SOCIAL COGNITION DEFICITS, SCHIZOPHRENIA, & VIOLENCE

THE RELATIONSHIP BETWEEN SOCIAL COGNITION DEFICITS AND VIOLENCE IN INDIVIDUALS DIAGNOSED WITH A PSYCHOTIC DISORDER

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ABSTRACT

Understanding the intentions of other people is critical for navigating the complex social interactions within our environment. Individuals with schizophrenia demonstrate difficulty relating to and recognizing the feelings, thoughts, and intentions of others – a construct known as social cognition. While many studies have investigated social cognition deficits in patients with schizophrenia, few have explored how these problems may contribute to social behaviour in this group, and violence specifically. Individuals diagnosed with schizophrenia show specific deficits when asked to take the perspective of another person, and perhaps this may account for findings that this same group is more likely to commit a criminal act, including interpersonal violence, compared to the general population. The present study aims to test the hypothesis that social cognitive deficits may be related to violence by evaluating various aspects of neuropsychological functioning, and social cognition specifically, in individuals diagnosed with a psychotic disorder. Twenty-two participants, 12 violent and 10 non-violent, completed a battery of psychometric tests that assessed neuropsychological functioning, emotion recognition ability, theory of mind ability, and attribution style. Although no significant group differences were found between the violent and non-violent participants, two interesting findings emerged. First, explaining social transgressions as a joke was a theme that emerged only in the violent group. Second, there was no relationship between one's accuracy and confidence regarding emotion recognition performance in this group. These trends signal potential explanations for violence in this group, with respect to misinterpretation, and specifically how this is related to psychotic content.

KEYWORDS: schizophrenia, psychotic disorder, violence, social cognition, theory of mind, emotion recognition, attribution style

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AUTHORS DELCARATION OF ORIGINALITY

I am the primary author of this thesis. I made significant contributions to the study by creating the research questions, interviewing the participants, analyzing the data, interpreting the results, and drafting the thesis.

CHAPTER I

Introduction

The ability to decode what another individual is thinking or feeling from indirect cues such as body language and eye gaze is critical in understanding the mental states of others. The term social cognition encompasses this ability and is primarily concerned with perception, interpretation, and processing of socially relevant information (Ostrom, 1984). The most commonly identified aspects of social cognition are Theory of Mind (ToM), social perception, emotion perception, and attributional style (Green, Olivier, Crawley, Penn, & Silverstein, 2005). Deficits in any one aspect of social cognition can lead to incorrect interpretations, which may result in various, sometimes problematic, social consequences. Individuals with psychotic illness display marked deficits across a variety of social cognition tasks (Craig, Hatton, Craig, & Bentall, 2004; Couture, Penn, & Roberts, 2006; Langdon, Coltheart, & Ward, 2006). This study focuses on social cognition deficits because poor performance on tasks involving mental state attribution is the strongest predictor of social behaviour problems in individuals diagnosed with a psychotic illness (Brüne, Abdel-Hamid, & Lehmkämper, 2007) and criminal behaviour can be considered an example of such a problem. More specifically, when compared to the general population, individuals diagnosed with schizophrenia are more likely to commit non-violent and violent crimes during periods of heightened psychosis (Brennan, Mednick, & Hodgins, 2000; Wallace, Mullen, & Burgess, 2004). The goal of this study is to understand how social cognitive deficits are related to interpersonal violence in patients diagnosed with a psychotic illness.

Social Cognition

Social cognition encompasses the range of processes that people use in order to understand, and respond to social situations. Perceiving, interpreting, and reacting to the emotions, intentions, and behaviours of others are all managed by this function (Brothers, 1990; Fiske & Taylor, 1991; Adolphs, 2001). Social cognition is made up of smaller concepts, which in turn work together so an individual can act effectively in their social environment. Common concepts investigated in social cognition research are emotion processing, social perception, social knowledge, theory of mind, and attributional style (Green et al., 2005). In research associated with major mental disorders such as schizophrenia, the primary domains investigated are emotion perception, and ToM (Penn, Sanna, & Roberts, 2008).

One of the most thoroughly researched aspects of social cognition is emotion processing, which encompasses the perception, understanding, and management of emotions in others as well as oneself (Green et al., 2005). The goal of emotion identification tasks is to measure the ability of the individual to detect emotional information from visual (i.e. facial) or vocal cues (Kee et al., 2009). Tasks designed to investigate emotion perception look either at identification of emotions or differentiation between emotion intensities. The tasks often rely on photos, and have the participant choose a qualitative label, either from a set of choices or based on their own interpretation (Kohler et al., 2010).

A critical component of social cognition is the ability to comprehend the mental states of others (i.e. beliefs, intentions, and emotions), which is known as ToM (Premack & Woodruff, 1978; Wellman, 1990). ToM develops in a particular and sequential manner; as children age their ability to use ToM increases in a predictable way (Stone, Baron-Cohen, & Knight, 1998). Around the age of three, children begin to develop the ability to understand false beliefs, such

that other people may not know everything they know (Wellman, 1990; Stone, Baron-Cohen, & Knight 1998). This first step in the development of ToM is called first order beliefs; the ability to describe what others think about real life events (Perner & Wimmer, 1985). After the development of false belief, children begin to understand that other individuals possess unique mental states and can represent these mental states. Children around six years old understand that people have "beliefs about beliefs" (Perner & Wimmer, 1985). These "beliefs about beliefs" are termed second order ToM abilites, as they are concerned with what people think about others' thoughts (Perner & Wimmer, 1985). By the age of ten, children develop the ability to recognize social faux pas, which refer to when an individual says something they should not have (either because they did not know or realize). Faux pas understanding requires the recognition of two mental states: the person speaking does not know they have said something they should not have, and that the individual on the receiving end feels hurt in some way. This ability includes a cognitive component and an affective component to faux pas recognition (Stone, Baron-Cohen, & Knight, 1998).

The ability to understand others' mental states is not the only component to decoding social situations. Another key element is attribution style. Attributions are how an individual explains positive and negative events in their life (Green et al., 2005). The majority of research on attribution style has resulted from research on depression and from this research different types of attributional styles have been developed, which have then been applied across a variety of psychological settings (Peterson et al., 1982). Uncontrollable events can be viewed in three different ways, the first being concerned with the *individual*; attributions can be internal, (i.e. caused by something within the individual), or external, (i.e. caused by something in the environment or situation). Uncontrollable events can also be seen as *stable* (i.e. caused by stable,

unchanging factors) or *unstable* (i.e. caused by temporary, changing factors). Finally, these uncontrollable events can be thought of as *situational* (i.e. only occurring in particular situations) or *global* (i.e. represented in a variety of situations; Peterson et al., 1982).

