Inter-rater reliability was very high ($\kappa = .96$, $p < .001$) with only four of 252 coding responses differing when compared to those of the investigators (M. W. and D. N.).

Social Personality Inventory. The SPI (42; 43) is a 46-item self-administered measure of psychopathy using a 7-point Likert scale ranging from 1 ("strongly disagree") to 7 ("strongly agree"). The SPI views psychopathy as a dimensional rather than categorical personality trait reflecting an intra-psychic (e.g., lack of remorse or impulsivity) and an interpersonal domain (e.g., interpersonal dominance or superficial charm) that is dynamic in nature. It restricts overt instances of antisocial behavior from the assessment of psychopathy, since individuals who are not psychopaths can also exhibit antisocial behavior. This instrument was validated both on an undergraduate sample (N = 402, alpha =.89) and a forensic sample (N = 172, alpha = .92). A sub-set of the just-noted undergraduate sample (n = 75) were administered the instrument again: test-retest reliability was r = .83. Note that a subset of the just-noted forensic test-takers (n = 55) was also administered the PCL-R: scores on each measure were uncorrelated.

Criminal Sentiments Scale. The Criminal Sentiments Scale (CSS) (44) is a 41-item, three-subscale, self-report measure of criminal attitudes. The attitudinal measures consist of three separate subscales: attitudes toward Law, Courts, and Police (25 items); Tolerance for Law Violations (10 items); and Identification with Criminal Others (6 items) and are rated on a 5-point Likert scale from 1 to 5, ranging from "strongly disagree" to "strongly agree." Higher scores on the TLV and ICO scales, coupled with a lower score on the LCP scale, are thought to be associated with pro-criminal sentiments. A meta-analysis of 10 studies of the CSS as well as modified version thereof, showed total score (pooled effect size range .14-.19), as well as sub-scale scores on TLV (pooled effect size range .13-.15) and LCP (pooled effect size range .14-.17), predicted criminal recidivism with modest effect size. It

also showed the ICO sub-scale score predicted it with small, pooled effect size (range .06-.10) (46). This meta-analysis reports internal consistency range of the measure's total score as .75 - .94. That of the LCP sub-scale was given as .67 - .94; that of the TLV, .72 - .88; and that of the ICO, .45 - .58.

Aggression Questionnaire. The Aggression Questionnaire (AQ) (45) is a 29-item self-report measure that assesses multiple components of aggression. It adopts a trait view of aggression, attempting to assess aggression utilizing a tripartite division of aggression into instrumental, affective, and cognitive domains. Individual items are rated on a 5-point Likert scale ranging from 1 - "strongly disagree" to 5 - "strongly agree." Besides an overall total scale score, there are four subscale scores for physical aggression, verbal aggression, anger, and hostility. Normative data on the final 29-item version of the test revealed the AQ to have good internal reliability with an overall alpha coefficient of .89. The alpha coefficients for the four subscales of Physical Aggression, Verbal Aggression, Anger, and Hostility were .85, .72, .83, and .77 respectively. Analyses of test-retest reliability for the overall score, and for the Physical Aggression, Verbal Aggression, Anger, and Hostility subscales, revealed a high level of stability over a nine-week period (r = .80, .80, .76, .72, and .72, respectively). Furthermore, the AQ has been shown to be useful in structural models designed to predict institutional violence in mentally disordered offenders, with the model accounting for 94% and 87% of the variance for physical and verbal aggression (47, 48).

These last three subscales have excellent reliability and acceptable validity (43, 44), but as they did not figure in any of the final regression equations they are not described further. Note, they exhibited high inter-correlations with the retained measures and with each other and are available from the authors.

