THE RELIABILITY AND VALIDITY OF THE EHAS IN CIVIL PSYCHIATRIC PATIENTS

by

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B.A. (Hons), Concordia University, 2007

THESIS SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF

MASTER OF ARTS

In the
Department of Psychology

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SIMON FRASER UNIVERSITY

Fall 2009

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ABSTRACT

This study examined the reliability and validity of a relatively new measure of hostile attributions, the External Hostile Attributions Scale (EHAS). Participants were 77 civil psychiatric patients discharged from a psychiatric ward of a general hospital. Results showed that the EHAS had good internal consistency at baseline and first follow-up. Generalizability (G) theory analyses suggest that EHAS scores were moderately stable over time, and that changes in item scores across participants and time accounted for most of this variance. Results from univariate analyses demonstrated that the EHAS had good convergent validity with measures of thought disorder, criminal attitudes, and treatment compliance. It was not, however, related to ratings on risk assessment instruments. The EHAS also demonstrated good divergent validity in that it was unrelated to measures of substance use, social support, and impulsivity. Finally, EHAS scores were not related to violence, victimization, and suicide-related behaviour retrospectively or prospectively.

Keywords: hostile attribution bias; risk assessment; risk factors; construct validity
DEDICATION

To Dr. Mark Ellenbogen, my first undergraduate thesis supervisor, for taking the time to share his passion for research with me and for encouraging me to pursue graduate studies in clinical psychology.
ACKNOWLEDGEMENTS

First and foremost, I would like to thank Dr. Kevin Douglas for his patience, encouragement, and kindness throughout the course of this project. I am very privileged to be a part of his lab and I look forward to continuing my graduate studies under his supervision. I would also like to acknowledge Drs. Tonia Nicholls and Stephen Hart for their feedback and insightful comments.

This project would not have been possible without the help and support of many individuals. To the other graduate students and research assistants in the CFL, thank you for the hard work and long hours spent on this study. Your dedication and sense of humour makes working with you a very rewarding experience. Many thanks to the staff and patients at Royal Columbian Hospital for their cooperation and efforts in facilitating data collection.

I am very appreciative for the support and encouragement of my friends and family over the course of my degree. In particular, I would like to thank Nathalie Lovasz for her friendship, for cooking such delicious meals, and most importantly for being there whenever I need someone to talk to; it means a lot. Thank you to Bryan Lovasz for his patience and unfailing ability to make me laugh, even in the most stressful moments. Finally, to my parents and grandfather for believing in my abilities and encouraging me to pursue my dream, even if it meant moving across the country – thank you.
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INTRODUCTION

Social cognition is the study of how individuals process information in social settings and situations. More specifically, social cognition refers to the perception and interpretation of social information (Sternberg, 1994). One of the most studied topics of social cognition is attributional style, which refers to the way in which individuals explain themselves, their actions, and the events around them. Individuals are thought to make attributions using three components for situations. Reasons for experiencing particular situations can be external or internal to the self, stable or unstable, and global or specific (Buchanan & Seligman, 1997). Different combinations of these three components typically result in different thinking patterns and attributional styles (Buchanan & Seligman, 1997), which have been described as developmentally acquired personality characteristics (Seligman, 1990).

Attributional style has been very important in the area of suicidality and depression, and a number of studies have demonstrated that internal (i.e., personal), global (i.e., pervasive; not situation-specific), and stable (i.e., permanent) attributions have been associated with depression and various harmful outcomes. Individuals with such a thinking pattern characterized by blaming themselves for negative outcomes, thinking that these negative events will be permanent and that they affect many areas of their lives have been
described as having a depressive attributional style (Abramson, Seligman, & Teasdale, 1978; Buchanan & Seligman, 1997).

Other authors have hypothesized that individuals form dominant themes that can guide social interaction and information processing by linking past experiences to newer experiences (Blackburn, 1989). It is suggested that, with extended experience, the way in which social situations are perceived becomes an overgeneralized manuscript, or self-schema. In individuals who have aggressive tendencies, the overgeneralized manuscript involves a bias in the attribution of hostile intent to others in interpersonal interactions (Blackburn, 1989).

The hostile attribution bias (HAB), or hostile attributional style, is the tendency to perceive others' intentions as hostile. This attributional style that has been extensively studied in the social cognition literature (Nasby, Hayden, & dePaulo, 1980), especially with respect to aggression and violent behaviour in children (see Dodge, 2006). The HAB is thought to result from a bias, or error, in social information processing. Novaco and Welsh (1989) suggested that individuals have deficits in how they process information relating to their pre-existing belief system, or schema, and that this has an influence on how these individuals attend to, encode, and store information; this is hypothesized to be an automatic process (Novaco & Welsh, 1989).

Dodge (1980) and Crick and Dodge (1994) hypothesized that cognitive distortions that lead to violence and aggression are characterized by an over-attribution of hostile intentions to others, and that this happens even in situations
where others are not behaving in a hostile manner towards them. The HAB has also been the subject of research on many more topics. The purpose of the present study is to investigate the reliability and validity of a new measure of HAB, the External Hostile Attributions Scale (EHAS; McNiel, Eisner, & Binder, 2003), in a sample of civil psychiatric patients. Therefore, this study will examine the convergent and discriminant validity of the EHAS against other variables, as well as to examine the EHAS' association with multiple adverse outcomes (e.g., violence, suicide-related behaviour).

After reviewing the literature on the HAB, much of which has been conducted with children, I will review what is known about the HAB with adults, focusing specifically on its association with psychiatric symptoms, anger, psychopathic traits, and adverse outcomes such as aggression, victimization, and suicide-related behavior. Finally, I will review the literature on the stability of the HAB over time.

**HAB and aggression in children**

As mentioned above, the majority of studies on the HAB have been conducted with the intent of examining aggressive behaviour in children. There is strong support for the conclusion that aggressive children tend to have higher levels of HAB relative to nonaggressive children. Most of the research of aggression and HAB in children has been conducted on males and has consistently found evidence for this relationship (e.g., Dodge, 1993; Dodge & Crick, 1990; Lochman & Dodge, 1994, 1998). However, the link between HAB and aggression has also been extensively studied in aggressive girls (e.g., Coie,
Dodge, Terry, & Wright, 1991; Crick & Dodge, 1994; Steinberg & Dodge, 1983), as well as male and female juvenile delinquents (e.g., Dodge, Price, Bachorowski, & Newman, 1990; Guerra, Huesmann, & Zelli, 1993; Lochman & Dodge, 1994). In a recent meta-analysis of 41 studies and over 6000 participants, the HAB was found to be a predictor of aggression in children, with a weighted mean effect size of $r = .17$, though effect sizes varied considerably across studies ($r = - .29$ to $r = .65$). In this meta-analysis, the overall relationship between HAB and aggression was highly significant, with increasing effect sizes being positively associated with the severity of the aggressive behaviour (Orobio de Castro, Veerman, Koops, Bosch, & Monshouwer, 2002). Evidence for this relationship was also found regardless of methodology (e.g., vignettes and hypothetical situations, self-report, experimental situations; see Dodge, 2006).

Although some studies have found smaller effects (e.g., Dodge, 1980; Dodge et al., 1986) and others have found that there was no significant relationship between the HAB and aggression in children (e.g., Dodge et al., 1997; Matthys, Cuperus, & van Engeland, 1999), the meta-analytic findings by Orobio de Castro et al. (2003) suggest an association between the HAB and aggression in children across samples, settings, and methodology.

The HAB in children has been found to be present in children as young as preschoolers, and retaliating using aggressive means due to a hostile interpretation of intent has been documented to begin as young as seven years, and has been found to continue into adulthood (Darley, Klossen, & Zanna, 1978; Dodge, 1980). Lochman and Dodge (1998) suggest that after having been
repeatedly exposed to negative situations in childhood, such as disagreement, rejection, and competitiveness, the HAB may be activated around nine years old, become self-sustaining and resistant to change, and remain present in adulthood.

**HAB and victimization in children**

Victimization also has been linked to hostile attributions, although the temporal relationship between these two variables is unclear. This has largely been investigated in the literature on children. Dodge, Pettit, Bates, and Valente (1995) found that abused children, relative to nonabused children, demonstrated significantly more hostile attribution biases, hypothesizing that as a result of victimization and abuse, such children have become hypervigilant to hostile cues and attend more to those than to nonhostile cues (Dodge et al., 1995). In line with this finding, others have suggested that hostile attributions may lead to inappropriate and angry behaviour, which in turn was predictive of maltreatment by peers (Nasby, Hayden, & DePaulo, 1980; Coie, Dodge, Terry, & Wright, 1991). The HAB has also been shown to be associated with relational victimization in third-, fourth-, and fifth-graders (Hoglund & Leadbeater, 2007; Yeung & Leadbeater, 2007).

**HAB and anger in children**

Research on anger has demonstrated that aggressive children who had high levels of HAB also had higher reported anger levels than nonaggressive children with lower levels of HAB (Crick, 1995; Graham, 1998). Furthermore,
children with aggressive tendencies are approximately 50% more likely to display HAB after ambiguous provocations (i.e., having their puzzle destroyed) than nonaggressive children (Dodge, 1980), and this is particularly salient in cases of threat to the self (Dodge & Frame, 1982). Teacher ratings of children's aggressive behaviour have also been found to be predicted by HAB (Dodge et al., 2002).

**HAB and aggression in adults**

Although there have been fewer investigations of the HAB and aggression in adult populations, these studies have found results consistent with the children's literature. Studies in nonclinical populations have demonstrated that, in experimental situations where adults were told that an opponent is shocking them maliciously, adults who attribute hostility to others tended to retaliate in a hostile and aggressive manner by administering shocks of higher intensity relative to nonhostile participants (Epstein & Taylor, 1967, Ohbuchi & Oku, 1980). Studies also show that, in hypothetical situations, participants with high levels of HAB would reportedly react to these situations in a verbally and physically hostile manner (Dodge & Somberg, 1987; Graham, 1998; Guerra et al., 1993). Furthermore, in sentence completion tasks, aggressive students were more likely to complete the phrase by choosing an aggressive ending in ambiguous or hostile sentences than were nonaggressive students (Dill, Anderson, Craig, & Deuser, 1997), and more likely to attribute hostile intent than nonaggressive students (Epps & Kendall, 1995).
The HAB has also, to a limited extent, been investigated with clinical populations. A sentence completion task has been used with criminal offenders, who were more likely to finish the phrase with an aggressive ending than nonoffenders, although there was no difference between offenders who had been violent and those who had not (Copello & Tata, 1990). Moreover, Eckhart, Barbour, and Davidson (1998) found that men who engage in intimate partner violence were more likely to display HAB than maritally satisfied or distressed men. Serin and Kuriychuk (1994) hypothesized that these distortions and biases are at the heart of aggression in psychopaths and that, through social learning, violent men have developed schemas biased toward HAB in social situations. In a correctional sample, hostile attributions have been shown to be predictive of violence in incarcerated male offenders (Vitale et al., 2005). The HAB has also been found to significantly predict inpatient violence in participants with severe mental disorders (Waldheter, Jones, Johnson, & Penn, 2005). Although the link between HAB and aggression in adults has been established, more research on clinical populations, such as psychiatric inpatients and outpatients, is needed.

**HAB and suicide-related behaviour in adults**

There is some support for a relationship between hostile attributions and non-suicidal self-injury, although most of the research in this area has been conducted on hostility rather than hostile attributions. Albeit different, these two concepts have been shown to be highly related (e.g., McNiel & Binder, 1994). For example, in a college sample, individuals who had self-harmed in the past 12 months had significantly higher hostility scores on the Positive and Negative
Affect Schedule (Watson, Clark, & Tellegen, 1988) than individuals who had self-harmed in the past and who had never done so. Furthermore, past self-harmers scored significantly higher on hostility than individuals who had never self-harmed (Brown, Williams, & Collins, 2007).

The relationship between hostility and self-harm has also been found with clinical populations. In a sample of individuals with schizophrenia, Barnett (2001) showed that those with high hostility and impulsivity had the highest incidence of self-harming behaviour, as well as the lowest scores on cognitive flexibility; however, as the author did not compare the variance accounted for by hostility, impulsivity, and cognitive flexibility separately, it is unclear whether hostility played a unique role. Other authors have obtained similar findings, further supporting the link between hostility and self-harm (Angst & Clayton, 1986), and impulsivity and suicidal acts (e.g., Herpertz, Sass, & Favazza, 1997; Hillbrand, 1995). Sampson, Mukherjee, Ukoumunne, Mullan, and Bullock (2004) demonstrated that psychiatric inpatients who had self-harmed had greater levels of intrapunitive aggression (i.e., aggression directed towards the self) and hostility than inpatients who had never engaged in such behaviour.

Using the Hostility and Direction of Hostility Questionnaire (HDHQ; Caine, Foulds, & Hope, 1967), other researchers have found similar results with respect to intrapunitive hostility. Follow-up analyses in a sample of individuals who presented to the hospital after a self-harm episode and subsequently discharged demonstrated that repeaters (i.e., those who self-harmed post-discharge) had significantly higher levels of hopelessness, intrapunitive hostility (i.e., hostility
directed toward oneself), and extrapunitive hostility (i.e., hostility directed toward others) than nonrepeaters. Those with a history of deliberate self-harming episodes were significantly higher on these three variables than those with no prior history (Brittlebank, Cole, Hassanyeh, Kenny, & Simpson, 1990).