Psychosis & Social Cognition

Couture, Penn, and Roberts (2006) introduced a conceptual model in order to explain how social cognition relates to functional outcomes, particularly in individuals diagnosed with psychotic disorders. First, individuals may commit errors in emotion recognition (i.e. misperceive a facial expression to be anger rather than stress) and attend to certain social cues while missing others. This original misperception results in an incorrect conclusion, therefore the next phase of processing, where the individual makes an attribution, will be based upon the inaccurate perception. Attribution style biases result in more personalized attributions (i.e. they are angry at me because of something I have done) and this bias is not corrected due to difficulties in ToM, which prevent the individual from seeing the situation through the eyes of someone else (Couture, Penn, & Roberts, 2006). As a whole, the individual is unable to comprehend the emotional and social context of other people's behaviours and this results in a cycle where the individual anticipates negative interactions in the future and does not challenge their expectations (Couture, Penn, & Roberts, 2006).

According to the *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition* (DSM; 2013) to receive a diagnosis of schizophrenia spectrum and other psychotic disorders an individual must experience abnormalities in one or more of the following domains: delusions, hallucinations, disorganized thinking, disorganized or abnormal motor behaviour, or negative symptoms. Social cognition is important as a diagnostic (as well as treatment) focus because deficits often occur before the onset of a psychotic episode and continue to worsen throughout

the course of the disorder (Pinkman, Penn, Perkins, & Lieberman, 2003). Marked social cognition deficits also contribute to the rate of relapse and future need for hospitalization (Pinkman, Penn, Perkins, & Lieberman, 2003). The impairment in social skills seen in those diagnosed with a psychotic disorder is thought to result from the inability to understand and appreciate others' mental states, as well as one's own. This inability can result in apathy and disorganization for one's own circumstances, as well as delusional ideation regarding the circumstances of others (Frith, 2004). Given those with schizophrenia have difficulty understanding the intentions of others, while simultaneously struggling to monitor their own actions (Spence et al., 1997; Frith, Blakemore, & Wolpert, 2000), they may be challenged by the planning aspect of social situations and have difficulties following social norms (Brüne, 2005). Brüne, Schaub, Juckel, and Langdon (2011) demonstrated that understanding others' mental states is the best predictor of social skills in individuals diagnosed with schizophrenia. These deficits in social skills appear to go beyond neurocognitive deficits commonly seen in those diagnosed with schizophrenia (Pinkham & Penn, 2006; Brüne, Schaub, Juckel, & Langdon, 2011). A meta-analysis of 113 articles, comparing 3908 individuals diagnosed with schizophrenia and 3570 normal controls, demonstrated that individuals diagnosed with schizophrenia performed poorly across all domains of social cognition (Salva, Vella, Armstrong, Penn, & Twamley, 2012).

Emotion recognition

Deficits in emotion recognition have been well established in the psychosis literature (Craig, Hatton, Craig, & Bentall, 2004; Bora, Eryavuz, Kayahan, Sungu, & Veznedaroglu, 2006; Bora, Gokcen, & Veznedaroglu, 2008; Inoue et al., 2006; Wang, Wang, Chen, Zhu, & Wang, 2008; Lysaker, Olesek, Warman, Martin, Salzman, Nicolò, & Dimaggio, 2011). Severe

impairments on the Reading the Mind in the Eyes Task (RMET), a multiple choice task where the participant must infer emotions from a black-and-white photo of a pair of eyes, predicted social difficulties in real-world settings (Baron-Cohen et al., 2001). In a sample of 50 individuals diagnosed with schizophrenia individuals who displayed good functional outcomes (e.g. high social engagement, good interpersonal communication) were significantly better at decoding the mental states of others. (Bora et al., 2006). The authors argue that because the RMET relies on a "gut feeling" it is more closely related to social perception. In a related study Craig and colleagues (2004) compared performance from individuals with schizophrenia and individuals diagnosed with Asperger's syndrome (currently known as high functioning Autism) on the RMET and found their performance to be comparable. Moreover, these deficits persisted when individuals are not currently experiencing symptoms (i.e. in remission) (Inoue et al., 2006; Lysaker et al., 2011).

Difficulties in identifying emotions are not only seen in tasks involving photos, but also in videos of social situations (Sparks, McDonald, Lino, O'Donnell, & Green, 2010). Thirty individuals diagnosed with schizophrenia or schizoaffective disorder and 25 healthy controls completed a facial processing task, the Awareness of Social Inferences Task, which assesses complex social inferences, such as sarcasm, in addition to self-report measures of empathy and social functioning. Results from Sparks and colleagues (2010) demonstrated that individuals with schizophrenia have difficulty picking up on sarcasm and detecting deceitful interactions, compared to healthy controls. The detection of negative emotions such as fear and disgust has been shown to produce the most pronounced differences between those with a psychotic illness and those without (Kohler et al., 2003).

Those with a such a diagnosis also appear to have little insight into their own difficulties in recognizing emotion (Bora et al., 2008) and even appear to be overconfident in their incorrect answers, particularly in individuals with chronic or severe symptoms of the disease (Köther et al, 2012). In Köther and colleagues (2012) 75 individuals diagnosed with schizophrenia or schizoaffective and 25 healthy controls completed the RMET and simultaneously rated their confidence in their answers. The sample diagnosed with a psychotic disorder had more instances of high confidence in incorrect answers and less instances of high confidence in correct answers when compared to controls (Köther et al, 2012). The overconfidence factor introduced by Köther and colleagues (2012) provides insight into how deficits in emotion recognition can function in the real world. If an individual incorrectly infers that someone is angry or threatening them and they are confident in this, how does this influence their likely response?

Performance on emotion attribution tasks is also correlated with performance on ToM tasks (Langdon, Coltheart, & Ward, 2006). Langdon, Coltheart, and Ward (2006) hypothesize that this relationship may exist because individuals with psychotic disorders have difficulties distinguishing their own perspective from that of other individuals. This idea is supported from previous research that has shown individuals with psychotic disorders not only have difficulty appreciating the mental states of others, but also the visual perspectives (Langdon et al., 2001), adding to the hypothesis that individuals with psychotic disorders struggle with recreating first person experiences.

The difficulty individuals with psychotic disorders have recognizing emotions is also hypothesized to be the reasoning behind poor performance on faux pas tasks. While they are able to recognize that a social faux pas has occurred, they are unable to recognize the resulting emotional state of the other individual (Shamay-Tsoory, Shur, Barcai-Goodman, Medlovich,

Harari, & Levkovitz, 2007; Shur, Shamay-Tsoory, & Levkovitz, 2008). Twenty-two individuals diagnosed with schizophrenia and 55 matched healthy controls completed a computer task involving the judgement of mental states based on verbal cues and eye gaze. The subject is shown a cartoon character and four images, with either a written description (he loves apples) or an eye gaze (the character is looking at one of the four images), and must select the correct item (Shamay-Tsoory et al., 2007). There were two categories for the written cues: affective (e.g. he loves apples) and cognitive (e.g. he is thinking about apples) (Shamay-Tsoory et al., 2007). Individuals diagnosed with schizophrenia underperformed on the affective ToM tasks, meaning they were unable to pick relevant stimuli based on the emotionally salient cues. When given affective cues (i.e. someone's emotional reaction to something) individuals with schizophrenia struggled with selecting the correct item based on the information given (Shamay-Tsoory et al., 2007).