Dependent Variable: Crime and Delinquency Index. The Dependent Variable: Crime and Delinquency Index (CDI) is a measure developed to assess elements of criminal actions for the purpose of quanti-

fying the seriousness of the act. The CDI is derived from the work of Sellin and Wolfgang (49) who developed an index of crime and delinquency incorporating a scheme of the relative seriousness of various offenses. It has been replicated in a Canadian population (38). The CDI was developed under the assumption that any index of crime and delinquency should be based on community-based judgments of the relative seriousness of offenses. Additionally, it was deemed important that it should measure offenses that involve bodily harm, theft, and/or damage or destruction of property, that the recorded units be the totality of the event and not restricted to its most serious aspect, and that this index would be appropriate as an estimation of seriousness particularly because of its additivity.

To this end, the CDI consists of five scoring elements based on the offense(s). These are physical harm, forced sexual harm (with and without weapon), non-sexual intimidation (with and without weapon), number of premises forcibly entered, number of motor vehicles stolen, and value of property stolen, damaged, or destroyed. Based on the offense(s)' description(s), independent of the stated or final charge (and thus unaffected by a plea arrangement), the number of acts (e.g., assaults) are tallied and multiplied by weights which increase based on increasing harm/injury (i.e., multiplied by 2 for a minor injury, by 7 if the victim was hospitalized, or 28 in the case of a murder). For example, if in addition to a victim being assaulted, a vehicle was stolen and the victim robbed after forcible entry into his/her premises, scores on all of these acts would be summed to provide the final tally. Thus, with this scheme, a higher score reflects a more serious crime with more harm to the victim(s).

The CDI has been shown to have excellent internal reliability (all α's exceeding .90 (38) and to hold up well over time, when used on a similar group of participants more than a decade later (49, 50). It has been shown to be valid across English-speaking (Canadian and American (38, 47), French Canadian (38), Chinese (51), and Spanish cultures

(52), and also with juvenile offenders (53), adult offenders and non-offenders (54, 55), and mentally disordered offenders (56).

Procedure

The nature of the study was explained to all participants, all questions asked by the prospective participant were answered, and the confidential and experimental nature of the study was emphasized. It was made clear to participants that details about past, unreported offenses should not be given, as the researcher was only interested in the number of prior convictions. Signed informed consent forms were obtained from all respondents prior to participation. The project was approved by the Centre of Addiction and Mental Health/University of Toronto Department of Psychiatry Research Ethics Board.

After completing the Informed Consent Form, the participants completed a demographic questionnaire in an adjacent quiet room on the Brief Assessment Unit or in a psychology testing room on the inpatient unit to minimize distractions and maximize privacy. It was emphasized that there were no right or wrong answers. The questionnaires were placed in the packages in random order to reduce the chance of bias due to order of presentation. The questionnaires were completed by the participant, unless the participant's reading ability was insufficient for the task. In such cases, the researcher assisted the participant by reading the questions and recording the responses. A chart review for 1) demographic information, 2) psychiatric diagnosis/diagnoses, and 3) current criminal charge, which was also given a CDI score (DV), was completed. After the study, participants were asked to keep all information they had learned about the study confidential. Any questions they had were answered. They were thanked for participating and the session was thereby terminated.

RESULTS

Descriptive Statistics

The means and standard deviations (and percentages when applicable) of the demographic, criminogenic, and psychometric variables

are shown in Tables 1, 2, and 3 respectively. Two extreme outliers were identified in regard to the dependent variable, with elevated scores being obtained due to the prosecutor's decision to issue a large number of charges in an attempt to have the accused accept a plea bargain. To commit the index offenses in Table 2, 24.9% of participants used predatory aggression, 0.5% defensive aggression, 3.5% non-realistic aggression, and 61.2% irritable/social aggression: 10% of such offenses did not involve violence.