Similar results have been obtained when examining the relationship between hostility and suicide-related behaviour (i.e., suicidal ideation, suicide attempts). In one study of individuals with bipolar disorder, hostility was related to having attempted suicide, and those having attempted suicide were more hostile and impulsive than those who had never attempted suicide. This relationship still held after controlling for severity of depression and illness duration (Michaelis, Goldberg, Davis, Singer, Gorno, & Wenze, 2004). Another study of individuals with bipolar disorder found that hostility was able to distinguish those with and without past suicide attempts, and that having two or more prior attempts increases the risk for future attempts in those with high, but not low, levels of hostility (Galfalvy, Oquando, Carballo, Sher, Grunebaum, Burke, & Mann, 2006).

Farmer and Creed (1986) also found an association between intrapunitive hostility and the presence of suicidal intent. Other authors examined hostility in both suicide-attempting and assaultive patients and found that both types of patients had high levels of hostility, and that there was no difference between the groups in terms of extrapunitive hostility. Suicide attempters, however, had higher levels of intrapunitive hostility (Maiuro, O'Sullivan, Michael, & Vitaliano, 1989). Hostility has also been found to be among the four factors increasing suicide risk in adolescents, along with hopelessness, negative self-concept, and
isolation (Rutter & Behrendt, 2004), and some authors have hypothesized that hostility in adolescents is associated with punitive self-injury directed at other (external) individuals (e.g., peers, parents) (Meehan, Lamb, Saltzman, & O’Caroll, 1992). Thus, the link between self-harming and suicide-related behaviour and hostility is a strong one, but less is known about the attribution of hostile intent and such behaviours.

**HAB and psychiatric symptoms, treatment compliance, and psychopathy**

Research has investigated the relationship between psychiatric symptoms and the HAB. Studies have demonstrated that there is a positive relationship between HAB and anger (e.g., Anderson, 1997; Anderson, Anderson, Dill, & Deuser, 1998; Mikulincer, 1998), and one suggestion is that HAB is caused by anger and its physiological arousal (Betancourt & Blair, 1992; Quigley & Tedeschi, 1996). Others have suggested that anger can be either an antecedent or a reaction to (Crick & Dodge, 1994) the HAB. However, another theory proposed that cognitive distortions (e.g., the HAB) determine emotions (e.g., anger), and that in turn aggressive behaviour is guided by anger (Weiner, 1980).

A few studies have examined the relationship between hostile attributions and treatment-related factors such as readiness to change, therapeutic alliance, and compliance to the recommended treatment. An unpublished dissertation by Zygmunt (1999) showed that individuals who had been noncompliant with antipsychotic medication one and six months post-discharge had significantly higher Hostility-Suspiciousness subscale scores on the BPRS than compliant individuals, which is consistent with past reports of hostility, uncooperativeness,
and suspiciousness being an important discriminator between compliance and noncompliance (e.g., Hoge, Appelbaum, Lawlor, Beck, et al., 1990; Marder, Mebane, Chien, Winslade, Swann, & Van Putten, 1983).

The relationship between psychopathy and HAB-related constructs has also been investigated. Some authors (Cleckley, 1976; Hare, 1991) have hypothesized that psychopathic individuals view the world as a hostile and unpredictable place, and consequently these distortions have been found to contribute to these individuals’ criminal behaviour (e.g., Newman & Wallace, 1993; Serin & Kuriychuk, 1994). In one of the first studies on the topic, Blackburn and Lee-Evans (1985) found that when adult male offenders are confronted with a hypothetical but threatening situation, offenders with psychopathic traits were more cognitively, physically, and emotionally reactive than nonpsychopathic individuals.

In line with these results, Serin (1991) demonstrated that psychopathic individuals had higher HAB levels than nonpsychopathic individuals, particularly when they felt provoked. Serin concluded that when they feel victimized, psychopathic individuals were more likely to perceive others as intentionally behaving in a harmful manner. Vitale, Newman, Serin, and Bold (2005) also investigated the HAB in incarcerated males and found a significant association (r = .20, p < .05) between HAB and scores on the Psychopathy Checklist – Revised (Hare, 2003). Furthermore, these authors found evidence that the relationship between psychopathy scores and the number of past violent offenses was mediated by the HAB (Vitale et al., 2005). Thus, although relatively little research
has been conducted on the HAB and psychopathy, the extant research
demonstrates a significant association between the two constructs, though this
needs to be confirmed in a psychiatric sample.

In sum, there is an overwhelming amount of evidence suggesting that the
HAB is an important construct to assess given its association with negative
emotions and outcomes such as anger, treatment noncompliance, suicide-
related behavior, and aggression. Despite the number of studies having focused
on the HAB, relatively fewer studies have examined whether the HAB is stable or
whether it fluctuates over time, which is important with respect to being a
potential focus of treatment and intervention.

**Stability of the HAB over Time**

Given that the HAB is a risk factor for violence as well as other harmful
outcomes, the development of a relatively short research and clinical tool that is
sensitive to change would be of use to clinicians and researchers. Few studies
have investigated the stability and the test-retest reliability of measures of hostile
attributions. Brittlebank and colleagues (1990) investigated the test-retest
reliability of the three subscales of the HDHQ in their sample of individuals who
self-harmed. They found that the reliability of the HDHQ after three to eight
weeks for the intropunitive hostility, dominance, and extrapunitive scales, was \( r = .85, .89, \) and .75, respectively, and another study found that a scale measuring
hostile attributions had good test-retest reliability \((r = .80)\) (Homant & Kennedy,
2003). A recent article by Cocco, Noblett, & McCloskey (2009) also found a
test-retest correlation of .75 for a measure of hostile attributions approximately 8 to 10 months after the first administration of that measure.

Despite its relative stability over time, there is now research suggesting that the HAB can decrease as a result of intervention. For example, in a sample of 47 mentally ill offenders undergoing generic correctional programming aimed at modifying offenders’ cognitions, Ashford, Wong, and Sternbach (2008) found that scores on the Hostile Interpretations Questionnaire (HIQ) as well as scores on the specific scale devoted to attribution of hostility, showed a significant decrease post-intervention compared to pre-intervention. Further, this change in hostile attributions was also related to a significant decrease in the number of technical probation violations, though there was no difference in actual arrest rates (Ashford et al., 2008).

Based on the literature suggesting that violence tends to occur when individuals have specific beliefs and thinking patterns such as persecutory delusions (Link & Stueve, 1994), hostility and suspiciousness (McNiel & Binder, 1994), and attributing blame onto others (Dodge & Schwartz, 1997), McNiel, Eisner, and Binder (2003) developed a 20-item self-report instrument to measure external hostile attributions which comprise what they labeled the aggressive attributional style in mentally ill individuals, given its potential in assessing their risk for violence towards others.

In their sample of 110 civil psychiatric patients, the EHAS was found to have good internal consistency (α = .84) and was positively and significantly correlated with anger (τ = .31, p < .01), persecutory ideas (τ = .54, p < .01), and
threat/control override (TCO) symptoms ($r = .44, p < .01$), suggesting that these variables may overlap with aggressive attributional style. Total EHAS scores were associated with having been violent in the past 2 months ($\beta = .30, p < .05$), and this relationship held even after controlling for demographic variables (i.e., age and substance-related, manic, and schizophrenic disorder). Thus, these results support the use of the EHAS in mentally ill individuals as a measure of cognitive style relevant to risk assessment (McNiel et al., 2003).

Although the EHAS demonstrated potential utility in violence risk assessment in its validation study, more research is needed before it can be established as a valid measure of aggressive attributional style. Studies are needed which replicate the reliability of the measure, and prospective studies should examine scores on the EHAS over time (i.e., test-retest reliability) to determine its potential utility as a dynamic risk instrument for violence risk management. Furthermore, the construct validity of aggressive attributional style has not been thoroughly investigated. McNiel and colleagues' initial findings provide some information for the convergent validity of the aggressive attributional style, but a more thorough investigation which includes multiple convergent and discriminant measures should be conducted. The EHAS has been shown to be retrospectively associated with violence, but to date no other adverse outcomes that have been shown to be frequent in mentally ill populations (e.g., victimization; e.g., Hiday, Swartz, Swanson, Borum, & Wagner, 1999) have been investigated with respect the EHAS, and this should be done while controlling for more specific variables (e.g., psychopathy scores) in addition
to demographic variables. As well, the EHAS has only been studied retrospectively, as opposed to prospectively.

**The present study**

The purpose of the proposed study was to investigate further the psychometric properties and validity of the EHAS in a sample of civil psychiatric patients. Specifically, I will investigate the internal consistency and the test-retest reliability of the EHAS; to my knowledge this is the first study to measure the EHAS at several intervals and examine the properties of this measure over time. Another goal of this project is to examine the convergent and discriminant validity of the EHAS with instruments of putatively dynamic risk factors. Lastly, given that the extant literature using the EHAS only examined its relationship with a single adverse outcome (i.e., violence), I also aimed to determine the strength of associations between the EHAS and theoretically relevant violence-related adverse outcomes (i.e., violence, victimization, self-harm, and SRB); this was done both retrospectively and prospectively.

Based on the extant literature and theory, I aimed to address the following research questions:

1. Does the EHAS have good psychometric properties (i.e., internal consistency, test-retest reliability) in a sample of civil psychiatric patients? Given its good internal consistency in the validation sample and the literature demonstrating attributional style to be relatively stable over time, it is predicted that the EHAS will have good internal consistency and test-retest reliability.
2. Does the EHAS have good convergent and discriminant validity? It is predicted that the EHAS will be significantly associated with variables such as negative attitudes and psychiatric symptoms (see Figure 1 for nomological net). Further, it is expected that there will be no association between the EHAS and variables it theoretically should not be related to (e.g., social support).

3. Does the EHAS have criterion-related and incremental validity vis-à-vis multiple violence-related adverse outcomes, such as victimization, violence, and suicide-related behaviour (SRB)? It is expected that the EHAS will be a significant predictor of negative life events, both retrospectively and prospectively.
Figure 1. Nomological Net for Aggressive Attributional Style

**Psychiatric Symptoms**
- COVR Beliefs/Delusion
  - Persecutory
  - Non-Persecutory
- BPRS-E Hostility-Suspicion
- BPRS-E Thought
- Disturbance

**Aggressive Attributional Style**

**Criminal Attitudes/Ideation**
- CSS-M Police/Total
- Schedule of Imagined Violence
- Treatment Noncompliance
- Anger

**Outcomes**
- Baseline
  - Violence
  - Victimization
  - Suicide-Related Behaviour

- Follow-up
  - Violence
  - Victimization
  - Suicide-Related Behaviour

**Discriminant Measures**
- DAST/MAST
- BPRS-E Activity
- BPRS Anxiety-Depression
- BPRS-E Withdrawal
- BIS
- ISSB

**Risk Assessment Tools**
- PCL:SV Facets 1 and 2
- HCR-20
  - Negative Attitudes
  - Active Sx of Major Mental Illness
METHOD

Overview

The current research protocol was part of a larger prospective, repeated-measures research project examining the relationship between dynamic risk factors and multiple adverse outcomes in patients admitted to the psychiatric ward of a general hospital. Semi-structured interviews and self-report measures were completed to examine, inter alia, which dynamic risk factors are predictive of violence, suicide-related behaviour, and victimization, with the goal of reducing adverse outcomes in this population. Ethical approval for the larger project was obtained from the Simon Fraser University Research Ethics Board and the Fraser Health Authority.

Participants

Participants were 77 civil psychiatric patients (38 male, 39 female) recruited from the psychiatric ward of Royal Columbian Hospital (RCH) in New Westminster, British Columbia. Participants' ages ranged from 19 to 61 years ($M = 36.06$, $SD = 11.09$), and had an average of 12.51 ($SD = 2.36$) years of education (range, 7 to 21). The majority (85.9%) of participants identified as being Caucasian, followed by Asian (11.3%), and Other (2.8%). Similarly, most (88.7%) participants had English as a first language. With respect to marital status, 53.6% of participants were single (never married or common law), 19.7%
were divorced, 11.3% were married, and 5.6% were divorced and remarried. The majority of participants (63.4%) were unemployed at the time of admission, and 35.2% lived alone (supporting themselves), 31.0% were living with family, and 14.1% were living alone in subsidized housing.

Approximately three quarters (76.1%) of participants were admitted involuntarily, whereas 23.9% were admitted voluntarily. Reasons for admission included concerns about harm to self (73.2%), harm to others (19.7%), and risk of psychiatric deterioration (62.0%). Over three quarters (75.8%) had a previous commitment decision, and the number of prior psychiatric hospitalizations ranged from 0 to 100 ($M = 4.23$, $SD = 12.63$, $Mdn = 2$). Most recent Axis I diagnoses were Major Depression (22.72%), Bipolar Disorder (19.7%), Psychotic Disorder Not Otherwise Specified (16.7%), Schizophrenia (15.2%), Schizoaffective Disorder (12.1%), and Dysthymia (3.0%).

**Procedure**

Participants were eligible to participate in this study if they: (a) were between the ages of 18 and 65 years, (b) could speak English, and (c) resided in the catchment area covered by the Fraser Health Authority, a government organization responsible for healthcare in the Fraser North, South, and East regions of the Lower Mainland of British Columbia. Participants who were unable to provide informed consent (see below) or had a diagnosis of mental retardation were excluded from this study. Names of patients who were eligible and about to be discharged from RCH were given to RAs by the psychiatrist in charge, who then approached the patients while they were still in hospital, described the
research project, asked whether they were willing to take part in it, and led them through informed consent procedures.