Performance on emotion recognition tasks is highly predictive of functional status in individuals diagnosed with psychotic disorders. Addington, Saeedi, and Addington (2006) invited 50 first-episode psychosis patients, 53 multi-episode schizophrenia patients, and 55 non-psychiatric controls to complete a social functioning questionnaire and two emotion recognition tasks: one that required them to see a face and then choose from a list of words the matching emotion (the Facial Emotion Identification Test) and one that required the individual to decide if two matching faces have the same emotion (the Facial Emotion Discrimination task). Both the first episode and chronic patients performed worse than the non-psychiatric controls (there was no difference between the psychiatric groups). The authors also found that performance on affect recognition was related to social functioning, and that performance on executive functioning tasks did not mediate this relationship. Therefore, they concluded that underperformance on the

emotion identification task could not be explained by deficits in other cognitive abilities (Addington, Saeedi, & Addington, 2006).

Theory of mind

Early work examining ToM and psychosis focused on the relationship between deficits and symptomology. Frith (1992, 1994) argued that symptoms such as delusions of reference and auditory hallucinations occurred because individuals were unable to represent the mental states of others and this could in turn be related to deficits in ToM. Frith (1992) reasoned that if an individual is unaware of how intentions lead to behaviours, impaired understanding of their own mental state can lead to the negative symptoms seen in schizophrenia and other psychotic illnesses. As there is no social reinforcement for engaging with others, they withdraw from these interactions, which further perpetuates any social cognition deficits and social cognition skills are not given the chance to recover. Positive symptoms were theorized to develop due to an inability to recognize behaviours or thoughts as self-generated, resulting in auditory hallucinations. Negative behavioural symptoms, such as poverty of speech and social withdrawal, or positive symptoms, such as incoherent speech, were predicted to result in poor performance on ToM (Frith, 1992, 1994). The research into the relationship between ToM and symptoms has been mixed. A 1999 literature review by Garety and Freedman found evidence that people with psychotic disorders do underperform on ToM tasks (when compared to controls) and those who display negative symptoms performed worse overall. Greig, Bryson, and Bell (2004) found that ToM performance was related to the presence of delusions in general, not one particular typology. Shur, Shamay-Tsoory, and Levkovitz (2008) demonstrated that both understanding and recognizing a social faux was affected by negative symptoms, but the understanding aspect of the task was affected by positive symptoms. Overall, research has found

mixed results in explaining social cognition performance in terms of positive and negative symptoms

Craig, Hatton, Craig, and Bentall (2004) found no difference in performance on ToM tasks between individuals diagnosed with schizophrenia and individuals diagnosed with Asperger's syndrome (currently known as high functioning Autism) when compared to non-psychiatric controls. The brain regions involved in ToM and social functioning, prefrontal cortical regions (PFC), are also implicated in schizophrenia (Lee, Farrow, Spence, & Woodruff, 2004). The medial and orbitofrontal regions of the PFC have also been hypothesized to be involved in a neural system responsible for social cognition, greatly implicated in autism research (Baron-Cohen, Ring, Moriarty, Schmitz, Costa, & Ell, 1994; Fletcher et al., 1995; Happé et al., 1996; Karmiloff-Smith, Klima, Bellugi, Grant, & Baron-Cohen, 1995; Lee, Farrow, Spence, & Woodruff, 2004). Shur, Shamay-Tsoory, and Levkovitz (2008) had twenty-six patients with schizophrenia and 35 health matched controls complete a ToM task and the Intradimensional/Extradimensional task (ID/ED; a task measuring orbitofrontal ability). The patients diagnosed with schizophrenia demonstrated poor performance on ToM tasks when compared to controls and only their performance was correlated with performance on the ID/ED, highlighting potential neurobiological underpinnings of social cognition deficits (Shur, Shamay-Tsoory, & Levkovitz, 2008).

Langdon, Coltheart, and Ward (2006) suggest the individuals diagnosed with psychotic disorders have difficulties with the simulation of another individual's subjective experience. In contrast to autism, they believe individuals with schizophrenia perform poorly on ToM tasks because they have difficulties empathizing with the first-person experience of someone else, or appreciating the other person's thoughts or emotions. Twenty-two patients diagnosed with a

psychotic illness and 18 healthy controls completed a picture sequencing task that assessed their ability to infer false beliefs. Individuals diagnosed with a psychotic disorder had difficulty attributing emotions based on how they believed another individual would feel, which co-occurred with their poor performance on ToM tasks (Langdon, Coltheart, & Ward, 2006). Derntl and colleagues (2009) had 24 patients diagnosed with schizophrenia and 24 matched healthy controls complete an emotion perspective taking task, an affective response task, as well as an emotion recognition task. Results demonstrated that patients diagnosed with schizophrenia demonstrated difficulties on many emotionally related tasks, not just emotion recognition, but also emotional perspective taking. The poor performance on emotion recognition tasks is not solely responsible for the poor performance on ToM tasks, as once the impairments in emotion recognition were controlled for performance on perspective taking tasks remained significant (Derntl et al., 2009). Perspective taking tasks appeared to be the most difficult tasks for individuals with schizophrenia as well; being able to infer the emotional states of others based on social cues and behaviours relies on high level social cognition proficiency (Derntl et al., 2009). Poor performance on ToM tasks is not due to the fact that individuals with schizophrenia are unable to understand that social errors have been made, but on their overall understanding of the social situation. For example, Shur, Shamay-Tsoory, and Levkovitz (2008) found that only healthy controls were able to explain the reason behind a social faux pas, while the participants diagnosed with schizophrenia could identify some social transgression had occurred but could not explain further. As another illustration of these deficits, Sparks and colleagues (2010) used The Awareness of Social Inference Test (TASIT;McDonald et al., 2003) to measure ToM skills. The results from this study suggested that individuals diagnosed with psychotic disorders may possess difficulties in social situations with insincere exchanges (Sparks et al., 2010). It was also

noted that performance was associated with medication dosage, such that those on higher doses were significantly more impaired, which is thought to be a reflection of the severity and chronicity of the disease (Sparks et al., 2010).

Social cognition deficits may be more critical to explaining behavioural abnormalities seen in individuals diagnosed with a psychotic illness rather than cognitive impairments, such as executive functions (Pinkham et al., 2003; Green et al., 2005; Brüne, 2006). The ability and capacity to be able to understand mental states is one of the best predictors of social functioning, performing even better than a battery of tasks examining executive functioning (Roncone et al., 2002). Furthermore, the more sophisticated second-order ToM tasks displayed a significant relationship with social functioning, as they more accurately represented sophisticated, life-like social situations (Roncone et al., 2002). Brüne and colleagues (2007) invited 38 patients diagnosed with schizophrenia and 29 matched healthy controls to complete a mental state attribution task that consisted of six cartoon stories. Two scenarios depicted cooperation, two scenarios depicted deceit, and the final two depicted cooperation at the cost of another individual. Each story consisted of four picture cards and participants were asked to place the cards in the correct order. They were also asked questions about the mental states of the characters in the story (Brüne, 2007). The schizophrenia patients' social skills and behaviours were measured by familiar nursing staff using the Social Behaviour Scale, a 21-item scale that measures social behaviours such as communication skills and socially inappropriate behaviours (Brüne, 2007). Results demonstrated that performance on mental state attribution tasks was the strongest predictor of social behavioural problems, as it explained more than half of the statistical variance.