Table 1. Descriptive Statistics for Demographic and Diagnostic Variables (n = 201)

Variable	Means	SD	Frequency/Percentage
Sex			
Males			171/85.9%
Females			28/14.1%
Age (Current)	35.28	10.75	
Age (At time of Index Offense)	34.62	10.45	
Education (Years)	11.78	2.83	
Elementary School Maladjustment			
None			114/57.3%
Minor			42/21.1%
Major			43/21.6%
Parental Separation Prior to Age 16			
Yes			55/27.6%
No			144/72.4%
Diagnoses			
Axis I			137/68.8%
Axis II			34/17.1%
Mixed Axis I & II			28/14.1%

Table 2. Descriptive Statistics for Criminal History Variables (n = 201)

Variable	Means	SD	Frequency/ Percentage
Current Offense			
Violent			133/66.8%
Non-Violent			67/33.3%
Number of Past Violent Offenses	2.61	3.27	
Number of Past Non-Violent Offenses	7.78	11.99	
Time Sentenced (Days)	790.98	1408.29	
Time Incarcerated (Days)	486.15	777.86	
Offense Type (includes attempted crimes)			
Assault			
Murder/Manslaughter			17/8.5%
Sexual			21/10.6%
Arson			9/4.5%
Weapons Charges			7/3.5%
Property Offenses			12/6%
Fraud Related			12/6%
Escape/Breach/Failure to Appear			10/5%
Other			17/8.1%
Victim Injury Level			
None/Slight			120/60.3%
Treated and Released			40/20.1%
Hospitalized			31/15.6%
Death			8/4%
Prior Release Failure			
Yes			130/65.3%
No			69/34.7%
Type of Aggression in Index Offense			
Predatory			48/24.1%
Defensive			1/0.5%
Non-Realistic Defensive			7/3.5%
Irritative/Social			123/61.8%
None			20/10.1%
Instrumental Aggression in Index Offense			
Yes			109/54.8%
No			90/45.2%

Table 3. Descriptive Statistics for the Various Psychometric Instruments (n = 201)

Variable	Means	SD
Violence Eliciting Situation Inventory (VESI)		
Definite:		
Predatory	0.05	0.25
Defensive	2.01	0.99
Non-Realistic Defensive	0.34	0.60
Irritable/Social	1.61	1.03
Might:		
Predatory	0.05	0.24
Defensive	0.53	0.78
Non-Realistic Defensive	0.27	0.64
Irritable/Social	3.15	0.97
Annoy but Controlled:		
Predatory	0.005	0.08
Defensive	0.05	0.26
Non-Realistic Defensive	0.07	0.27
Irritable/Social	3.87	0.43
Altruism	0.71	1.28

Hierarchical Linear Regression Model

Table 4 shows four models assessing offense severity using hierarchical, linear regression analysis. Model 1 assessed the predictive value of gender, only, to offense severity. This was done in order to control for any (unanticipated) effect of gender, given the very gendered nature of choice of crime to be committed (see e.g., review in Messerschmidt and Tomsen [57]). Given gender's lack of predictability (R^2 = 0.005, ns), it was removed from subsequent analyses. Variables were entered if they significantly contributed to predicting offense severity ($p < .05$) and were removed if they lacked significant predictability (p

> .05). Model 2 assessed the predictability of other demographic, criminal history, and diagnostic variables that might typically be considered as static "second generation" risk instrument predictors, including the AQ - Hostility Subscale score and CSS - Law, Court and Police score to offense severity scores. Other demographic variables were entered in this second step, again to control for any effect that differences in items previously shown to be related to crime commission such as age (58) might have had. Note that the Diagnosis variable was scored as 1, 2 or 3 for diagnoses involving Axis I only, Axis II only or a combination of Axes I and II, respectively. Thus, positive regression coefficients progress from Axis I, believed to be less related to aggression and violence, to Axis II—typically reflecting the externalizing Cluster B consisting of antisocial, narcissistic, borderline and histrionic diagnoses whose collective symptoms are mirrored by PCL-R-2 items (59)—that is more directly associated with aggression, to Mixed Axis I and Axis II diagnoses combining the motivation propensity for violence with impaired regulation secondary to cognitive and other deficits intrinsic to the psychotic disorders that identified the sample as forensic inpatients. The model was significant ($R^2 = .274$, $p < 0.05$).