All participants needed to provide informed consent in order to take part in the study. After approaching the participants, RAs went through the consent form with them. In addition to broadly explaining the purpose and procedures of the study, the consent form explained the voluntary and confidential nature of this research project, the limits to confidentiality, and that study participation, refusal, or withdrawal would not affect the standing of the participant (e.g., treatment opportunities, quality of care) either at RCH or following discharge. Once the participant read the consent form and agreed to participate, they were asked to answer five multiple-choice questions, as well as five open-ended questions to ensure their understanding of the material in the consent form. Information relating to any question answered incorrectly was reviewed by the RA, and the question was asked again. Participants needed to answer all questions correctly to be considered competent to give informed consent. The consent form was then completed by the participant and the RA; additionally, a witness observed the signature process.

Over the course of the study, psychiatrists gave RAs a total of 349 names of individuals who were about to be discharged from the hospital. Of these, 93 (26.65%) were either not eligible or were discharged before an RA approached them. Of the 256 remaining patients who were asked if they were willing to hear about the study, 42 (16.41%) declined, and 214 (83.59%) agreed to RAs approaching them; however, 33 (15.42%) individuals were discharged before
completing informed consent. A total of 181 patients completed the informed consent procedure. Of these, 68 (37.6%) declined participation in the research project; 95 (52.5%) agreed to participate, and 18 (9.9%) agreed to participate but were found not to be competent to participate as they could not accurately answer the questions after reviewing the consent form with the RAs. Of the 95 participants who agreed and were competent to take part in the study, partial or full data were available for the self-report and/or interview portion; demographic information for these participants can be found in the Participants section.

Participants completed a self-report session, lasting approximately an hour and a half, and consisting of a number of questionnaires assessing different dynamic risk factors, such as substance use, psychiatric symptoms, anger, mood, and criminal/violent attitudes. Participants were compensated $10 for participating in this part of the study.

Graduate-level RAs administered the interview protocol, which was a semi-structured interview taking an average of 3 hours to complete. This interview inquired about participants' backgrounds, current psychiatric symptoms, personality, experiences, and plans for the future, and was also used to code certain risk assessment instruments (see Measures). Although the interview protocol covered most aspects of the participants’ current situations, it was also specifically targeted to examine the lifetime occurrence of antisocial tendencies and violence-related adverse outcomes such as violence, victimization, suicide, and self-harm. Again, participants were compensated $10 for their involvement in this phase of the project.
Being in the hospital during the baseline interview and self-report session was desirable; however, in some instances participants were discharged before having completed all phases of the baseline protocol. In such cases, screening, self-report, and interview sessions were completed at safe public locations (e.g., Starbucks) chosen by the participant and RA, or at one of the outpatient clinics, halfway houses, and independent living facilities who offered us office space to facilitate data collection. To ensure accuracy of information as well as correspondence between self-report and interview sessions, the two phases of the baseline protocol needed to be completed close in time; a maximum of two weeks in between the two sessions was allotted.

Follow-up assessments were conducted in the community, and data from follow-ups was used for the test-retest reliability portion of the measure being validated, as well as for any occurrence of violence-related adverse outcomes during the follow-up period to examine the prospective validity of the measure in question. RAs met with participants in community mental health clinics or other public locations every four to six weeks, on 5 different occasions. For this phase, participants completed the same self-report measures of putatively dynamic risk factors as they did at baseline, and RAs conducted a semi-structured interview asking about different areas of functioning since their last meeting. Participants were remunerated $10 for their involvement with in the follow-up phase.

Before each phase of the study (i.e., screening, self-report, interview), participants were reminded of the main points included in the informed consent
(i.e., participation is voluntary, confidential, and would not affect their standing within the hospital or subsequent treatment opportunities and privileges).

Participants' files were reviewed at RCH. File information (e.g., discharge summaries, nursing notes) was used to rate some rater-based measures and to add to the information given by the participants during the self-report and interview components of the study. File information was also useful in the case where participants were poor historians and did not accurately recall certain events and/or incidents.

**Measures**

*External Hostile Attribution Scale* (EHAS; McNeil, Eisner, & Binder, 2003). The EHAS is a 20-item self-report questionnaire measuring aggressive attributional style and external hostile attributions, or a pattern of thinking characterized by thoughts that others are targeting them and will cause them unprovoked harm. Items are rated by the participant according to how much he or she believes the statements, on a 4-point scale (1 = Do not believe at all, 4 = Completely Believe). This construct has been hypothesized to provoke individuals to act violently (McNiel et al., 2003).

In addition to using the total score, I created two subscales based on conceptual dissimilarities in the items (See Table 1): Scale 1 consisted of items that appear to measure *Persecutory Delusions* (12-items), and Scale 2, which appears to measure *Attitudes toward Violence* (8-items). Readers are referred to the Introduction for an in-depth discussion of the extant literature on the reliability
Table 1

Composition of the two scales of the External Hostile Attributions Scale (EHAS)

<table>
<thead>
<tr>
<th>Scale Name</th>
<th>Item Number and Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scale 1. Persecutory Delusions</td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Someone intends to harm me.</td>
</tr>
<tr>
<td>2.</td>
<td>Someone has singled me out.</td>
</tr>
<tr>
<td>3.</td>
<td>I am in no danger at all.</td>
</tr>
<tr>
<td>6.</td>
<td>No one wants to hurt me.</td>
</tr>
<tr>
<td>7.</td>
<td>I am someone’s special target.</td>
</tr>
<tr>
<td>8.</td>
<td>I have reason to be very afraid of someone.</td>
</tr>
<tr>
<td>11.</td>
<td>Someone intends to do me wrong.</td>
</tr>
<tr>
<td>12.</td>
<td>I am the central object of someone’s thoughts.</td>
</tr>
<tr>
<td>13.</td>
<td>I am in great danger.</td>
</tr>
<tr>
<td>16.</td>
<td>No one is planning to hurt me.</td>
</tr>
<tr>
<td>17.</td>
<td>Someone is concentrating on me.</td>
</tr>
<tr>
<td>18.</td>
<td>I have no reason to be afraid of any one person in particular.</td>
</tr>
<tr>
<td>Scale 2. Attitudes toward Violence</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>People have every right to use physical harm to protect themselves from harm.</td>
</tr>
<tr>
<td>5.</td>
<td>When someone hurts you, it doesn’t necessarily mean they’re a bad person.</td>
</tr>
<tr>
<td>9.</td>
<td>When someone is hurting you, the best way to stop them is by using physical means.</td>
</tr>
<tr>
<td>10.</td>
<td>People who do harmful things are basically bad people.</td>
</tr>
<tr>
<td>14.</td>
<td>It’s never right to strike back at someone physically, even if they’re hurting you.</td>
</tr>
<tr>
<td>15.</td>
<td>Good people can hurt others.</td>
</tr>
<tr>
<td>19.</td>
<td>Physical force is not a good way to protect yourself from harm.</td>
</tr>
<tr>
<td>20.</td>
<td>Only a bad person would hurt someone.</td>
</tr>
</tbody>
</table>
and validity of the EHAS, and to the Results section for detailed information on the psychometric properties of the EHAS and its scales.

Construct Validity – Convergent Measures

_Psychopathy Checklist: Screening Version_ (PCL:SV; Hart, Cox, & Hare, 1995). The PCL:SV was developed for use as a short screening measure for psychopathy in forensic patients and offenders. It is scored on a 3-point scale (0 = does not apply, 1 = applies to a certain extent, 2 = applies), and total scores range from 0 to 24. The PCL:SV has been shown to be reliable, valid, and predictive of violence with civil psychiatric patients (e.g., Douglas, Ogloff, Nicholls, & Grant, 1999; Monahan et al., 2001). The PCL:SV has also shown incremental validity above and beyond the Violence Risk Appraisal Guide (VRAG; Quinsey, Harris, Rice, & Cormier, 1998) (Edens, Skeem, & Douglas, 2006), and there is support for its use cross-culturally (Douglas, Strand, Belfrage, Fransson, & Levander, 2005).

The PCL: SV was initially considered to have 2 factors: Part 1 assesses interpersonal and affective components of psychopathy (e.g., deceitfulness, lack of empathy) and Part 2 assesses a socially deviant and impulsive lifestyle (e.g., criminal behaviour) (Hart et al., 1995). However, recent developments have suggested that a three-factor model may be a more adequate fit than the two-factor model. The former is comprised of Arrogant and Deceitful Interpersonal Style, Deficient Affective Experience, and Impulsive and Irresponsible Behavioural Style (Cooke & Michie, 2001). A 4-factor model was then proposed by Hare (2003), in which each of the two original factors were further
decomposed into two nested factors, resulting into four ‘facets’: Interpersonal, Affective, Lifestyle, and Antisocial. Research supports the use of the three- (e.g., Cooke, Kosson, & Michie, 2001; Skeem, Mulvey, & Grisso, 2003) and four-factor solutions using the PCL-SV (e.g., Hill, Neumann, & Rogers, 2004). Facet 1 and 2 scores were calculated for this project; these scores had adequate internal consistency in this sample (i.e., .69, .80, and .79, respectively).

*State-Trait Anger Expression Inventory-2* (STAXI-2; Spielberger, 1999). The STAXI-2 is a three-part self-report questionnaire that asks about how participants are experiencing anger *presently* (state anger; 15 items; 1 = Not at all, 4 = Very much so), how they experience it *generally* (trait anger; 10 items; 1 = Almost Never, 4 = Almost Always), and how they react or behave when they are angry or furious (22 items; 1 = Almost never, 4 = Almost always). In a sample of 1085 participants, the STAXI-2 demonstrated adequate internal consistency and test-retest reliability, as well as convergent validity with measures of similar constructs (Borteyrou, Bruchon-Schweitzer, & Spielberger, 2008). Only the Trait Anger portion of the STAXI-2 was used for this project, and the scale demonstrated good internal consistency (α = .85) in this sample.

*Classification of Violence Risk – Beliefs/Delusions Questions* (COVR; Monahan et al., 2005). The COVR is an instrument that results from the MacArthur Study of Mental Disorder and Violence (Monahan et al., 2001) and is used as an actuarial instrument to estimate the probability of future violence based on 106 identified risk factors. One section of the COVR focuses on delusions and consists of eight common delusions participants may have had in
the past two months (e.g., someone was plotting against them, trying to poison them, spying on them). When participants endorse one or more beliefs, they are asked follow-up questions allowing the interviewer to rate the belief as (a) delusional, (b) possibly delusional, or (c) delusional. Participants are also asked to rate the frequency with which they have had these beliefs in the past two months, on a four-point scale (0 = Never, 4 = Very often). They are asked whether they have held this belief in the past week as well as the week before they were hospitalized, and again to rate the frequency of these beliefs on the same four-point scale. Research on this instrument in general (but not specifically this scale) has shown that the COVR has good interrater reliability and predictive validity with respect to violence (see Monahan et al., 2001). Scoring for this scale was done by assessing (a) the presence or absence of any delusion (if rated as delusional; \( \alpha = .749 \)), and (b) the presence of persecutory delusions endorsed (\( \alpha = .639 \)).

Brief Psychiatric Rating Scale – Expanded Version: Hostility-Suspicion, and Thought Disorder Factors (BPRS; Lukof, Nuechterlein, & Ventura, 1986). The BPRS is a 24-item measure which uses behaviourally anchored 7-point scales for each item, from 1 (symptom is not present) to 7 (symptom is very severe) in the past week. The first 12 items will be rated during the course of the semi-structured interview and on the basis of the participants' self-report of the symptoms based on questions asked by the interviewer. The last 12 items are rated on the basis of observation of the participant's behaviour during the interview. The BPRS-E can be examined using a global assessment of symptom
severity, or as several symptom clusters, which may be able to capture constructs of interest more easily (Lachar et al., 2001). The BPRS-E has been used extensively in psychiatric settings and has high inter-rater reliability in such settings (Dingemans, Linszen, Lenior, & Smeets, 1995).

For this study, the 5-factor model of the BPRS-E put forth by Burger, Calsyn, Morse, Klinkenberg, & Trusty (1997) using a sample of 165 outpatient psychiatric patients was used. This model consists of Thought Disorder, Withdrawal, Anxiety-Depression, Activity, and Hostility-Suspicion factors. The sum of scores on items for the Hostility-Suspicion (hostility, suspiciousness, and uncooperativeness), and the Thought Disorder (grandiosity, hallucinations, unusual thought content, and conceptual disorganization) scales were used to examine convergent validity. Internal consistency for these two factors was poor for the Hostility-Suspicion factor (α = .263) and mediocre for the Thought Disorder factor (α = .665).

Schedule of Imagined Violence (SIV; Grisso, Davis, Vesselinov, Appelbaum, Monahan, 2000). The SIV is an 8-item scale intended to measure the extent to which participants have been having daydreams or thoughts about physically hurting another person. Items measure frequency, target, and chronicity of these violent fantasies. This measure has been shown predictive of violence in psychiatric patients (e.g., Grisso et al., 2000; Lee, 2004). Because of limited sample size, only the item pertaining to the presence or absence of imagined violence was coded for analysis.
Criminal Sentiments Scale – Modified (CSS-M; Shields & Simourd, 1991).