Attribution style

Besides demonstrating deficits in ToM, individuals with psychotic illnesses are also biased in their interpretations of events. For example, individuals with persecutory delusions excessively blame others for negative events, while also being more likely to take credit for positive events (Langdon, Coltheart, & Ward, 2006). The majority of research regarding attributional style and individuals with schizophrenia has primarily focused on those with paranoid and persecutory delusions. Bentall and colleagues (1994) hypothesized that individuals with persecutory delusions possess an externalizing bias for negative events, demonstrated by the Attributional Style Questionnaire (ASQ; ASQ: Peterson et al., 1982). Martin and Penn (2002) included 30 individuals diagnosed with schizophrenia (15 persecutory delusions, 15 non-persecutory) and 15 healthy controls to complete the ASQ. Results demonstrated that the self-serving bias was not unique to individuals diagnosed with schizophrenia and that all individuals tended to attribute greater blame to others (rather than situational factors) when explaining negative outcomes, although there was a trend for the bias to be stronger in those with persecutory delusions (Martin & Penn, 2002). In a study by Aakre, Seghers, St-Hilaire, and Docherty (2009) 65 (18 paranoid, 30 past paranoid, and 17 non-past paranoid) patients diagnosed with a psychotic disorder and 29 controls were interviewed. Overall functioning was assessed using the Global Assessment of Functioning tool, which renders higher scores indicative of higher levels of functioning (Aakre et al., 2009). Attribution style was assessed by an interview where they were recorded as they recalled positive and negative experiences, which were then coded post-interview by a blind coder (Aakre, et al. 2009). Paranoid patients were more likely to use external-personal attributions to explain negative events and this pattern of attribution style did not appear to remain once patients had gone into remission (Aakre, et al. 2009). All patients

diagnosed with psychosis used external personal attributions for positive events, which was not a pattern seen in the control group (Aakre, Seghers, St-Hilaire, Docherty, 2009).

Further research has shown that individuals with persecutory beliefs can be divided into subgroups that have distinct attributional styles (Jolley et al., 2006). Seventy-one individuals diagnosed with a psychotic illness (e.g. schizophrenia, schizoaffective disorder, or delusional disorder) completed a measure of delusional beliefs, (the Scale of Assessment for Positive Symptoms), the Beck Depression Inventory, and the ASQ (Jolley et al., 2006). Those with persecutory delusions and grandiose beliefs tended to externalize negative events, while those with persecutory delusions and depression tended to externalize positive events (absence of a self-serving bias) (Jolley et al., 2006). Jolley et al. (2006) concluded from these results that there is not one particular attributional style that is associated with persecutory beliefs; instead attributional style results as a confluence of multiple factors.

Attributional style is thought to have a negative impact on social functioning. In a 2004 study by Lysaker, Lancaster, Nees, and Davis 40 individuals in a post-acute phase of psychosis completed the ASQ, the Positive and Negative syndrome scale (to assess symptology), and the Quality of Life scale. Individuals with psychosis rated life events as external and unstable (Lysaker et al., 2004). The authors reasoned that this interpretation prevents them from creating interpersonal relationships or may even drive them to create social distance (Lysaker et al., 2004). Lysaker and colleagues provided indirect evidence for this, as individuals with psychosis recover they understand their own influence on life events and enforce the idea that life events are predictable. Recovery results in increased internal attributions and increased stable attributions (Torgalsboen, 1999; Young & Ensign, 1999). From their research, Lysaker and colleagues (2004) found that symptoms associated with schizophrenia and attributional style are

both related to social functioning, although independently. Individuals diagnosed with schizophrenia tended to attribute life events to unstable causes (measured via the ASQ), and when combined with negative symptoms (measured via the Positive and Negative Syndrome Scale) predicted 50% of the variance of a measure of interpersonal relationships (via the Quality of Life Scale) and 30% of community participation (Lysaker et al., 2004). The authors concluded that given these individuals do not believe that life events result from predictable or stable causes it deters them from interacting with others. A positive correlation between attributions for positive and negative events was found (Lysaker et al., 2004). While Lysaker and colleagues (2004) hypothesized that social withdrawal was a result of seeing the world as unpredictable, patients diagnosed with schizophrenia have also tended to endorse internal-personal causes for negative events (Aakre, Seghers, St-Hilaire, Docherty, 2009), which likely also contributes to social isolation. Aakre and colleagues (2009) reasoned that this could be the result of actual differences found between the lives of the patients versus controls, such that patients attributed negative events to their mental illness, which is an internal-personal cause.

Social Cognition & Violence

Multiple studies have demonstrated a significant relationship between major mental illness and criminal offending (Teplin, 1990; Link, Andrews, & Cullen, 1992; Swanson, Holzer, Ganju, & Jono, 1990; Tiihonen et al., 1997; Steadman et al., 1998). Individuals diagnosed with schizophrenia are at a higher risk for violence than those without the disorder, but are not as high risk as those with antisocial personality disorders (ASPD) and substance abuse (Swanson, Holzer, Ganju, & Jono, 1990; Tiihonen et al., 1997). Brennan, Mednick, and Hodgins (2000) found a significant positive relationship between major mental disorders that resulted in hospitalization and criminal violence in a birth cohort of over 350,000 individuals in Denmark.

The odds ratios were 2.0-8.8 for men and 3.9-23.2 for women (Brennan, Mednick, & Hodgins, 2000). The amount of violence committed by individuals with a major mental disorder was disproportionate when compared to the rest of the cohort, such that individuals diagnosed with a psychotic disorder were more likely to have been arrested for a violent crime even when variables like substance abuse and personality disorders were controlled for (Brennan, Mednick, & Hodgins, 2000). This finding was also observed by Wallace, Mullen, and Burgess (2004) who examined criminal offending behaviour in individuals diagnosed with schizophrenia over a 25-year period. They found a clear relationship between a diagnosis of schizophrenia and higher rates of convictions across a wide variety of criminal offences (including violent).

Individuals with psychosis who have a criminal history have demonstrated impairments in tasks that require them to infer the mental states of others and this tends to be a persistent feature in chronic cases (Bo, Kongerslev, Dimaggio, Lysaker, & Abu-Akel, 2015). Bo and colleagues (2015) used the Metacognitive Assessment and the Global Assessment of Functioning to assess the understanding of mental states and social functioning in 79 patients diagnosed with schizophrenia who had a criminal background (proportion of violent vs. non-violent was not given). The authors found that difficulty in understanding mental states of others results in poor social functioning, as well as higher levels of delusions and conceptual disorganization (Bo, et al., 2015). Mitchell and colleagues (2012) interviewed patients diagnosed with schizophrenia and a history of interpersonal violence (n = 18), as well as non-violent individuals diagnosed with schizophrenia as a control (n = 11), using the Metacognitive Assessment Scale (MAS). The MAS measures the ability to understand one's own mind, the ability to understand other's minds, and the ability to use one's social cognition ability to navigate social tasks and problems (Mitchell et al., 2012). While there was no difference between the two groups on the social

cognition task, forensic patients with schizophrenia who had a history of interpersonal violence were impaired in their overall social cognition performance, such that although they were able to infer their own mental states, they had problems appreciating the mental states of others (Mitchell et al., 2012). Murphy (2006) compared performance between forensic patients with Asperger's syndrome (n = 13), schizophrenia (n = 13), and personality disorders (n = 13) on the RMET and a ToM task. The authors found that schizophrenia patients did not significantly differ from Asperger's patients on both measures of social cognition, but both groups performed worse than personality disordered offenders.