Model 3 assessed whether there was any added predictability of offense severity afforded by two self-report measures. These were two potential dynamic self-report instruments, the CSS and the Buss-Durkee Aggression scale (60), which reflect pro-criminal attitudes and hostile/angry traits, both of which are potentially amenable to intervention. Addition of these two self-report measures increased the predictive accuracy of the model by 0.03 points ($R^2 = .311$, $p < 0.05$).

In the final model, two VESI variables were entered to evaluate the utility of adding individual's projections of violent situations involving realistic and unrealistic defensive triggers. This addition improved the model's predictive accuracy by 0.03 points ($R^2 = .341$, $p < 0.05$). Note that the VESI variables were selected because it was hypothesized that Axis I and Axis II characteristics seen in forensic patients tend to engender more sensitivity to slights and insults, and those with these

characteristics often interpret innocuous events as demeaning insults or serious threats. These interpretations and attributions could incrementally provoke irritable or fear based aggression. Thus the greater number of Defensive responses in the "Would Definitely Make You Violent" category could be related to a need to eliminate the threat, leading to more severe attacks. The number of Non-Realistic Defensive responses in the "Might Make You Violent" category similarly speaks to the tendency to perceive minor incidents as requiring an aggressive physical response. The number of "Irritate Not Make You Violent" responses made, speaks to the range of situations that the individual finds anger inducing. These individuals may have concurrent anger control difficulties affording especially violent responses to a range of situations that others might not perceive as even upsetting. Predatory responses in all categories were not selected because they occurred very infrequently: this seems likely to be a result of individuals not admitting venal motives out of self-presentation concerns. Alternately, relatively few of these forensic psychiatric patients had predatory violent offenses on their criminal records. Another reason exists why entering VESI data in the final step of the regression model was advisable. That is, it is possible that the events cited on the VESI that would make the participant act violently/become irritated but not violent, would be those surrounding the act for which the individual had been most recently charged. If participants completed the VESI in that way and cited the act(s) of which they were accused, it is possible the very act(s) the model was attempting to predict numbered among its predictors.

In summary, the most predictive model of offense severity scores based on the current sample was that including either Axis II (Personality Disorder) or both Axes I & II diagnoses, being younger at first non-violent offense, being older at first violent offense, scoring higher on the Law, Court and Police subscale of CSS, a greater number VESI Realistic Defensive "definitely make you violent" responses, and a less-

er number of VESI Non-realistic Defensive "might make you violent" responses ($R^2 = 0.341$; $\chi^2(159) = 276.06$, $p < 0.001$).

Table 4. Assessment of Best Fitting Model Using Hierarchical Regression – Best Fitting Model (n = 199)

Variable	Cumulative R^2	ΔR^2	B	SE	B
Model 1 ns	.005	.005			
Gender			-3.06	1.38	-.14
Model 2 * (Demographics)	.279	.274*			
Diagnosis			2.92	.64	.27
Marital Status			1.76	.60	.19
Age at time of first Non-Violent Offense			-0.165	.04	-.26
Age at time of first Violent Offense			0.10	.04	.17
Prior Release Failures			1.87	.97	.12
Model 3 ** (Self-Report)	.311	.03**			
Criminal Sentiments Scale (Law Court and Police)			0.05	.03	.12
Model 4 * (VESI)	.341	.03*			
VESI Definite violent/ Realistic Defensive			1.34	.51	.17
VESI Annoy but not violent/ Non-Realistic Defensive			-1.85	.72	-.15
Total R^2	.341				

* $p < .05$. ** $p < .01$.

Multiple Logistic Regression Analysis (MLRA) Model

Some of the predictive variables used in the just-noted hierarchical, linear regression were categorical. Consequently, although linear regression is relatively robust to violations of assumptions, it was considered worthwhile to also conduct a logistic regression in which nominal predictors may be employed. Also, crucially, much of the potential

utility of this work is to those deciding whether offenders held not responsible due to mental illness would severely recidivate, and therefore whether they should be released and/or have conditions placed on their liberty. Such decision-makers must make categorical decisions—to release or not, to impose a given condition or not. Showing a set of relative risk categories into which the current study's participants' scores actually placed them, was thought to be potentially helpful in assisting tribunals considering the merits of our predictors. Thus, an MLRA was performed.