The CSS-M is a 41-item measure assessing theoretically-relevant attitudes and beliefs regarding crime and justice, divided into five subscales: Attitudes toward the Law, Court, Police, Identification with Criminal Others, and Tolerance for Law Violations. For each item, participants indicate if they (a) agree, (b) are undecided, or (c) disagree with the statement. Examples of statements are “The law is rotten to the core,” “It’s OK to break the law as long as you don’t get caught,” and “The police are as crooked as the people they arrest.” Studies using this measure in correctional and forensic settings support the use of the CSS-M given its predictive validity vis-à-vis recidivism in violent offenders (e.g., Simourd, 1997; Simourd & Van de Ven, 1997) and concurrent validity with a scale measuring a similar construct, the Pride in Delinquency Scale (PID; Shields & Whitehall, 1994). In past research, the CSS-M has been found to have good internal consistency overall (α = .91) and for most (though not all) subscales (range, α = .51 - .87; Simourd & Olver, 2002). Only the Police and Total Scores were used in this study, and both scales were found to have good internal consistency (αs = .82 and .92).

HCR-20 Risk Assessment Scheme (HCR-20; Webster, Douglas, Eaves, & Hart, 1997). The HCR-20 is a broadband violence risk assessment instrument which uses professional judgment in making final risk decisions. This instrument can be employed in various settings, including psychiatric and correctional settings. The HCR-20 focuses on 20 risk factors having been found to predict violence; 10 historical factors, 5 clinical factors reflecting an individual’s current
and fluctuating violence correlates, and 5 risk management items which attempt to forecast risk factors a person could be exposed to during the follow-up period. Many research studies have demonstrated that the HCR-20 has good predictive validity in populations of interest for this study, namely civil psychiatric patients (e.g., Nicholls, Ogloff, & Douglas, 2004) and correctional offenders (e.g., Douglas & Webster, 1999; Belfrage, Fransson, & Strand, 2000). A meta-analysis of 60 studies using the HCR-20 scale in various settings demonstrated that it has good inter-rater reliability (range, ICC1 = .70 to .92) (Nikolova et al., 2006). A more recent meta-analysis of 113 studies examining the performance of different structured professional judgment tools also reported good predictive validity both for the HCR-20 Total scores and for the H, C, and R scales independently (range, AUCw = .69-.73, indicating moderate effect sizes) with respect to violence. Furthermore, in general moderate to large effect sizes were observed for the HCR-20 Total (AUCw = .48 - .72), R subscale (AUCw = .62 - .71), and C subscales (AUCw = .63 - .69) across different types of violence, while the H subscale had moderate effect sizes (AUCw = .64 - .75) (Guy, 2008). For this project, only scores on C2 (Negative Attitudes) and C3 (Active Symptoms of Major Mental Illness) were used.

Prior and Current Admission Treatment Checklist. This section of the interview sought to determine whether participants have been non-compliant with treatment in the past and during their current admission. More specifically, participants were asked whether they have ever (excluding the current admission) participated in specific types of treatment (e.g., medication, individual
or group therapy, substance abuse program), and whether there have ever been instances of non-compliance, such as not taking medication according to doctor's orders, or if they stopped going to treatment if it did not end naturally. Moreover, treatment involvement and compliance was assessed using the same manner for the current admission. Past and current admission non-compliance was coded as present if participants stopped going to or did not participate as suggested by a mental health professional for any of the treatments asked during each time period.

**Construct Validity – Discriminant Measures**

*Barratt Impulsiveness Scale, Version 11* (BIS-11; Barratt, 1994). The BIS-11 is a 30-item questionnaire measuring three aspects of impulsivity: attentional impulsiveness, non-planning impulsiveness, and motor impulsiveness. Items are rated on a 4-point scale ranging from ‘Rarely/Never’ to ‘Always/Almost always’. Research supports the use of the BIS-11 in terms of its internal consistency (alpha coefficients of .80 and .83 in prison inmates and psychiatric patients, respectively) (Patton, Stanford & Barratt, 1995), and test-retest reliability of .71 to .84, depending on the scale (Someya et al., 2001). Impulsivity as measured by the BIS-11 has been found to be predictive of adverse outcomes such as violence (e.g., Komarovskaya, Loper, & Warren, 2007) and suicide attempts (e.g., Brodsky et al., 2001). The BIS-11 was found to have acceptable internal consistency in this sample (α = .74).

*Brief Psychiatric Rating Scale – Expanded Version: Activity, Anxiety-Depression, and Withdrawal Scales* (BPRS-R; Lukof, Nuechterlein, and Ventura,
1986). The sum of scores on items for the Withdrawal (disorientation, blunted affect, emotional withdrawal, and motor retardation), Activity (tension, excitement, mannerism and posturing, and motor hyperactivity), and Anxiety-Depression (somatic concern, anxiety, depression, guilt, and self-neglect) scales were used to examine discriminant validity. Validity and reliability information pertaining to the BPRS-E was discussed above. In this sample, internal consistency for the Anxiety-Depression and Activity factors was acceptable ($\alpha = .720$ and $.720$, respectively) but mediocre for the Withdrawal factor ($\alpha = .60$).

*Inventory of Socially Supportive Behaviour* (ISSB; Barrera, Sandler, & Ramsay, 1981). The ISSB is a 40-item measure assessing actual (i.e., not perceived) aid, assistance, and supportive action (e.g., being taught something, provided with a service, support) that participants received from the people around them. For this study, a one-month time period prior to the self-report session was targeted. The ISSB has good internal consistency, test-retest reliability, and is correlated with other measures of social support (e.g., Finch et al., 1997) and perceived social support (Oritt, Paul, & Berhman, 1985). The ISSB had great internal consistency in this sample ($\alpha = .96$).

*Michigan Alcohol Screening Test* (MAST; Pokorny, Miller, & Kaplan, 1972). The MAST is a 25-item self-report measure which assesses the presence or absence of impairment associated with alcohol abuse. All items are rated on a 2-point scale (yes/no). The MAST has excellent internal consistency (alphas .83 to .95) as well as high test-retest reliability in psychiatric inpatient and outpatients (Zung, 1979). This measure has also been successful at determining whether
individuals meet DSM-III criteria for alcohol abuse (Ross, Gavin, & Skinner, 1990). In line with previous research, the MAST also had good internal consistency in this sample ($\alpha = .90$).

*Drug Abuse Screening Test* (DAST; Skinner, 1982). The DAST is a 28-item self-report questionnaire assessing the degree to which individuals have been impaired because of their non-medical use of drugs, or excess use of prescription drugs. Items are rated as present or absent. The DAST has been found to have good internal consistency and was good in discriminating between individuals diagnosed with a DSM-III diagnosis of substance abuse in a large sample of psychiatric patients (Staley & el-Guebaly, 1990). The internal consistency of the DAST in this sample was .92.

**Retrospective and Predictive Validity**

*MacArthur Violence Interview* (Monahan et al., 2001). Participants were asked whether they have engaged in any of eight aggressive behaviours during the current admission (e.g., kicking, biting, threats with weapon in hand). The same set of questions was asked pertaining to behaviour within six months prior to hospital admission. If the participant engaged in more than one of these behaviours during one incident, the most severe incident was recorded. If the incidents were separated by time, they were all recorded.

Likewise, participants were asked the same set of questions and needed to say whether they were the victim of one (or more) of these types of incidents during their current admission or within six months prior to admission. Data was coded using the coding scheme put forth by Monahan and colleagues (2001) and
classified each act as belonging to one of two following categories: (a) violence resulting in physical injury, threats made with weapon in hand, sexual violence, and assault with weapon use, and (b) other aggression, which includes battery not resulting in physical injury. These questions were asked both at baseline as well as during each of the follow-up interviews, to examine prospective validity.

*Supplementary Aggression Questions.* Participants were asked, in interview format, whether they engaged in violent and aggressive behaviour of a less severe nature (e.g., threat without a weapon in hand, yelling or screaming in a frightening manner). Information from files was also used to code these items. Again, these questions were rephrased to assess whether others may have victimized the participant in the same way. These incidents must have happened during the participant’s current admission and/or within the six months prior to admission. The same questions were asked at baseline and at each follow-up.

*Classification of Violence Risk – Self-Harm and Suicide Module (COVR; Monahan et al., 2005).* The self-harm and suicide module of the COVR is administered as part of a semi-structured interview and asks about the presence of suicidal ideation, attempts, as well as self-harm during the past two months. Additional questions include the means by which individuals attempted suicide, whether they were trying to kill themselves, the degree of self-harm sought, whether they had made plans in anticipation for dying, left a self-harm note, and whether the suicide attempt was premeditated, or passive or active. Validity information about the entire COVR was previously discussed.
Background questions, such as past or current admission suicide attempt or ideation, as well as self-harming behaviours, were also assessed during the course of the interview.

**Coding of Outcome Variables**

*Violence and Victimization*. For the baseline phase, I computed three indices of violence/victimization: Community Violence or Victimization in the 6 months prior to admission, violence or victimization either in hospital (current admission) or in the 6 months prior to admission, and lifetime violence or victimization. Community violence/victimization consisted of whether participants endorsed any of the *MacArthur Violence Interview* questions, and was coded dichotomously as present or absent. The presence or absence of violence during current admission and past 6 months was assessed using the *MacArthur Hospital Violence and Violence Interviews* and will be coded dichotomously. Lifetime violence was any adult (18 years +) violence perpetrated by the participant either in the hospital or in the community. This included the *MacArthur Violence Interview*, background questions for having robbed someone, set fires, and forced someone into sexual activity, and *Supplemental Aggression questions*. Lifetime victimization was assessed using the *MacArthur Hospital Violence and Violence Interviews, Supplemental Hospital Aggression questions,* and background questions that aimed at determining whether the participant was violently victimized in the past. Lifetime violence or victimization was also coded dichotomously.
Violence and victimization during the follow-up phase were coded dichotomously based on the presence or absence of these behaviours during any of the five follow-up periods. That is, data from each follow-up were aggregated to determine whether participants were violent or victimized at any point during the duration of the study. Both violence and victimization were assessed using the MacArthur Violence Interview and Supplemental Aggression questions, and one variable was created for having been violent, and one was created for having been victimized, during the follow-up period.

Suicide-Related Behaviour (SRB). For the baseline phase, I computed three variables pertaining to SRB; two variables were computed using data collected in the follow-up interviews, which were again aggregated to correspond to SRB at any point during the follow-up period. Lifetime self-harm was coded using a background question asking about the engagement in any self-harming behaviour during the participant’s stay at the institution and the MacArthur Self-Harm questions. Self-harming behaviour during follow-up was coded using the MacArthur Self-Harm questions. Self-harm was restricted to self-harming behaviour without intent to die and was coded dichotomously.

Having attempted suicide in one’s lifetime was coded at baseline using background questions asking participants whether they had made suicide attempts (i.e., with intent to die), as well as using the MacArthur Suicide Module. This was coded dichotomously.

The lifetime presence of any SRB was comprised of lifetime self-harm, lifetime suicide attempts, as well as questions asking participants if they had ever
had thoughts or plans about suicide (i.e., suicidal ideation). These three variables were measured both for current admission as well as lifetime presence of these outcomes. These were coded dichotomously based on background questions and on the MacArthur Self-Harm and Suicide Module questions.

Analyses

Inter-Rater Reliability. Some of the risk assessment and symptom severity measures used in this study require special training in order to be used consistently by different raters (i.e., HCR-20, PCL-SV, BPRS-E). Consequently, all graduate-level RAs administering the research interview underwent training for each measure prior to data collection. Interrater reliability was determined using practice cases for each instrument. Furthermore, to ensure reliability once data collection started, approximately 25% of the cases assigned were assigned to 2 RAs, meaning that one RA conducted the interview while the other sat in on the interview. Both raters then independently reviewed the participant’s file and rated the instruments. All interviewers were observed once at the beginning of the study and given supervision and feedback on their performance, to ensure that RAs were properly trained and administered the interview in a standardized manner.

A total of 14 cases were chosen and completed to determine inter-rater reliability (IRR); these cases were randomly assigned to different pairs of RAs. A total of 15 interviewers were involved in making IRR ratings – seven different RAs were primary interviewers for these cases, and 12 RAs were the inter-rater for the case. Thus, some RAs had both an interviewer and inter-rater role at
different points in the study. All 14 cases were coded by different pairs of inter-raters; that is, particular pairs of raters never rated more than one case.

Intraclass correlation coefficients (ICC) were examined using one-way random effect models for single (ICC₁) and averaged (ICC₂) ratings. Although I considered ICC₁ the primary index of reliability, ICC₂ was also calculated to determine the reliability of averaged ratings. ICC was chosen as the reliability coefficient of choice given its ability to measure agreement as opposed to association between scores of two raters, because it is sensitive to biases between raters, and because it corrects for chance agreement (Bartko & Carpenter, 1976). A generally accepted guideline for the interpretation of kappa (κ) and weighted kappa (κw), which are mathematically equivalent to ICC, is as follows: indices below .40 are considered “poor”, indices between .40 and .59 are considered “fair”, those between .60 and .74 are interpreted as “good”, and those between .75 and 1.00 are considered “excellent”.