Misinterpretation of social cues can result in inappropriate responses, such as reacting violently in an ambiguous situation (Akhtar & Bradley 1991; Dodge et al., 2002). Hoaken, Allaby, and Earle (2007) found that violent non-mentally ill offenders performed poorer than non-violent offenders and controls when interpreting emotions via facial expression and they often attributed emotions to hostility. Individuals who commit violent acts may inaccurately interpret social cues, particularly in a hostile manner, which could lead to negative arousal in an otherwise non-threatening situation (Hoaken, Allaby, & Earle, 2007). A negative association between accuracy in perspective taking in angry scenes and the number of violent assaults was also found, such that offenders with a history of violence were more impaired in situations where anger is the most prominent emotion (Seidel et al., 2013).Hoaken, Allaby, and Earle (2007) found that offenders have a tendency to negatively interpret the inner states of others. Non-mentally disordered aggressive offenders have shown deficits in the ability to recognize facial expressions (Hoaken, Allaby, & Earle, 2007; Gery et al., 2009). Kret and Gelder (2013) demonstrated that violent offenders were more likely to misjudge fearful body movements as

aggressive and tended to be inhibited by seemingly aggressive body language even when someone was smiling.

While the interpretation of emotion information is critical, the attribution of the event is also important. The most common attribution styles were previously introduced, and a hostile attribution bias is one that is frequently observed in forensic literature. A hostile attribution bias is the tendency to assume that others are acting in a hostile manner in situations with a negative outcome (Waldheter, Jones, Johnson, & Penn, 2005). There is a positive association between hostile attributions and violence; individuals with mental illness who tend to blame others for negative events or assume others are acting hostile towards them are more likely to behave in a violent manner (Waldheter, Jones, Johnson, & Penn, 2005). In forensic samples, those with psychotic symptoms tend to externalize the blame for their offending behaviour and this seems to be independent of nature of the delusions, such as persecutory or non-persecutory (Carlin, Gudjonsson, & Rutter, 2005).

Deficits in emotion recognition and attribution style are demonstrated by individuals diagnosed with a psychotic disorder who engage in violent behaviour. According to the model proposed by Couture, Penn, and Roberts (2006), the next facet of social cognition that could potentially be impaired is ToM. In a study by Abu-Akel and Abushua'leh (2004) 12 violent patients and 12 non-violent patients diagnosed with paranoid schizophrenia completed a ToM task. The authors found that violent patients with schizophrenia performed better than non-violent patients with schizophrenia on tasks that required them to understand the cognitive mental states of others. Performance on empathy related tasks (i.e. ones that required them to understand the emotional state of the other person) and tasks that required them to understand when a social faux pas occurred were worse than non-violent controls with schizophrenia (Abu-

Akel &Abushua'leh, 2004). A regression analysis indicated that violence was associated with the ability to understand cognitive states of others (i.e. what they were thinking, not feeling) and the ability to infer emotions (or lack thereof). Furthermore, violence in paranoid patients appeared to be the result of a combination of hostility towards others, good mentalizing abilities, and poor empathy (Abu-Akel & Abushua'leh, 2004).

Majorek at el. (2009) compared performance of 33 forensic patients diagnosed with schizophrenia (both violent and non-violent), 38 schizophrenia patients with no criminal history, and 29 healthy controls on a series of ToM tasks. The Positive and Negative Symptoms Scale (PANSS) was administered to assess psychopathology. The participants were given pictures and had to sequence the stories, as well as answer questions about the mental states of the people in the pictures. The authors found that forensic patients with a primary diagnosis of schizophrenia performed better than non-forensic patients with schizophrenia on the ToM subtest, but their overall performance on the sequencing task was comparable; both forensic and non-forensic individuals with schizophrenia demonstrated difficulties with ToM (Majorek et al., 2009). In the forensic group, ToM was negatively correlated with the excitement factor from the PANSS and when excitement was included as a covariate the forensic sample outperformed the non-forensic participants. The authors concluded that symptoms such as excitement, hostility, tension, and lack of impulse control may negatively influence the understanding of other's mental states (Majorek et al., 2009).

Although individuals with psychosis are at increased risk for violent behaviour, violence committed by individuals with the diagnosis is rare and accounts for very little of the overall violence in society (Walsh, Buchanan, & Fahy, 2002). What is only recently being investigated is the role of social cognition deficits in individuals with a major mental disorder who have

committed a crime. For example, the ability to empathize has been shown to inhibit aggression and violent behaviour (Miller & Eisenberg,1988). A potential link between ToM and empathy is demonstrated by studies showing that patients with empathy related disorders (i.e. autism) also demonstrate ToM difficulties (Abu-Akel & Abushua'leh, 2004). This link between ToM and empathy, as well as empathy and violence, has resulted in the idea that violence may be partially related to deficits in understanding the mental states of others (Ward et al., 2000; Abu-Akel & Abushua'leh, 2004).

Summary

Individuals with psychosis display a wide range of deficits across all domains of social cognition and these deficits are one of the most robust predictors of real world functioning. While social cognition deficits are greatly researched in the general psychotic disorders literature, they have only recently been applied to explanatory models for violence in this population. Previous literature has demonstrated that individuals diagnosed with a psychotic disorder in forensic settings (both violent and non-violent) possess similar social cognition deficits, yet no research has examined whether such deficits are different from those observed as a function of the diagnosis itself, and if so, how are they related to violence.

Introduction to Present Study

The present study seeks to examine the relationship between social cognition deficits and violent offending behaviour in individuals diagnosed with a psychotic disorder. Specifically, 1) does social cognition ability distinguish between violent and non-violent patients with psychosis 2) if such a difference does exist, can it explain violence in this group, and finally, 3) what

impact does confidence in one's own perception of ability on emotion recognition tasks have on interpretations and violence. The specific research questions are:

1. Do differences in social cognition ability exist between patients with psychosis who have engaged in violence and patients with psychosis who have no history of violence?

It is hypothesized that there will be group differences on the emotion perception and ToM tasks, such that violent patients will underperform when compared to the patients with schizophrenia who have not engaged in violence. Individuals diagnosed with a psychotic disorder have a similar attribution style (externalizing negative events) to those that have engaged in violent behaviour, so we do not anticipate any differences between the two groups.

2. Can individuals be categorized as violent or nonviolent based on social cognition ability?

Due to the interpersonal nature of a violent crime, it is hypothesized that social cognition deficits may be used to categorize individuals diagnosed with a psychotic disorder as violent or non-violent.