Table 5. Multinomial Logistic Regression of Model 4 – Best Fitting Model

Effect	AIC of reduced model	BIC of reduced model	-2 log likelihood of reduced model	χ^2	df	Sig.
Intercept	602.857	1137.992	278.857[a]	.000	0	
Diagnosis	636.924	1152.240	324.924	46.068	6	.000
Marital status	612.786	1118.192	306.786	27.930	9	.001
Age 1st non-violent offense	537.252	666.081	459.252	180.396	123	.001
Gender	607.632	1132.858	289.632	10.776	3	.013
# "Might make you violent" Realistic Defensive Responses	605.416	1110.822	299.416	20.559	9	.015
# "Might make you violent" Non-Realistic Defensive Responses	612.978	1118.384	306.978	27.122	9	.001

* $p < .05$. ** $p < .01$.

Table 5 presents a multinomial logistic regression of the most predictive model (Model 4). These regressions' Akaike Information Criterion (AIC) and Bayesian Information Criterion (BIC) values were

compared, with the goal of determining the model of better fit. Where the AIC or BIC value is lower, better fit is indicated. Note that while AIC and BIC are related, the latter incorporates more inflation of score on account of overfitting (61). Model 4's McFadden value of .49 indicates that almost 50% of the variance in the offense severity scores was accounted for by this relatively parsimonious set of predictors. The model's overall correct classification rate was 68.2% (see Table 3). It is important to note that the Buss-Durkee Aggression variable is not present within the final model. A possible explanation for its lack of predictive ability within the final model, may be this questionnaire was not developed for mentally-disordered offenders. Indeed, institutional violence may be very different from that in the community.

Table 6. Percent of Participants Correctly Categorized Into Each CDI Score Quartile Via Multinomial Logistic Regression Model 4

Classification					
Observed	Predicted				
	Membership in lowest CDI quartile	Membership in second-lowest CDI quartile	Membership in second-highest CDI quartile	Membership in highest CDI quartile	Percent Correct
Membership in lowest CDI quartile	36	8	5	0	73.5%
Membership in second-lowest CDI quartile	10	35	7	2	64.8%
Membership in second-highest CDI quartile	8	7	36	5	64.3%
Membership in highest CDI quartile	3	3	6	30	71.4%
Overall	28.4%	26.4%	26.9%	18.4%	68.2%

Since MLRA predicts group membership, the distribution of CDI scores was divided into 4 nearly equal groups (0-2 CDI, first quartile; 3-6 CDI, second quartile; 7-11 CDI third quartile; 12 or higher CDI, fourth quartile). Then, the percentage of participants correctly assigned, via the final model, to each of these CDI score ranges, was assessed. As noted, overall percentage of participants correctly categorized was 68.2% (see Table 6).

DISCUSSION

We undertook this investigation to begin filling a void in the forensic psychological literature, predicting the severity of violent recidivism within a forensic population. The model may, in future, provide empirical support as part of a professional opinion. The article began by showing that prediction of severity of future violence in many such individuals (i.e., those found NCR) is implicitly required under certain circumstances in the four countries probed. It is likely that many other countries we did not examine also have explicit or implicit requirements for predictions of severity. Severity is a reasonable facet to consider before imposing a lengthy period of confinement or extensive conditions of release. Simple assault is made out in some jurisdictions by shouting at someone in public or non-sexual touching. One can see that a criminal justice system might not wish to impose an indeterminate sentence on individuals who would predictably shove or touch someone in a shopping mall or on a sidewalk once yearly. Aside from fundamental justice issues such as proportionality of punishment to offense, practical resource considerations suggest taxpayers are getting poor value in terms of enhanced public safety, in return for the high cost of incarcerating a relatively benign individual for decades, at a cost of approximately $1,000,000 per decade. Looked at from this perspective, public funds would be better spent if shorter sentences were imposed, accompanied by correctional programming that further reduced the risk of recidivism to the public.