Table 2 presents ICC₁ and ICC₂ indices for measures rated by more than one RA. For symptom severity on the different factors of the BPRS-E, inter-rater reliability ranged from “poor” (i.e., Activity) to “excellent” (i.e., Thought Disorder, Hostility, and Anxiety-Depression). On the HCR-20, reliability indices ranged from “poor” to “good”, whereas all reliability coefficients pertaining to the PCL: SV were in the “excellent” range. It is important to note that the ICCs for item- and scale-level reliabilities are expected to differ based on the number of items which they comprise. As a general rule, scales and factors which use the sum of single
Table 2

*Interrater Reliability of the BPRS-E, PCL:SV, and HCR-20*

<table>
<thead>
<tr>
<th>Item/Scale</th>
<th>ICC₁</th>
<th>(95% C.I.)</th>
<th>ICC₂</th>
<th>(95% C.I.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BPRS-E</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Activity</td>
<td>.352</td>
<td>(-.181 -.731)</td>
<td>.521</td>
<td>(-.443 -.845)</td>
</tr>
<tr>
<td>Anxiety-Depression</td>
<td>.890</td>
<td>(.703 -.963)</td>
<td>.942</td>
<td>(.825 -.981)</td>
</tr>
<tr>
<td>Hostility-Suspicion</td>
<td>.753</td>
<td>(.405 -.913)</td>
<td>.859</td>
<td>(.576 -.954)</td>
</tr>
<tr>
<td>Thought Disorder</td>
<td>.984</td>
<td>(.952 -.995)</td>
<td>.992</td>
<td>(.975 -.997)</td>
</tr>
<tr>
<td>Withdrawal</td>
<td>.473</td>
<td>(-.038 -.792)</td>
<td>.642</td>
<td>(-.079 -.884)</td>
</tr>
<tr>
<td>PCL:SV</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Facet 1</td>
<td>.842</td>
<td>(.590 -.946)</td>
<td>.914</td>
<td>(.742 -.972)</td>
</tr>
<tr>
<td>Facet 2</td>
<td>.762</td>
<td>(.422 -.916)</td>
<td>.865</td>
<td>(.593 -.956)</td>
</tr>
<tr>
<td>Total</td>
<td>.903</td>
<td>(.735 -.968)</td>
<td>.949</td>
<td>(.847 -.984)</td>
</tr>
<tr>
<td>HCR-20</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C2</td>
<td>.254</td>
<td>(-.284 -.676)</td>
<td>.405</td>
<td>(-.791 -.807)</td>
</tr>
<tr>
<td>C3</td>
<td>.477</td>
<td>(-.033 -.794)</td>
<td>.645</td>
<td>(-.068 -.885)</td>
</tr>
<tr>
<td>Total</td>
<td>.713</td>
<td>(.328 -.897)</td>
<td>.832</td>
<td>(.494 -.946)</td>
</tr>
</tbody>
</table>

Notes. N = 14. C2 = Negative Attitudes. C3 = Active Symptoms of Major Mental Illness. C.I. = Confidence Interval. BPRS-E Thought Disorder, BPRS-E Hostility-Suspicion, BPRS-E Anxiety Depression, PCL:SV Facet 1, PCL:SV Facet 2, PCL:SV Total, and HCR-20 Total scores ICC₁ and ICC₂ values are significant at p < .001. BPRS-E Withdrawal and HCR-20 Active Symptoms of Major Mental Illness ICC₁ and ICC₂ values are significant at p < .05. BPRS-E Activity and HCR-20 Negative Attitudes ICC₁ and ICC₂ values are not significant at p < .05.
items are more reliable than single items (e.g., Douglas & Reeves, 2010); these results are consistent with this general rule.

Psychometric Properties. Psychometric properties of the EHAS were examined using Cronbach's alpha (α), which is the coefficient of choice when looking at a measure's reliability (John & Benet-Martinez, 2000). I also computed the mean interitem correlations (MIC) and the corrected item total correlations (CITC), which calculates the correlations of each item with the sum of the remainder of the items on the scale, for the Total EHAS score as well as Scale 1 and Scale 2. I also examined item distributions, frequency counts, and histograms, examining the data for restricted range and/or truncated range.

Generalizability (G) theory was used to parse out the variance components attributed to time and change in EHAS item scores for participants, to determine whether the variance in test-retest scores can be explained by time or by an actual change in attitudes. These analyses were limited to Total EHAS scores. G theory divides variance into 'facets', and attributes a lot of importance to those 'facets' in the model because they inform researchers as to the potential sources of error (Marcoulides, 2000). The advantage of G theory over classical test theory is that the latter cannot estimate the multiple sources of error, thereby aggregating them into only one error term. In contrast, G theory recognizes that there can be multiple sources of error, that these can occur simultaneously (e.g., different testing occasions, test items), and takes into account the changes in rank order of participants.
Thus, I examined the absolute (i.e., reliability of scores across items and
time) and relative (i.e., degree to which participants' rank order is maintained) G
coefficients and the variance attributed to items (I), time (T), and participants (P)
using a two-facet fully-crossed design. Thus, Facet 1 (items) was composed of
20 items, and Facet 2 (time) had 2 conditions. I also examined the interactions
between these three facets to reflect participants' rank ordering across items,
rank ordering of individuals across time, and the degree to which the construct is
being assessed by the measure across time (Brennan, 2001). Analyses were
conducted using syntax developed by Mushquash and O'Connor (2006).

Given that this was an exploratory study of the EHAS which could have
implications for future revisions, I was also interested in performing Decision
Study (D study) analyses, because these can be used to forecast G-Coefficients
that could theoretically be obtained for hypothetical levels of facets (Mushquash
& O'Connor, 2006). In the case of the present study, this could be done by
altering the number of occasions (or times) the EHAS would be administered to
participants, as well as how many items the measure has, assuming that the
EHAS could be either shortened or lengthened if need be. Thus, analyses were
performed using a hypothetical number of occasions ranging from 1 to 5, as well
for a hypothetical EHAS comprised of 10, 15, 20, 25, or 30 items. This was also
computed for a two-facet fully crossed design using syntax provided by

Validity. To examine the convergent validity of the EHAS with other
theoretically-relevant variables, I computed zero-order correlations and point
biserial correlations (for dichotomous variables) between EHAS total and scale scores and the variables to which these were expected to be related (See Figure 1). Discriminant validity was established in the same manner, where bivariate correlations between the EHAS were computed to examine the relationship between the measures of interest and constructs that theoretically should not be related to the EHAS.

Logistic regression analyses were used to examine the relationship with the EHAS and the presence or absence of outcome variables (i.e., violence, victimization, and suicide-related behaviour) for concurrent validity analyses, when point biserial correlations revealed a significant association between the two variables. Logistic regression was chosen for its ability to predict dichotomous outcomes (Cohen, Cohen, West, & Aiken, 2003). Hierarchical logistic regression analyses were performed to examine the incremental validity of the EHAS above and beyond variables related to perceived hostility, and to examine the validity of the EHAS vis-à-vis outcomes (i.e., victimization, violence, suicide-related behaviour, self-harm). For these analyses, covariates and variables theoretically related to the EHAS constituted Block 1, and the EHAS was entered in Block 2.

*Power.* Based on an estimated medium effect size ($\hat{\rho} = .15$), power of .80, $\alpha$ of .05, and a total sample size of 62 and 48 participants for the baseline and follow-up phases, respectively, the maximum number of variables included in the logistic regression models to detect significant associations was two for analyses including lifetime and prior outcomes (i.e., baseline data), and one variable (i.e.,
the EHAS) for predictive validity analyses (Cohen, 1992). All analyses were conducted using pairwise deletion of cases, to allow for a larger sample size. To reduce the probability of a Type 1 error and control for familywise error, all analyses were performed using the Bonferonni correction.
RESULTS

Psychometric Properties of the EHAS

First, I examined the psychometric properties of the EHAS in the current sample. Table 3 presents the descriptive statistics as well as the psychometric properties of the EHAS total and scale scores at baseline and follow-up #1. Also reported (in Table 4) are the mean scores and standard deviations at baseline for each item. As shown in Figures 2 and 3, the EHAS has a normal distribution both at baseline (skewness = .563, kurtosis = .656) and at the first follow-up interview (skewness = .712, kurtosis = .629), and there were no outliers.

Intercorrelations between the EHAS and its two subscales at baseline were as follows: .932 (p < .001) for Scale 1, and .514 for Scale 2 (p < .001). The correlation between Scales 1 and 2 was .169, which was not statistically significant. Similarly, the intercorrelation between the EHAS and Scale 1 at follow-up #1 was .907 (p < .001), and the EHAS and Scale 2 at follow-up #1 was .661 (p < .001). Scales 1 and 2 were significantly correlated at follow-up (r = .283, p < .05).

The EHAS had good internal consistency at baseline and follow-up (α = .826 and .802, respectively), as well as Mean Inter-item Correlation and Corrected Item-to-Total Correlations values within the normal range (Nunally & Bernstein, 1994). A paired samples t-test was used to determine whether scores
<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>M</th>
<th>SD</th>
<th>Range</th>
<th>α</th>
<th>MIC</th>
<th>CITC</th>
</tr>
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<tbody>
<tr>
<td>EHAS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baseline</td>
<td>66</td>
<td>42.29</td>
<td>9.59</td>
<td>24 - 70</td>
<td>.826</td>
<td>.187</td>
<td>-.037 -.757</td>
</tr>
<tr>
<td>Follow-up #1</td>
<td>48</td>
<td>39.42</td>
<td>8.09</td>
<td>26 - 64</td>
<td>.802</td>
<td>.191</td>
<td>.130 -.648</td>
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<tr>
<td>Scale 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baseline</td>
<td>66</td>
<td>23.49</td>
<td>8.53</td>
<td>7 - 48</td>
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<td>.417</td>
<td>.373 -.819</td>
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<tr>
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<td>18.40</td>
<td>3.68</td>
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<td>.358</td>
<td>.185 -.719</td>
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<tr>
<td>Scale 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baseline</td>
<td>66</td>
<td>20.32</td>
<td>6.32</td>
<td>12 - 44</td>
<td>.513</td>
<td>.113</td>
<td>.022 -.356</td>
</tr>
<tr>
<td>Follow-up #1</td>
<td>48</td>
<td>19.09</td>
<td>3.55</td>
<td>9 - 25</td>
<td>.608</td>
<td>.163</td>
<td>.135 -.418</td>
</tr>
</tbody>
</table>

Notes. MIC = Mean Inter-item Correlation. CITC = Corrected Item-to-Total Correlations.
<table>
<thead>
<tr>
<th>Item</th>
<th>M</th>
<th>SD</th>
<th>α if item deleted</th>
</tr>
</thead>
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<tr>
<td>1</td>
<td>1.58</td>
<td>.842</td>
<td>.806</td>
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<tr>
<td>2</td>
<td>1.89</td>
<td>1.025</td>
<td>.802</td>
</tr>
<tr>
<td>3</td>
<td>2.64</td>
<td>1.076</td>
<td>.820</td>
</tr>
<tr>
<td>4</td>
<td>2.68</td>
<td>.963</td>
<td>.826</td>
</tr>
<tr>
<td>5</td>
<td>2.52</td>
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<td>.834</td>
</tr>
<tr>
<td>6</td>
<td>2.48</td>
<td>1.153</td>
<td>.808</td>
</tr>
<tr>
<td>7</td>
<td>1.65</td>
<td>.953</td>
<td>.807</td>
</tr>
<tr>
<td>8</td>
<td>1.70</td>
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<td>.789</td>
<td>.832</td>
</tr>
<tr>
<td>11</td>
<td>1.70</td>
<td>.928</td>
<td>.801</td>
</tr>
<tr>
<td>12</td>
<td>1.79</td>
<td>1.031</td>
<td>.823</td>
</tr>
<tr>
<td>13</td>
<td>1.38</td>
<td>.780</td>
<td>.807</td>
</tr>
<tr>
<td>14</td>
<td>3.09</td>
<td>.836</td>
<td>.828</td>
</tr>
<tr>
<td>15</td>
<td>2.18</td>
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<td>.837</td>
</tr>
<tr>
<td>16</td>
<td>2.48</td>
<td>1.218</td>
<td>.807</td>
</tr>
<tr>
<td>17</td>
<td>1.85</td>
<td>1.070</td>
<td>.821</td>
</tr>
<tr>
<td>18</td>
<td>2.61</td>
<td>1.288</td>
<td>.802</td>
</tr>
<tr>
<td>19</td>
<td>2.59</td>
<td>1.007</td>
<td>.822</td>
</tr>
<tr>
<td>20</td>
<td>1.77</td>
<td>.941</td>
<td>.828</td>
</tr>
</tbody>
</table>
Figure 2

SPSS plot of the distribution of EHAS scores at baseline
Figure 3

SPSS plot of the distribution of EHAS scores at follow-up #1
on the EHAS at baseline and follow-up #1 differed significantly in participants who remained in the study. Results demonstrate that scores on the EHAS decreased significantly from baseline to follow-up, \( t(47) = 2.725, p = .009 \).

Next, I examined the psychometric properties of Scales 1 and 2 in this sample. Scale 1 had good internal consistency both at baseline (\( \alpha = .887 \)) and follow-up #1 (\( \alpha = .828 \)), as well as good MIC and CITC values. Results for Scale 2 were not as positive. Internal consistency for this scale was mediocre at baseline (\( \alpha = .513 \)) and acceptable at follow-up #1 (\( \alpha = .608 \)), but otherwise had MIC and CITC values within the normal range. Paired samples \( t \)-tests demonstrate that scores on Scale 1 significantly decreased over time (\( t(47) = 4.376, p < .001 \)), but that this was not the case for Scale 2 (\( t(47) = -1.540, p = .130 \)).