3. Does a discrepancy exist between perceived performance on social cognition tasks and actual performance, and if so, is it related to violent offending in patients diagnosed with a psychotic disorder?

It is hypothesized that the gap between actual performance and perceived performance will be larger in the patients who have engaged in violence, as the discrepancy between their actual and perceived social perceptions may account for interpersonal conflict and thus contribute to violent behaviour.

CHAPTER II

Methods

Participants

The study received ethics approval from the Hamilton Integrated Research Ethics Board. Participants were recruited from St. Joseph's Healthcare Hamilton and received a $10 gift card for their participation. Study eligibility criteria required participants to be an adult, capable to consent to treatment, able to read English, and have a primary diagnosis of a psychotic disorder, which was ascertained from the medical chart. Any individual diagnosed with dementia, an organic brain disorder or injury, or an identified intellectual disorder was excluded from participation. A total of 22 individuals participated: 16 from forensic units, both inpatients and outpatients, and six from schizophrenia outpatient. A participant was considered violent if they had engaged in any behaviour that resulted in a violent criminal offence, this information was obtained from the patient's medical chart.

Procedures

Care team members identified and approached eligible participants and if agreeable the author approached potential participants to review the study in more detail. The author reviewed the study and provided the consent form for the individual to read and sign; at this point individuals were able to ask questions and indicate if they would like to do one session or two separate sessions. For forensic inpatients, participation took place on the unit in a quiet area. For schizophrenia outpatients, participation took place in an outpatient assessment room. Breaks were allowed whenever the participant requested. If the individual agreed to one session it lasted between one hour to an hour and a half (with breaks available at any point). Single sessions

would begin with the social cognition tasks and end with the neuropsychological measures. The social cognition tasks were considered the most critical to the study and were performed first to ensure that all participants were able to complete them. All tasks were randomly administered within their own section. After the session the participant received a $10 gift card to Tim Hortons. In the event of two sessions, participants completed three tasks in each session that would last between 30-45 minutes each. Participants received one $5 gift card to Tim Hortons for each session. Each participant underwent a neurocognitive screening and social cognitive battery. The neurocognitive battery addressed overall neuropsychological functioning, intellectual ability, and executive functioning. The battery was included to ensure that potential differences in social cognition performance were not due to any potential executive functioning differences. The social cognitive battery investigated emotion recognition, ToM and empathetic ability, and attributional style. At the end of the study all participants were debriefed and allowed to ask any further questions.

Materials

Neuropsychological Measures

The Repeatable Battery for the Assessment of Neuropsychological Status (RBANS): The Repeatable Battery for the Assessment of Neuropsychological Status (RBANS) was used to assess overall neuropsychological functioning. The RBANS is a neuropsychological test that consists of a series of tasks to assess a range of brain functions: immediate memory, visuospatial construction, language, attention, and delayed memory (Randolph, 1998). The reliabilities for the index scores have alphas range from 0.75 (Visuospatial/Construction) to 0.93 (total index), with subtest reliabilities ranging from 0.50 (Figure Copy) to 0.85 (List Learning; Randolph, 1998). Test-retest reliability ranges from 0.55 (Language) to 0.88 (Total), indicating moderate to high

reliability for the indices and relatively better reliability for the total score. The intercorrelations between the indices are rather low (0.29-0.28) indicating they are measuring distinct constructs. The RBANS also correlates with related measures of intellectual ability and memory (e.g. WAIS-R, r = 0.78, WMS-R, r = 0.82) demonstrating criterion validity. The RBANS has demonstrated reliability in samples diagnosed with schizophrenia as well: alpha of 0.87 was reported for reliability. Subscales from the RBANS were highly correlated with performance on the Weschler Adult Intelligence Scale, test-retest reliability was measured to be 0.84 (Gold, Queern, Iannone, & Buchanan, 1999; Hobart, Goldberg, Bartko, & Gold, 1999; Chianetta, Lefebvre, LeBlanc, & Grignon, 2008).

Test of Premorbid Functioning: The Test of Premorbid Functioning (TOPF; Pearson, 2009) was used to estimate general intelligence, based on verbal ability. The TOPF consists of a list of words that the participant reads aloud. The TOPF has demonstrated excellent internal consistency, with split-half reliability coefficients ranging from 0.96-0.99 (Pearson, 2009). The TOPF has also demonstrated a high degree of reliability over time, with test-retest correlation ranging from 0.89-0.95 (Pearson, 2009). If the TOPF is an accurate predictor of premorbid ability, it should correlate moderately to highly with other current measures of intellectual functioning. When compared with the Wechsler Adult Intelligence Scale, the correlations ranged from 0.37 (Processing Speed) to 0.75 (Verbal Comprehension), with a correlation of 0.70 for the Full Scale IQ (Pearson, 2009). The TOPF also correlates well (r= 0.80) with the Wechsler Individual Achievement test, which consist of a single word reading test similar to the TOPF (Pearson, 2009).

Stroop Test: Finally, the Stroop Test (Stroop, 1935) was used to assess executive functioning. The Stroop consists of three phases. First the participant reads three color words,

blue, red and green printed in black ink, on a page as quickly and accurately as they can under time constraints. Then, participants are asked to name colored Xs as quickly and accurately as they can in a timed session. The final task, also known as an incongruent task, assessed the participant's ability to name the ink color the color word, red, green and blue, while ignoring the word itself. As such, if the word red is printed in blue, they must say blue not red. In addition, they must execute this task this as quickly and accurately as they can in a timed session. The Stroop has very high reliability (0.93-0.98; Jensen, 1965), is correlated with other measures of neuropsychological ability, and is very stable over time; while differences may exist between the three scores for one individual on the task, these differences remain consistent (Jensen & Rohwer, 1966). The Stroop effect has also been demonstrated in samples diagnosed with schizophrenia (Hepp, Maier, & Spitzer, 1996; Henik & Salo, 2004).

Social Cognition Tasks

Reading the Mind in the Eyes: Emotion recognition was investigated using the Reading the Mind in the Eyes Task, which consists of pictures of eyes which the participant must match to the correct emotion (Baron-Cohen et al., 2001). A review by Vellante et al., (2013) found moderate reliability (alphas between 0.58-0.77; split half 0.77; test-retest 0.65) and moderate correlations with other empathy measures (EQ r=0.23-0.56). In addition to completing the task, individuals were asked to give confidence ratings similar to Köther and colleagues (2012). Participants were asked to rate their confidence in their answers on a scale of one to five, with one being the least confident and five being the most confident.

Faux Pas Task: ToM and empathetic ability were tested using the Faux Pas Task (Appendix I), which involves the participant reading a description of a social transgression and

then answering questions about the transgression (Stone, Baron-Cohen, & Knight, 1998). Inter-rater reliability is reported to be high (r = 0.98; Stone, Baron-Cohen, & Knight, 1998).