SUMMARY OF METHODS

This study utilized an existing data set originally utilized by co-author Mark Watson at York University as the basis of his Ph.D. Thesis. As such, measures used were decided upon based on the needs of a different study's design. Sufficient measures had been employed, however, to allow for testing of the within hypotheses for the purposes of an exploratory study. The original study received ethical approval from the University of Toronto Research Ethics Board (as the patients were drawn from a University of Toronto-associated teaching hospital) and from the Research Ethics Board of the Department of Psychology, York University, where Dr. Watson was enrolled. The first author (D.N.) served as a co-supervisor for the thesis and received permission to re-use the data set for the purposes of prediction of severity of the index offense from the University of Toronto Research Ethics Board.

We note that the sample consisted of a group of actual forensic psychiatric patients, rendering our results potentially applicable to similar "real world" populations. A drawback of such ecological validity, however, exists: Participants may have reported their actual, most recent offenses (i.e., those they had just been charged with, and which we attempted to "predict") as those they might commit, in their VESI testing. Thus, one of the independent variables might have also been the same as the dependent variable, for some offenders. The change in R^2, however, accounted for by VESI scores was, as noted, only .03 (see Table 3). Thus, even excluding the VESI scores as predictors, an apparently better-predicting model of recidivistic severity (i.e., cumulative $R^2 = .311$) was still created, compared with previously available methods discussed above.

The existing data set of 201 participants' clinical files included a rich combination of demographic, clinical (e.g., diagnostic), and criminal history (e.g., description of index offense, list of previous criminal charges) data. Its diverse demographic make-up suggests that results might generalize to other geographic locales. For purposes of the

study, each participant, in addition to completing other measures, completed the VESI . Some VESI responses (e.g. Defensive type) are divided into Realistic Defensive (e.g., being attacked by a stranger on the street) or Delusional (e.g., being captured by a space ship). This distinction was important given that a not insignificant number of inmates were suffering from serious mental disorders and legally found Not Criminally Responsible on account of same (NCR). Often the basis for their NCR findings was that their *actus reus* originated in a delusional belief. The dependent variable was a severity score assigned to the index offense on the Akman-Normandeau Severity Index (ANSI).

SUMMARY OF RESULTS

Regardless of which type of analysis we conducted (i.e., multiple linear hierarchical regression or MLRA), results showed that some of the proposed variables successfully predicted severity of violence as measured by the ANSI. More specifically, the MLHR analysis produced a final R^2 value of 0.341while the MLRA analysis correctly classified participants 68% within the 4 severity quartiles defined by the ANSI scores. We now discuss specifics of the analyses in detail.

Gender did not contribute to severity prediction. Approximately 82% of the model's predictive success stems from the demographic variables (diagnosis, younger age at first non-violent offense, marital status, older age at first violent offense and prior release failures). The Law Court and Police subscale of the Criminal Sentiments Scale (CSS) added an additional 3% to the demographic predictability, and the two VESI variables (a greater number of VESI Definite violent, Realistic Defensive responses and fewer VESI Annoy not violent non-realistic defensive responses) added an additional 3%, resulting in a total predictability (r^2) of 0.34 (or an r of 0.58.). This result is stronger than existing predictions reviewed in the literature section above, with the exception of the single study reported by Burgess et al. (36), arguing

for its heuristic nature even if the current study marks a beginning and not endpoint of this research domain.

Turning to the MLRA, the strength of the predictive model is somewhat underestimated if we neglect the pattern of values adjacent to the diagonals in Table 6. Broadening the category to include the most similar adjacent category would further enhance the row accuracy rates. Specifically, the top row's (lowest quartile) accuracy would become 36+8/49 or 90% rather than 73%. Similarly, the second row (45/49) would become 92% rather than the current 65%, the third row would become 41/49 or 84% while the fourth row, reflecting the highest quartile 36/42 or 86%. Admittedly, this manipulation involves considerable "researcher optimism" but we note that this research is a first attempt at developing an accurate set of predictors for severity of future violence. What this operation suggests is that, with the addition of relatively few alternate predictors, a predictive accuracy in the mid to high 80 percent range appears feasible.