To examine whether there was a difference in scores between individuals who completed both baseline and follow-up #1 interviews and those who only completed the baseline phase, an independent samples \( t \)-test was performed to compare both groups. However, there was no difference in total or scale scores between individuals for whom data on the EHAS at follow-up #1 were not available. Additionally, \( t \)-test analyses also demonstrated that there was no difference in baseline or follow-up #1 scores between male and female participants. Thus, both genders were grouped for the remainder of the analyses.

As was shown in Table 3, both the Total EHAS score and the Scale 2 EHAS score at baseline had relatively low CITC values, meaning that some items were not meaningfully related to their respective total or scale scores,
which could have negatively impacted both the internal consistency of the scales as well as the strength of the findings.

According to Cohen (1988), a correlation ($r$) of .10 corresponds to a small effect size; therefore, internal consistency and total scores of the scales on which items had CITC values below .10 were recalculated. This consisted of Items 5, 10, and 15 on the Total EHAS score at baseline, and of item 20 for the Scale 2 score at baseline. Following this, alphas for Total and Scale 2 scores improved to .855 and .556, respectively. Analyses were performed again using these scores; no differences were found with respect to Scale 2 or Total EHAS scores; therefore, the results obtained using the original calculations and including items 5, 10, and 15 for the Total scale, and item 20 for Scale 2, were used for all analyses presented below.

**Generalizability Theory Analyses**

As mentioned above, G theory was used to parse out the variance components attributed to time and change in item scores for participants from baseline to follow-up #1, to determine whether the variance in test-retest scores can be explained by time or by an actual change in participants' attitudes. As shown in Table 5, averaging across participants and items, very little variance was due to the "Time" facet; similarly, relatively little variance was attributed to participants' scores averages across time and items. However, a significant proportion of variance was accounted for by changes in items across participants and time, which refers to variation in the degree with which the items assess the construct of interest. Further, the interaction between Participants and Items,
Table 5

Temporal Stability of the EHAS

<table>
<thead>
<tr>
<th></th>
<th>df</th>
<th>SS</th>
<th>MS</th>
<th>Variance</th>
<th>Proportion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participants (P)</td>
<td>47</td>
<td>331.012</td>
<td>7.043</td>
<td>.134</td>
<td>.114</td>
</tr>
<tr>
<td>Items (I)</td>
<td>19</td>
<td>572.302</td>
<td>30.121</td>
<td>.295</td>
<td>.251</td>
</tr>
<tr>
<td>Time (T)</td>
<td>1</td>
<td>8.938</td>
<td>8.938</td>
<td>.007</td>
<td>.006</td>
</tr>
<tr>
<td>P x I</td>
<td>893</td>
<td>832.873</td>
<td>.933</td>
<td>.249</td>
<td>.211</td>
</tr>
<tr>
<td>P x T</td>
<td>47</td>
<td>56.587</td>
<td>1.204</td>
<td>.038</td>
<td>.033</td>
</tr>
<tr>
<td>I x T</td>
<td>19</td>
<td>24.218</td>
<td>1.275</td>
<td>.017</td>
<td>.015</td>
</tr>
<tr>
<td>P x I x T</td>
<td>893</td>
<td>388.757</td>
<td>.435</td>
<td>.435</td>
<td>.370</td>
</tr>
</tbody>
</table>

G coefficient     | .758
Phi coefficient   | .685

Note. Df = Degrees of Freedom; SS = Sum of Squares; MS = Mean Squares; G coefficient = Relative G coefficient; Phi = Absolute G coefficient
which refers to how variable the rank ordering of participants was across items, accounted for a significant amount of variance, while the interactions between participants and time, as well as time and items, did not. A large amount of variance was attributable to a three-way interaction between participants, time, and items; however, the literature suggest that researchers not interpret this variance as it may reflect residual error, may be an actual interaction between the three facets of the study. As such, it is recommended that this variance component not be interpreted given that the three-way interaction term tends to be confounded (Brennan, 2001; Mushquash & O'Connor, 2006).

A plot of the $D$ Study coefficients is depicted in Figure 4, which reveals error variances for various hypothetical number of occasions and items. The figure demonstrates that there is an increase in reliability when the number of items as well as occasions is increased, which in turn suppresses measurement error. However, a closer look at the graph suggests that gains from multiple time points are minimal beyond three occasions.

**Outcome Criteria Descriptive Statistics**

Table 6 displays the proportion of the sample that experienced the various types of violence, victimization, and SRB outcomes of interest. Retrospectively, base rates of violence ranged from .606 for the broader, lifetime variable, to .197 for the narrow MacArthur definition of violence. A similar pattern emerged for victimization, whereby base rates ranged from .712 for lifetime victimization to .212 for the narrow MacArthur Victimization definition. The base rate for suicide-related behavior ranged from .288 (self-harm) to .818 (lifetime suicidal
Figure 4

SPSS Plot of D Study G coefficients for the EHAS
Table 6
Outcome Criteria Descriptives

<table>
<thead>
<tr>
<th>Criterion</th>
<th>N</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Outcomes at baseline (retrospective)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Community violence, past 6 months</td>
<td>13</td>
<td>(19.7)</td>
</tr>
<tr>
<td>Community or hospital violence</td>
<td>14</td>
<td>(21.2)</td>
</tr>
<tr>
<td>Lifetime violence</td>
<td>40</td>
<td>(60.6)</td>
</tr>
<tr>
<td>Community victimization, past 6 months</td>
<td>14</td>
<td>(21.2)</td>
</tr>
<tr>
<td>Community or hospital victimization</td>
<td>17</td>
<td>(25.8)</td>
</tr>
<tr>
<td>Lifetime victimization</td>
<td>47</td>
<td>(71.2)</td>
</tr>
<tr>
<td>Lifetime self-harm</td>
<td>19</td>
<td>(28.8)</td>
</tr>
<tr>
<td>Lifetime suicide attempt</td>
<td>34</td>
<td>(51.5)</td>
</tr>
<tr>
<td>Any lifetime SRB</td>
<td>54</td>
<td>(81.8)</td>
</tr>
<tr>
<td><strong>Outcomes at follow-up (prospective)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Community violence or aggression</td>
<td>15</td>
<td>(31.3)</td>
</tr>
<tr>
<td>Community victimization</td>
<td>17</td>
<td>(35.4)</td>
</tr>
<tr>
<td>Self-harm</td>
<td>6</td>
<td>(9.1)</td>
</tr>
<tr>
<td>Any SRB</td>
<td>29</td>
<td>(43.9)</td>
</tr>
</tbody>
</table>

Notes. For baseline outcomes, N = 61-62. For follow-up outcomes, N = 48.
behaviour). With respect to negative life events at any time during the follow-up period, base rates of community violence/aggression and victimization were .313 and .354, respectively. The base rate of self-harming behaviour was .091, and that of suicide-related behaviour was .439.

**Univariate Analyses**

*Convergent Validity.* Zero-order and point-biserial correlations were performed to determine the extent to which the EHAS and its subscales were correlated to variables they theoretically should be related to. As mentioned in the *Analyses* section, Bonferroni corrections were used to decrease the likelihood of Type I and familywise error; results are presented in Tables consisting of "families" of analysis in which I divided α (.05) by the number of correlations between the EHAS and other measures in that family. However, due to the number of comparisons and the relatively small sample size of this project, and given that for convergent and discriminant validity the pattern of findings was thought more important than the statistical significance of the results, the correlation coefficients presented in the tables below are those prior to applying to Bonferroni correction. Results are discussed using non-corrected values, followed by the pattern of findings after the Bonferroni correction was used.

With respect to psychiatric symptoms (see Table 7), the EHAS was found to be significantly correlated to the BPRS-E Thinking Disorder factor \(r = .365, p < .01\) as well as the presence of delusions generally \(r = .358, p < .01\) and, more specifically, the presence of persecutory delusions \(r = .458, p < .01\). Interestingly, EHAS scores were not significantly associated with scores on the
Table 7

Zero-order and point biserial correlations between the EHAS and psychiatric symptoms

<table>
<thead>
<tr>
<th></th>
<th>EHAS</th>
<th>BPRS-E Thinking Disorder</th>
<th>BPRS-E Hostility-Suspicion</th>
<th>Presence of Delusion(s)</th>
<th>Persecutory Delusion(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>EHAS</td>
<td>1</td>
<td>.365**</td>
<td>.185</td>
<td>.358**</td>
<td>.485**</td>
</tr>
<tr>
<td>BPRS-E</td>
<td>-</td>
<td>1</td>
<td>.428**</td>
<td>.424**</td>
<td>.383**</td>
</tr>
<tr>
<td>Thinking</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>.334**</td>
<td>.361**</td>
</tr>
<tr>
<td>Disorder</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>.768**</td>
</tr>
<tr>
<td>BPRS-E</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>Hostility</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Suspicion</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Note. N = 61-66. *p < .05, **p < .01.
BPRS-E Hostility-Suspicion factor ($r = .185$, ns). The same pattern of results was found for Scale 1 (see Table 8), where this scale was significantly correlated with the presence of delusions, persecutory delusions, and BPRS-E Thinking Disorder scores, but not with BPRS-E Hostility-Suspicion scores. This was the case both before and after the Bonferonni correction was used.

The relationship between the EHAS and measures of attitudes, anger, and treatment noncompliance was also investigated. Specifically, higher scores on the EHAS were associated with higher scores on the Police ($r = .366$, $p < .01$) and Total ($r = .307$, $p < .05$) scale of the CSS-M, as well as with having been noncompliant with treatment during the current admission to the hospital ($r = .277$, $p < .05$), but not in their lifetimes. No significant associations were found between the EHAS and trait anger or violent ideation. Upon using the Bonferonni correction, only the association between the EHAS and Police CSS-M scores remained significant. Table 9 presents these results in more detail. As shown in Table 10, Scale 1 of the EHAS correlated significantly with CSS-M Police scores ($r = .390$, $p < .01$), as well as noncompliance with treatment during the current hospital admission ($r = .337$, $p < .05$); again, after correcting for Type I error, only the association between Scale 1 and Police CSS-M scores remained significant. I also examined the relationship between the EHAS Total and Scale 2 scores and various components of widely used risk assessment tools, as presented in Tables 11 and 12. There were no significant correlations between the EHAS and Facets 1 and 2 of the PCL:SV, or with the Negative Attitudes and Active Symptoms of Major Mental Illness items of the Clinical Scale on the HCR-20. The
Table 8

Zero-order and point biserial correlations between Scale 1 and psychiatric symptoms

<table>
<thead>
<tr>
<th>Scale 1</th>
<th>BPRS-E Thinking Disorder</th>
<th>BPRS-E Hostility-Suspicion</th>
<th>Presence of Delusion(s)</th>
<th>Persecutory Delusion(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scale 1</td>
<td>1</td>
<td>.418**</td>
<td>.192</td>
<td>.369**</td>
</tr>
<tr>
<td>BPRS-E Thinking Disorder</td>
<td>-</td>
<td>1</td>
<td>.428**</td>
<td>.424**</td>
</tr>
<tr>
<td>BPRS-E Hostility-Suspicion</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>.334**</td>
</tr>
<tr>
<td>Presence of Delusion(s)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>Persecutory Delusions(s)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1</td>
</tr>
</tbody>
</table>

Note. $N = 61-69$. *$p < .05$, **$p < .01$. 