Attributional Styles Questionnaire: Attributional style was assessed with the Attributional Styles Questionnaire (ASQ; Peterson et al., 1982; Appendix II). The ASQ is a questionnaire which requires participants to read sentences about particular life circumstances (i.e. losing a job) and then requires them to generate a potential cause. The participant is then asked a series of questions about the cause, for example the likelihood of it happening again or if the cause is due to them or someone else. The ASQ has good internal consistency (alphas = 0.72 - 0.75), and is better at discriminating between attributions towards negative events (Peterson et al., 1982).

CHAPTER III

Results

All data were treated according to Tabachnick and Fidell (2001). Sixteen percent of the neuropsychological data were missing and 14% of the social cognition data were missing. All missing data were replaced with the corresponding group mean (violent vs. non-violent). The data met all assumptions of normality except for one extreme score, which was windsorized. No skewness or kurtosis was present.

Descriptive Analyses

A total of 22 participants were recruited from inpatient and outpatient units of the forensic and schizophrenia programs at St. Joseph's Healthcare Hamilton in Hamilton, Ontario. The age of participants ranged from 22 to 61 years (M = 39.95, SD = 10.94). Seventy-three percent of the participants were male (16 individuals), with the remaining 27% being female (6 individuals). There were no age or gender differences present between the two groups. Twelve participants had a history of violent behaviour (54%), with the remaining ten (46%) having no known history of violence. Sixty-four percent (14 individuals) of the sample had a primary diagnosis of schizophrenia, the remaining 36% (8 individuals) had another psychotic disorder (schizoaffective disorder, psychosis NOS) as a primary diagnosis. Only one individual received a diagnosis of antisocial personality disorder.

Analysis of Neuropsychological Measures

A one-way analysis of variance (ANOVA) was completed to compare violent and non-violent groups on neuropsychological performance (RBANS, TOPF, and Stroop) to rule out any confounds present between the two groups to which any subsequent differences could be

attributed. No significant group differences were found on any of the neurocognitive measures. Refer to Table 1 for a summary of the results.

Table 1

ANOVA for Neuropsychological Data

	Mean (SD)	*df*	*F*	*p*
RBANS Immediate Memory				
Violent	77.75 (14.12)	1	.24	.63
Nonviolent	81.30 (20.00)			
RBANS Visuospatial				
Violent	72.92 (7.80)	1	.32	.58
Nonviolent	71.00 (8.14)			
RBANS Language				
		1	4.11	.06
Violent	99.00 (7.76)			
Nonviolent	90.10 (12.65)			
RBANS Attention				
		1	.12	.74
Violent	91.67 (13.67)			
Nonviolent	93.80 (15.57)			
RBANS Delayed Memory				
		1	2.38	.14
Violent	68.83 (16.86)			
Nonviolent	78.90 (13.02)			
RBANS Total Score				
		1	.04	.85
Violent	411.25 (36.31)			
Nonviolent	414.80 (48.37)			
TOPF Raw				
		1	1.25	.28
Violent	45.67 (12.43)			
Nonviolent	39.40 (13.81)			
Stroop Interference				
		1	.03	.87
Violent	33.83 (8.26)			
Nonviolent	33.20 (9.72)			

Note. N = 22. RBANS = Repeatable Battery for the Assessment of Neuropsychological Status. TOPF = Test of Premorbid Functioning.

Associations Between Variables

A series of correlations were completed to examine relationships between the social cognition variables. All correlations were measured via Kendall's tau, as the majority of the data were ordinal. The correlation matrix can be found in Appendix III.

Diagnosis and history of violence were positively correlated ($\tau = .64$, $p < 0.01$). The only demographic variable that was correlated with any aspect of social cognition was sex, which was positively correlated with the detection score ($\tau = .44$, $p < 0.05$), the intention score ($\tau = .47$, $p = 0.01$), and the empathy score ($\tau = .46$, $p = 0.01$) from the faux pas task.

Correlations were present between performance on the RBANS and the faux pas task. The immediate memory portion of the RBANS was correlated with the detection score ($\tau = 0.34$, $p < 0.05$) and the intention score ($\tau = .47$, $p < 0.01$) from the faux pas task. The total score from the RBANS was correlated with the faux pas detection score ($\tau = .41$, $p = 0.01$), the faux pas intention score ($\tau = .51$, $p = 0.01$), and the total number of correct responses on the RMET ($\tau = .34$, $p < 0.05$). Performance on the Stroop was correlated with the detection score ($\tau = .35$, $p < 0.05$) and the belief score ($\tau = .31$, $p < 0.05$) from the faux pas task.

Multiple significant correlations were found among social cognition variables. Ratings for good events on the ASQ were found to be positively correlated with aspects of the Faux Pas task (detection score $\tau = .38$, understanding inappropriateness $\tau = .38$, intentions $\tau = .37$, empathy $\tau = .35$; all significant at the $p < 0.05$ level). No correlations were found with attribution style for negative events. The elements of the Faux Pas task were positively correlated with one another, and the strongest correlations were seen with the detection of the faux pas and the other elements

of the task. Performance on the RMET task was also correlated with the faux pas task, with the strongest correlation observed between performance and empathy ($\tau = .56$, $p < 0.01$). Conversely, some variables were not correlated as expected. For example, total confidence rating from the RMET was not correlated with any aspect of social cognition ability, including actual performance on the task itself.

Social Cognition Performance

In order to answer the research question "do differences in social cognition ability exist between patients with psychosis who have engaged in violence and patients diagnosed with a psychotic disorder who have no history of violence?" Mann-Whitney tests were completed to compare performance on the ASQ and the Faux Pas. The data from the ASQ were from Likert scales and the data from the Faux Pas were proportions, due to this a nonparametric method of comparison had to be selected. It was hypothesized that violent individuals would underperform on the empathy portion of the faux pas task and there would be no difference in attribution style. Table 2 displays results from the Mann-Whitney analysis; no results were significant. It was hypothesized that there would be a significant difference between violent and non-violent individuals on emotion recognition ability. A one-way ANOVA was used to compare performance on the RMET between violent and non-violent participants. There was no significant difference between groups on the RMET, $F(1,20) = 2.08$, $p = .17$, with an effect size of $r = 0.10$.

Table 2

Mann-Whitney Table for Social Cognition Tasks

	Z	*U*	*p*	Effect Size (r)
ASQ Good Events	-.79	48.00	.43	.17
ASQ Bad Events	-1.02	44.50	.31	.22
FP Detection	-.43	53.50	.67	.09
FP Understanding Inappropriateness	-1.43	38.50	.15	.31
FP Intention	-1.19	42.00	.23	.26
FP Belief	-1.36	39.50	.17	.29
FP Empathy	-.37	54.50	.72	.08

Note. N = 22. ASQ = Attribution Style Questionnaire. FP = Faux Pas.