ADVANCES OF CURRENT STUDY AND ITS LIMITATIONS

The primary advance of this study is that it might provide forensic mental health clinicians with the ability to generate objective statements about severity levels of future violence contingent on likelihood estimates that an act of violent recidivism will occur. This combination of demographic, psychometric (CSS), and semi-structured interview (VESI) data represents different sources that combine into the predictive algorithm. This may serve as a model for other researchers attempting to advance beyond the UAC value of 0.75-0.80 in risk and severity prediction.

Despite our optimism, we are well aware of a number of limitations of the study. First, it is an initial study and replication is necessary to ensure generalizability of its results. Second, the study reflected a retrospective "postdiction" (i.e., not a prediction) of severity of the index offense. Third, our sample was predominantly pretrial, meaning the described crimes were allegations at the time of study and some

participants may have not actually committed the acts described. Finally, we used the Akman-Normandeau (ANSI) scale to measure severity of violence and this scale may be deficient for some purposes. Consequently, we urge caution when applying predictions derived from this procedure, despite its outperformance of existing measures. Despite these limitations, given the incipient nature of research into this aspect of risk assessment and the frequent necessity of providing a sense of how violent an individual might be in future, the utility of the given model is suggested. The model may, in future, provide empirical support as part of a professional opinion, and thus real-world utility.

From a theoretical perspective, there may be a situational limitation on the predictability of violence severity where an attack is motivated by attainment of a tangible goal (i.e., instrumental or predatory aggression). A feature of instrumental aggression is that only sufficient violence to achieve the intended goal is applied. Consequently, if the victim surrenders a purse or wallet quickly, a mugger may take it, escape the scene quickly, and inflict relatively little in the way of physical or psychological trauma. In contrast, if attacking a non-compliant intended victim, an escalation of violence to that level required to attain the attacker's goal will more often ensue. Consequently, victims' actions become an intrinsic element of prediction of violence severity for instrumental aggression. The forensic mental health professional cannot anticipate the actions of a victim, so this element of an ultimate predictive algorithm remains unavailable. One potential way of dealing with this is to assume a future victim would resist instrumental attack attempts to the greatest extent possible. Additional considerations might also jointly influence severity. These considerations might include a) the necessity of the goal for the assailant's well-being, (i.e., level of motivation), b) assailant's level of empathy, c) assailant's susceptibility to frustration and anger, and d) neuropsychological intactness of the assailant's frontal lobes to regulate anger and motivational systems. We note that much work remains to be done before such a

model could be put to use. Our improvement in predictive accuracy of severity of recidivism still only accounts for 30% of the variance. Much work remains before we can confidently conclude that optimal prediction of severity of possible future violence exists.

FUTURE PERSPECTIVES

A number of specific recommendations are made, with the goal of moving the study of recidivistic severity prediction forward. First recommended is the use of the PCL-R, instead of the self-report psychopathy measure we used (SPI), in some future work testing our model. This is suggested since the PCL-R has (independently) shown criminal recidivistic predictive ability. It was not used herein, due to practical constraints as noted, but its future use in some replications would demonstrate whether its predictive ability contribution is greater than that of the measure used. This may indeed be the case, especially given that scores on the two measures were uncorrelated in one forensic sample (46). Second, the development of a psychometrically superior scale for measuring severity of violence is recommended. Work on an enhanced scale is currently underway that involves quantifying physical and psychological aspects of violence severity. Also recommended is the development of a more comprehensive set of predictors of severity, including neuropsychological measures of cognitive, motivational and emotional regulation. This is recommended in part in recognition of the fact that individuals can "fail" psychological tests by scoring atypically high or low. Utilization of objective electrophysiological measures, concurrent with selected psychological tests, should furnish concurrent markers of extreme psychometric performance.

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