Table 9

Zero-order correlations between the EHAS, attitudes, and treatment noncompliance

<table>
<thead>
<tr>
<th></th>
<th>EHAS</th>
<th>Trait Anger</th>
<th>SIV</th>
<th>CSS-M Police</th>
<th>CSS-M Total</th>
<th>Current NC</th>
<th>Lifetime NC</th>
</tr>
</thead>
<tbody>
<tr>
<td>EHAS</td>
<td>1</td>
<td>.237</td>
<td>-.171</td>
<td>.366**</td>
<td>.307*</td>
<td>.277*</td>
<td>.180</td>
</tr>
<tr>
<td>Trait Anger</td>
<td>-</td>
<td>1</td>
<td>.000</td>
<td>.329</td>
<td>.409**</td>
<td>.561**</td>
<td>.202</td>
</tr>
<tr>
<td>SIV</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>-.224</td>
<td>-.206</td>
<td>-.083</td>
<td>.131</td>
</tr>
<tr>
<td>CSS-M Police</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>.637**</td>
<td>.321*</td>
<td>.112</td>
</tr>
<tr>
<td>CSS-M Total</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>.386**</td>
<td>.088</td>
</tr>
<tr>
<td>Current NC</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>.274*</td>
</tr>
<tr>
<td>Lifetime NC</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1</td>
</tr>
</tbody>
</table>

Note. $N = 62$-$66$. *$p < .05$, **$p < .01$. NC = Noncompliance. After performing analyses again upon recalculation of the Total EHAS scores, the relationship between the EHAS and Trait Anger became significant ($r = .270$, $p < .05$).
Table 10

Zero-order correlations between Scale 1, attitudes, and treatment noncompliance

<table>
<thead>
<tr>
<th></th>
<th>Scale 1</th>
<th>CSS-M Police</th>
<th>Current NC</th>
<th>Lifetime NC</th>
<th>HCR-20 C3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scale 1</td>
<td>1</td>
<td>.390**</td>
<td>.337*</td>
<td>.172</td>
<td>.150</td>
</tr>
<tr>
<td>CSS-M Police</td>
<td>-</td>
<td>1</td>
<td>.321*</td>
<td>.112</td>
<td>.097</td>
</tr>
<tr>
<td>Current NC</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>.274*</td>
<td>.058</td>
</tr>
<tr>
<td>Lifetime NC</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>.150</td>
</tr>
<tr>
<td>HCR-20 C3</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1</td>
</tr>
</tbody>
</table>

Note. N = 62-66. *p < .05, ** p < .01. NC = Noncompliance.
Table 11

Zero-order correlations between Scale 2 and convergent measures

<table>
<thead>
<tr>
<th></th>
<th>Scale 2</th>
<th>Facet 1</th>
<th>Facet 2</th>
<th>HCR-20 C2</th>
<th>Trait Anger</th>
<th>CSS-M Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scale 2</td>
<td>1</td>
<td>-.085</td>
<td>.110</td>
<td>.027</td>
<td>.057</td>
<td>.067</td>
</tr>
<tr>
<td>Facet 1</td>
<td>-</td>
<td>1</td>
<td>.242</td>
<td>.276*</td>
<td>.212</td>
<td>.135</td>
</tr>
<tr>
<td>Facet 2</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>.431**</td>
<td>.218</td>
<td>.090</td>
</tr>
<tr>
<td>HCR-20 C2</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>.239</td>
<td>.148</td>
</tr>
<tr>
<td>Trait Anger</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>.425**</td>
</tr>
<tr>
<td>CSS-M</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1</td>
</tr>
</tbody>
</table>

Notes. $N = 61-62$. *p < .05, **p < .01.
Table 12

Zero-order correlations between the EHAS and risk assessment tools

<table>
<thead>
<tr>
<th></th>
<th>EHAS</th>
<th>PCL: SV Facet</th>
<th>PCL: SV Facet</th>
<th>HCR-20 C2</th>
<th>HCR-20 C3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>-.031</td>
<td>.105</td>
<td>.099</td>
<td>.125</td>
</tr>
<tr>
<td>Facet 1</td>
<td>-</td>
<td>1</td>
<td>.242</td>
<td>.276*</td>
<td>.135</td>
</tr>
<tr>
<td>Facet 2</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>.431**</td>
<td>.090</td>
</tr>
<tr>
<td>HCR-20 C2</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>.148</td>
</tr>
<tr>
<td>HCR-20 C3</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1</td>
</tr>
</tbody>
</table>

Notes. N = 61-62. *p < .05, ** p < .01.
mean and median correlations for convergent validity analyses using Total EHAS scores were .206 and .211, respectively, and the correlations ranged from -.171 to .485. Thus, the Bonferonni correction did not need to be used.

_Discriminant Validity._ Next, I examined the relationship between the EHAS and variables it should theoretically not be related to using zero-order correlations. Expectedly, there was no significant association between the EHAS and measures of social support, alcohol and drug use, impulsivity, and the Anxiety-Depression, Activity, and Withdrawal factors of the BPRS-E. These results are presented in Table 13. The mean and median correlations for discriminant validity analyses using Total EHAS scores were .199 and .183, respectively, and the correlations ranged from -.111 to .237. I did not need to correct for Type I error.

_Association with outcomes._ Similar analyses were performed using point biserial correlations to determine the extent to which the EHAS was related to outcomes at baseline (i.e., retrospectively) and during follow-up (i.e., prospectively). As can be seen in Table 14, after using the Bonferonni correction the EHAS was not significantly retrospectively associated with any outcome of interest. However, there was a notable positive relationship between EHAS scores at baseline and having attempted suicide in the past prior to correcting for Type I error ($r = .298, p < .05$). No association was found for other adverse outcomes such as violence, violent victimization, and other forms of SRB. Similarly, there was no relationship between EHAS scores at baseline and the
Table 13

Zero-order correlations between the EHAS and measures of discriminant validity

<table>
<thead>
<tr>
<th></th>
<th>EHAS</th>
<th>ISSB</th>
<th>MAST</th>
<th>DAST</th>
<th>BIS</th>
<th>Anx-Dep</th>
<th>Activity</th>
<th>Withdrawal</th>
</tr>
</thead>
<tbody>
<tr>
<td>EHAS</td>
<td>1</td>
<td>.183</td>
<td>.144</td>
<td>.200</td>
<td>.237</td>
<td>.111</td>
<td>-.111</td>
<td>.231</td>
</tr>
<tr>
<td>ISSB</td>
<td>-</td>
<td>1</td>
<td>.216</td>
<td>.185</td>
<td>.206</td>
<td>.086</td>
<td>.181</td>
<td>.105</td>
</tr>
<tr>
<td>MAST</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>.662**</td>
<td>.138</td>
<td>-.170</td>
<td>.278*</td>
<td>-.057</td>
</tr>
<tr>
<td>DAST</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>.207</td>
<td>-.281*</td>
<td>.188</td>
<td>-.189</td>
</tr>
<tr>
<td>BIS</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>-.036</td>
<td>.036</td>
<td>.068</td>
</tr>
<tr>
<td>Anx-Dep</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>-.160</td>
<td>.113</td>
</tr>
<tr>
<td>Activity</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>.075</td>
</tr>
<tr>
<td>Withdrawal</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1</td>
</tr>
</tbody>
</table>

Notes. $N = 61-66$. *$p < .05$, **$p < .01$. Anx-Dep = Anxiety-Depression.
Table 14

*Point biserial correlations between the EHAS and baseline outcomes of interest*

<table>
<thead>
<tr>
<th></th>
<th>EHAS</th>
<th>Violence, past 6 months</th>
<th>Violence, past 6 months /hospital</th>
<th>Lifetime violence</th>
<th>Victim, past 6 months</th>
<th>Victim, past 6 months /hospital</th>
<th>Lifetime Victimization</th>
<th>Lifetime self-harm</th>
<th>Lifetime suicide attempt</th>
<th>Lifetime SRB</th>
</tr>
</thead>
<tbody>
<tr>
<td>EHAS</td>
<td>1</td>
<td>-0.064</td>
<td>-0.024</td>
<td>0.053</td>
<td>0.086</td>
<td>0.097</td>
<td>0.046</td>
<td>0.005</td>
<td>0.298*</td>
<td>0.084</td>
</tr>
<tr>
<td>Violence, past 6 months</td>
<td>-</td>
<td>1.0</td>
<td>0.954**</td>
<td>0.377**</td>
<td>0.382**</td>
<td>0.391**</td>
<td>0.094</td>
<td>-0.091</td>
<td>-0.003</td>
<td>0.084</td>
</tr>
<tr>
<td>Violence, past 6 months and hospital</td>
<td>-</td>
<td>-</td>
<td>1.0</td>
<td>0.395**</td>
<td>0.351**</td>
<td>0.443**</td>
<td>0.112</td>
<td>-0.030</td>
<td>-0.045</td>
<td>0.097</td>
</tr>
<tr>
<td>Lifetime violence</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1.0</td>
<td>0.231</td>
<td>0.220</td>
<td>0.211</td>
<td>-0.019</td>
<td>0.072</td>
<td>0.217</td>
</tr>
<tr>
<td>Victim, past 6 months</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1.0</td>
<td>0.878**</td>
<td>0.298*</td>
<td>-0.030</td>
<td>0.112</td>
<td>0.097</td>
<td></td>
</tr>
<tr>
<td>Victim, past 6 months / hospital</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1.0</td>
<td>0.339**</td>
<td>-0.023</td>
<td>-0.014</td>
<td>0.133</td>
</tr>
<tr>
<td>Lifetime victimization</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1.0</td>
<td>0.130</td>
<td>0.093</td>
<td>0.120</td>
</tr>
<tr>
<td>Lifetime self-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1.0</td>
<td>0.181</td>
<td>0.256*</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>------</td>
<td>------</td>
<td>------</td>
<td>------</td>
<td>------</td>
<td>------</td>
<td>------</td>
<td>------</td>
<td>------</td>
<td>-----</td>
</tr>
<tr>
<td><strong>Lifetime suicide attempt</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td><strong>Lifetime SRB</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-</td>
</tr>
</tbody>
</table>

Notes. $N = 61-62$. *$p < .05$, **$p < .01$.}
occurrence of any of the multiple adverse outcomes at any point during the follow-up period (see Table 15).

**Multivariate Analyses**

Logistic regression was used to examine further the association between the EHAS and Lifetime Suicide Attempts. EHAS scores were a significant predictor of lifetime suicide attempts, Wald $\chi^2 (1) = .579$, $p < .05$, $R^2 = .121$. Then, hierarchical logistic regression was used to determine whether the EHAS could significantly predict Lifetime suicide attempts above and beyond variables that have been associated with suicide attempts in the literature, namely substance use and impulsivity. To do so, substance use and impulsivity were entered in Block 1, and the EHAS was entered in the second block, with Lifetime Suicide Attempts as the criterion. Neither of the variables entered in Block 1 (i.e., substance use, impulsivity) were a significant predictor of lifetime suicide attempts (see Table 16). Similarly, both impulsivity and substance use remained nonsignificant in Block 2; the EHAS emerged as a significant predictor in that model. The model was not significant, however ($\chi^2 (3) = 6.814$, n.s., $R^2 = .139$).
Table 15

*Point biserial correlations between the EHAS and follow-up outcomes of interest*

<table>
<thead>
<tr>
<th></th>
<th>EHAS</th>
<th>Violence</th>
<th>Victimization</th>
<th>Self-Harm</th>
<th>SRB</th>
</tr>
</thead>
<tbody>
<tr>
<td>EHAS</td>
<td>1</td>
<td>-.122</td>
<td>.079</td>
<td>.271</td>
<td>.113</td>
</tr>
<tr>
<td>Violence</td>
<td>-</td>
<td>1</td>
<td>.535**</td>
<td>.289*</td>
<td>.178</td>
</tr>
<tr>
<td>Victimization</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>.379**</td>
<td>.332*</td>
</tr>
<tr>
<td>Self-Harm</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>.306*</td>
</tr>
<tr>
<td>SRB</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1</td>
</tr>
</tbody>
</table>

Notes. N = 48. *p < .05, ** p < .01.
**Table 16**

*Logistic Regression examining the relationship between the EHAS and Lifetime Suicide Attempts*

<table>
<thead>
<tr>
<th>Criterion/Predictor</th>
<th>B</th>
<th>SE (B)</th>
<th>Wald</th>
<th>$e^\beta$</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Lifetime Suicide Attempts</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Block 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Constant)</td>
<td>-2.263</td>
<td>1.941</td>
<td>1.359</td>
<td>.104</td>
<td>.244</td>
</tr>
<tr>
<td>Impulsivity</td>
<td>.032</td>
<td>.028</td>
<td>1.336</td>
<td>1.032</td>
<td>.248</td>
</tr>
<tr>
<td>Substance Use</td>
<td>.011</td>
<td>.014</td>
<td>.624</td>
<td>1.011</td>
<td>.430</td>
</tr>
<tr>
<td>Block 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Constant)</td>
<td>-4.225</td>
<td>2.325</td>
<td>3.302</td>
<td>.015</td>
<td>.069</td>
</tr>
<tr>
<td>Impulsivity</td>
<td>.022</td>
<td>.030</td>
<td>.566</td>
<td>1.023</td>
<td>.452</td>
</tr>
<tr>
<td>Substance Use</td>
<td>.007</td>
<td>.015</td>
<td>.241</td>
<td>1.008</td>
<td>.623</td>
</tr>
<tr>
<td>EHAS</td>
<td>.064</td>
<td>.033</td>
<td>3.910</td>
<td>1.067</td>
<td>.048</td>
</tr>
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</table>

Note. $N = 62$. 
DISCUSSION

The purpose of this project was to examine the reliability and validity of the EHAS and its two conceptually-derived subscales in a sample of civil psychiatric patients. Specifically, I aimed to explore further the psychometric properties of the EHAS and its subscales (i.e., internal consistency, temporal stability) as well as examine their association with other dynamic risk factors and multiple adverse outcomes.

These results build on McNiel and colleagues' (2003) initial investigation of the EHAS in several ways. First, I examined the psychometric properties of the EHAS over time; that is, this project was able to explore changes in EHAS scores over a four to six week period, as well as determine the variance components attributed to these changes. Second, I derived two subscales based on conceptual dissimilarities in the items, and examined the psychometric properties of these subscales. Third, I was able to examine the convergent and discriminant validity of the EHAS and its subscales using many different measures of dynamic risk factors and risk assessment instruments. Fourth, contrary to McNiel et al. (2003), this project investigated the association between the EHAS and many different violence-related adverse outcomes. Lastly, whereas McNiel et al. (2003) limited their analyses to retrospective validity, this project examined the relationship between the EHAS and the different negative life events both retrospectively and prospectively.
Psychometric Properties of the EHAS

In general, the EHAS was found to have good psychometric properties. Consistent with McNiel et al. (2003), we found that the EHAS had excellent internal consistency both at baseline (α = .826) and at follow-up (α = .802). The MIC and CITC were also within the normal range for both baseline and follow-up #1 (Nunnally & Bernstein, 1994). Thus, the EHAS had good psychometric properties at two different time points in this sample. After careful examination of this data, however, it was found that three of the items on the Total EHAS, as well as one item on Scale 2 (discussed below), had CITCs below .10, which is an accepted cutoff value for small effect sizes (Cohen, 1988). Thus, internal consistency coefficients were recalculated for these scales, and analyses were performed using fewer items; however, there was no difference in the patterns of scores from the original scales to the modified scales. Consequently, the original scales were retained for analyses.

The psychometric properties of the two EHAS subscales were also examined. Scale 1, which refers to Persecutory Delusions, also demonstrated good psychometric properties both at baseline and follow-up. Specifically, internal consistency was good for both baseline (α = .887) and follow-up (α = .828), and MIC and CITC were within normal range. Although MIC and CITC for Scale 2 were acceptable for both occasions, they were relatively low compared to both Total and Scale 1 values. Further, Cronbach’s alphas for these two occasions were below what is typically considered to be acceptable (i.e., .513 for baseline and .608 for follow-up #1) (Nunnally & Bernstein, 1994).
Correlations performed on Total and Scale scores of the EHAS demonstrated a strong association between Total and Scale 1 scores, both at baseline ($r = .932$) and follow-up #1 ($r = .907$), whereas the correlations between Scale 2 and Total EHAS scores were weaker, albeit still statistically significant for both baseline ($r = .514$) and follow-up #1 ($r = .661$). Interestingly, a paired samples t-test showed that there was a significant decrease in EHAS Total scores from baseline to follow-up #1, and the same pattern was found for Scale 1, but not Scale 2. Taken together, the strong correlations between Total and Scale 1 scores, as well as the similar decrease in scores from baseline to follow-up in both Total and Scale 1 scores, suggest that items on Scale 1 of the EHAS may be most important compared to Scale 2 scores in that Scale 1 may be tapping most into the construct that the EHAS is attempting to tap into.

Temporal Stability of the EHAS

I used G-theory to determine what components accounted for variance in the temporal stability of the EHAS from baseline to follow-up #1. The results demonstrate that changes in EHAS scores from Time 1 to Time 2 were mostly attributed to changes in item scores across participants and time (25.1%), as well as attributed to the interaction between participants and items, averaged across time (21.1%). Although a 3-way interaction between participants, items, and time accounted for a significant portion of the variance (37.0%), the literature cautions against the interpretation of this interaction term as it is likely impossible to determine the actual cause of it (e.g., Brennan, 2001). The G-coefficient for the analyses was .758; G-coefficients can be interpreted in much the same manner...
as ICCs, and as such, the G-coefficient for this study represents good test-retest reliability.

In addition, I conducted a D Study to examine the reliability of the EHAS across hypothetical number of items and time points. As was shown in Figure 4, G-coefficients for a 30-item EHAS over 5 occasions would be ideal as it is significantly higher than that of the present study. However, a closer look at the plot suggests that most of the benefits of multiple measurements may be lost after the third measurement occasion; increasing the number of items, however, seems to improve reliability in a linear function.

**Univariate Analyses**

*Convergent and Discriminant Validity.* Correlations were performed to examine the association between the EHAS and variables it theoretically should and should not have been related to. Bonferroni corrections were used for each family of correlations, and general patterns of findings will be discussed here given the lack of opportunity to examine the statistical significance of the correlations due to sample size. In general, the EHAS was found to have good convergent validity with measures of psychiatric symptoms, adequate convergent validity with measures of attitudes, anger, and noncompliance, and very little convergent validity with risk assessment tools.

Specifically, strong correlations were found between the Total EHAS and Scale 1 scores and measures of thought disorder, such as the BPRS-E Thinking Disorder factor as well as the presence of delusions and presence of persecutory delusions on the COVR Beliefs/Delusions questions. However, no association
was found between the EHAS and the BPRS-E Hostility-Suspicion factor. There are at least two possibilities for this unexpected finding. First, because of restricted range the reliability of the Hostility-Suspicion factor was very poor (α = .223) in this sample, which could have affected the EHAS' ability to be associated with this measure. Another possibility is that the EHAS may actually be measuring symptoms of psychosis (e.g., persecutory delusions) more so than symptoms of suspiciousness, uncooperativeness, and hostility. A more in depth analysis of items on the EHAS supports the hypothesis that this measure may be measuring delusions. For example, items such as "I am someone's special target" and "Someone is concentrating on me", which typify Scale 1 of the EHAS, could be interpreted as measuring hostile attributions in a healthy community sample, and could also be endorsed by individuals with psychosis, who would likely obtain higher scores on measures of thought disorder and delusional beliefs. This would be consistent with findings of very strong correlations between Scale 1 (i.e., Persecutory Delusions) and Total EHAS scores, and needs to be investigated further.

The EHAS also showed relatively good convergence with a measure of criminal attitudes and treatment noncompliance, but not with trait anger or violent fantasies. Specifically, the EHAS was significantly associated with the Police subscale score on the CSS-M, as well as with having been noncompliant with treatment during the current admission to the hospital. This makes theoretical sense, as if someone believes that others are acting in a hostile manner towards them, they are likely to think that treatment providers are doing the same as well,
thereby decreasing the likelihood of attending treatment. Similarly, the EHAS has items such as "People have every right to use physical harm to protect themselves from harm" and "Good people can hurt others" would be expected to correlate with measures of criminal attitudes. Again, the pattern of findings here was similar to that of Scale 1.

The findings that trait anger and violent fantasies were not associated with EHAS scores were somewhat unexpected, as it would be predicted that if someone perceives hostility and malevolent intent in others, then they would likely feel angry and may have fantasies about hurting or injuring some other party. However, the correlation between the EHAS and the Trait Anger scale of the STAXI-2 (r = .237, p = .057) was not significant but likely would have been significant with a larger sample size, and the relatively low base rates on the SIV (.16) could account for the lack of association with the EHAS.

One extremely unexpected finding was that the EHAS or Scale 2 scores were not significantly associated with any of the facets and items of the risk assessment tools in this project. There was no significant correlation between the EHAS and the Interpersonal (Facet 1) and Affective (Facet 2) facets of the PCL:SV and, more surprisingly, no relationship between the EHAS and the Negative Attitudes and Active Symptoms of Major Mental Illness items of the Clinical scale of the HCR-20. This suggests that the EHAS may be measuring a construct that neither the PCL:SV nor the HCR-20 measure; alternatively, and mostly in the case of the HCR-20, this could be related the fact that these
correlations are based on the association between the EHAS and single items on the HCR-20, which may not be ideal.

For a measure to have adequate validity, it is not only necessary to demonstrate its relationship with measures of similar constructs, but also that it is not associated with measures that it is theoretically unrelated to. As expected, there was a lack of association between the EHAS and measures it should theoretically not be related to, such as social support, substance use, and the Anxiety-Depression, Activity, and Withdrawal factors of the BPRS-E. This provides further support for the validity of the EHAS in that it demonstrates good discriminant validity.

**Associations with Outcomes**

Point biserial correlations were also performed to examine the association between the EHAS and multiple adverse outcomes such as violence, victimization, and SRB. These correlations were performed both for baseline and follow-up. The EHAS was positively and significantly related to having attempted suicide in one's lifetime before Bonferonni correction, but not afterwards. However, there was no relationship between the EHAS and any other outcomes at baseline or follow-up. This is contrary to McNiel et al. (2003), who found that the EHAS was significantly predictive of violence even after controlling for demographic variables.

Hierarchical regression was used to determine of the EHAS was a significant predictor of lifetime suicide attempts while controlling for substance use and impulsivity, which are variables that have been linked to suicide attempts.
in the literature. The results demonstrate that the EHAS was still significant in the model, but that the final model was not significant in that it did not predict suicide attempts.

**Strengths and Limitations**

There are considerable strengths to this study that should be mentioned. The present study included individuals who were in a psychiatric ward of a hospital and were subsequently in the community, which makes the results directly relevant to similar clinical populations. Further, although time consuming, the research protocol used was extremely thorough as information was collected from interviews, self-report measures, file review (e.g., nursing notes, psychiatrists' reports), as well as behavioural observation (e.g., BPRS-E). Also, the number of measures examining different risk factors allowed for a comprehensive investigation of the convergent and discriminant validity of the measure in question.

Another strength of this study was that this was the first attempt to examine the EHAS at different time points, and the first to investigate the predictive validity of the EHAS. It was also the first study exploring the validity of the EHAS with respect to outcomes other than violence (e.g., SRB), and the first to consider multiple measures for convergent and discriminant validity. Further, results obtained from examining the subscales derived from conceptual dissimilarities in items suggest that the EHAS may be best conceptualized as having two subscales, each measuring different constructs; however, this has yet to be empirically investigated.
As part of this research project, I examined using G-theory the temporal stability of the EHAS, as well as which components of the test-retest reliability of the EHAS (i.e., participants, items, time, and their interactions) accounted for significant proportions of variance from baseline to follow-up #1. Another component of G-theory used in this study to explore the hypothetical psychometric properties of the EHAS was the D Study, which examined the hypothetical G-coefficients of the EHAS if it were to have either a smaller or larger number of items, as well as how it would perform over a larger number of measurement occasions. This was a strength of this study as the EHAS is a relatively new measure whose psychometric properties have not been examined with the exception of its validation study (McNiel et al., 2003); as such, results obtained using G-theory, as well as the creation of two subscales, could have implications for revisions of the EHAS,

The current study is not without limitations, the most significant of these being the sample size of this project. The available sample sizes for baseline (N = 77) and follow-up (N = 48) interviews were small and therefore not adequate to detect significant associations between the EHAS and the constructs and outcomes of interest. This was further exacerbated by using the Bonferroni correction due to having performed multiple correlations. However, as noted above, in these types of situations the pattern of findings is more important than the significance of statistical analyses. Thus, subsequent research using a larger sample size may be able to elucidate the relationship between the EHAS and such variables. Another consequence of this small sample size was the inability
to investigate the composition of the conceptually derived scales empirically.

That is, although it would have been useful to examine the factor structure of the EHAS and whether it actually consists of two subscales using Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA), this was impossible due to sample size.

The use of self-report as the primary method of data collection for this project is problematic, as participants may have given more socially desirable answers and may have been poor historians. Although some measures and items were also based on file review and observation ratings (e.g., BPRS-E, PCL:SV), most of the protocol was administered in interview and questionnaire format. Additionally, there may have been fatigue effects due to the length of the protocol, which took an average of 1.5 hours for the questionnaire phase and around 3 hours for the interview phase.

Further, although in this thesis one of my primary aims was to determine the convergent and discriminant validity of the EHAS, this was not always possible as this project involved the use of secondary data. As such, there are measures that would have been useful in establishing the validity of the EHAS that were not part of the existing research protocol. For example, given that the EHAS is a measure of attributional style, the inclusion of other measures of hostile attributional style, or other attributional styles (i.e., pessimistic) would have been ideal. Further, given Seligman’s (1990) argument that attributional style is a personality characteristic, it would have been beneficial to measure its convergence with measures of personality (e.g., Personality Assessment...
Inventory [PAI; Morey, 1991]). In addition, given the larger project's focus on dynamic risk factors to multiple adverse outcomes, measures were typically chosen because they were risk factors for such outcomes, making it a challenge to find measures that would not be related to another potential risk factor (i.e., aggressive attributional style).

Finally, the generalizability of these findings to the population as a whole, and even civil psychiatric patients, is important to consider. Participation in this study was done on a voluntary basis, and there may have been a systematic bias in recruitment or challenges with respect to reaching every eligible patient. For example, it is possible that only more agreeable and less hostile patients may have agreed to participate, thereby restricting the range of EHAS scores and making the sample less representative of civil psychiatric patients in general. As well, it is uncertain whether these results would generalize to other clinical populations (e.g., inmates, forensic patients) or even to community-dwelling citizens. Nevertheless, findings of this study are expected to have implications for the use of the EHAS in civil psychiatric populations.

**Directions for Future Research**

Future research is needed on the EHAS and its reliability and validity. Investigations of EHAS should extend to other samples (e.g., community samples, correctional and forensic settings) to determine its suitability of use in other populations and to determine the extent to which EHAS scores vary and fluctuate in different settings. Importantly, longitudinal research with larger sample sizes should investigate, among other things, (a) whether the EHAS has
predictive validity vis-à-vis multiple adverse outcomes, (b) whether is has
incremental validity over measures that have already been associated with such
outcomes, (c) whether and how much the EHAS changes over time, and (d)
whether these changes are related to an increase or decrease in other risk
factors and outcomes.

Another area in need of research is the factor structure of the EHAS.
Given my observation that the EHAS seems to have items measuring two
different constructs, namely Persecutory Delusions (e.g., “I am someone’s
special target”, “Someone intends to harm me”) and Attitudes toward Violence
(e.g., “Good people can hurt others”), and the preliminary results above
suggesting that this may be a sensible way to reduce the data, future research
should explore and/or confirm the factor structure of the EHAS in larger and ore
heterogenous samples.

Conclusion

This study examined the reliability and validity of a relatively new
measure, the EHAS, in a civil psychiatric setting. Results support the use of the
EHAS in that it had good psychometric properties both at baseline and follow-up,
had good convergent and discriminant validity, especially with respect to criminal
attitudes and measures of delusional thinking. However, these positive findings
do not extend to using the EHAS as part of a risk assessment, as it was not
related to multiple adverse outcomes (with one exception) at baseline or follow-
up, although it is questionable whether the current sample size was adequate for
these analyses. Future research should examine further the predictive validity of the EHAS in other populations and with larger sample sizes.
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