Qualitative Analysis

A descriptive qualitative analysis was performed on the responses from the Faux Pas task in order to further investigate the differences in social cognition ability between violent and non-violent individuals. Three major themes emerged: 1) the presence of anger in a response (i.e. anger as the primary emotion felt or reasoning behind a particular situation), 2) the indication that the situation was not awkward but instead was a joke, and 3) the interpretation of a control story as a social faux pas (a common mistake was a situation where an individual was misheard). A total of 16 (nine non-violent, seven violent) participants completed the Faux Pas task. Twenty-two percent (two individuals) of the nonviolent participants had responses that centred around anger while 43% (three individuals) of the violent individuals had responses centred around anger. Fisher's exact was not significant ($p = .60$). There were no incidents where a non-violent participant explained a social faux pas as a joke, but 43% (three individuals) of the violent

participants believed social faux pas were jokes. Fisher's exact was not significant, but it did approach significance (p = .06). Roughly half (55%, five individuals) of the non-violent individuals interpreted control stories as social faux pas while only one individual from the violent group (14%) made this error. Fisher's exact was not significant (p = .15).

Strength of relationship

Given the Fisher's exact approached significance as an exploratory measure the phi coefficient was calculated. Since there were no instances of joking in the non-violent group a logistic regression was unable to be calculated. The results from the phi coefficient indicated a moderate relationship between violence and the interpretation of social faux pas as a joke (ϕ = 0.47.

Social Cognition Task Performance: Categorization

In order to answer the research question "can individuals be categorized as violent or nonviolent based on social cognition ability?" chi-square analysis was completed. It was hypothesized that performance could categorize individuals as violent or non-violent. Empathy was selected from the Faux Pas task based on previous research from Abu-Akel and Abushua'leh (2004) and Majorek at el. (2009). These studies demonstrated a difference in performance between violent and non-violent individuals. The first approach was to group the scores according to each quartile, which resulted in a 2x4 Fisher's exact. Due to the small sample size, this analysis did not provide viable results as many of the cells had no data or had very few cases. To accommodate the sample size, scores were then resorted according to the median, with cases being sorted into groups below or above the median score. This resulted in a 2x2 Fisher's exact analysis. The results are listed in Table 3; no results were significant.

Table 3

Fisher's Exact Test for Social Cognition Variables and Violence Categorization

	p (two-sided significance)
ASQ Good	.65
ASQ Bad	.23
FP Detection	.14
FP Empathy	.65
RMET	1.00

Note. N = 22. ASQ = Attribution Style Questionnaire. FP = Faux Pas. RMET = Reading the Mind in the Eyes Task.

Emotion Recognition Ability and Confidence

In order to answer the research question "Does a discrepancy exist between perceived performance on social cognition tasks and actual performance, and if so, is it related to violent offending in patients diagnosed with a psychotic disorder?" an ANOVA was completed. It was hypothesized that a difference would exist and that it may potentially be predictive of violent behaviour. As stated previously, there was no significant difference between violent and non-violent individuals on the RMET, $F(1,20) = 2.08$, $p = .17$. The violent group had a mean confidence rating of 140.25, with a standard deviation of 15.23. The nonviolent group had a mean confidence rating of 124.90, with a standard deviation of 29.81. There was no significant difference between groups on confidence ratings, $F(1,20)=2.44$, $p = .13$. There was no significant correlation between actual performance on the RMET and perceived performance (measured via confidence ratings; $\tau = -.01$, $p = .96$).

Emotion recognition ability and confidence: Logistic Regression

In order to explore the relationship between emotion recognition ability, confidence, and presence of violence a logistic regression was completed. This regression was exploratory, given there were no significant differences, but the analysis was completed in order to answer the research question. Total performance on the RMET task and overall confidence rating were entered as predictors of violent behaviour. The model was not significant, $X^2(2) = 4.12$, $p = .13$. Table 4 provides a summary of the results.

Table 4

Logistic Regression for Emotion Recognition and Violence

	B	*S.E.*	*Wald*	*p*	*Exp(B)*
Emotion Recognition Ability	.11	.10	1.35	.25	1.11
Confidence Rating	.04	.03	1.57	.21	1.04
Constant	-7.05	4.51	2.44	.12	‹.01

CHAPTER IV

Discussion

This study sought to see if any differences in social cognition ability existed between violent and nonviolent individuals diagnosed with a psychotic disorder. If differences did exist, the next steps were to see if the differences were able to categorize the individuals as violent or nonviolent to investigate possible predictability of social cognition deficits. While the overall performance on social cognition tasks were not different, which is similar to previous work (Abu-Akel & Abushua'leh, 2004; Majorek at el., 2009), there were also no subtest specific differences between the groups, which is different from previous work which has noted differences on the empathy portion of the task (Abu-Akel & Abushua'leh, 2004; Majorek at el., 2009). Furthermore, performance on social cognition tasks did not successfully categorize violent or non-violent groups. Qualitative analysis showed interesting results with three major themes: anger, joking, and the misinterpretation of a non-faux pas story as faux pas. Only using joking as an explanation approached significance for categorization of violent or non-violent. There was no relationship between group membership (violent vs. non-violent), performance on the RMET, and confidence ratings, contrary to findings from Köther and colleagues (2012). Moreover, confidence ratings were not related to actual performance on the emotion recognition task.

Social Cognition Task Performance

There was no significant difference on any aspect of social cognition between violent and non-violent individuals with a psychotic illness. Most effect sizes were in the low-moderate range, with the highest effect size noted for the understanding inappropriateness aspect of the

faux pas task. Interestingly, there was no significant difference on the empathy portion of the faux pas task and the effect size was very small. Previous research has shown that violent individuals with a psychotic illness often outperform non-violent individuals with a psychotic illness on the cognitive components of the faux pas task, but comparison of empathetic portion show weaknesses in the violent group (Abu-Akel & Abushua'leh, 2004). The results from the qualitative analysis of the faux pas task would appear to match this trend, as the violent group included individuals who used joking to explain certain awkward situations. These individuals either dismissed faux pas as simple jokes, so they were not awkward, or would recognize that the situation was awkward but insisted everything was fine because the person was joking.

While there was no significant difference, only one violent individual considered a control story a faux pas compared to roughly half of the non-violent individuals. The violent individuals may have been able to read the social situations more accurately than their non-violent counterparts, but where they deviated in performance was their explanation of why certain events happened. Out of the individuals who used anger or joking to explain the faux pas, the majority were from the violent group; a stronger narrative for the reasoning behind why the social interaction was created. The violent individuals provided more detail in their reasoning for why the faux pas occurred, even if the narrative was incorrect (as in the case of joking). This emphasizes that the recognition of the faux pas is not what violent individuals are challenged by, but by the subsequent explanation of why the events occurred.

The original hypothesis was that individuals with a psychotic illness who engage in violent behaviour may have difficulties with social cognition; the misinterpretation of social cues results in them reacting violently to otherwise nonviolent situations. Interestingly the results from the qualitative analysis show that this may not be the case, perhaps individuals with a

psychotic illness who engage in violence are underestimating the severity of social transgressions which could result in potential confrontation. The qualitative analysis of the faux pas task provided interesting results, particularly the introduction of joking as an explanation of social behaviour. This has not been discussed in either forensic or social cognition literature and introduces questions and ideas about how this way of thinking can affect real world scenarios. A follow up study that examines the characteristics of the violent act for participants who have engaged in violence would be interesting, as the circumstances that lead to violence could be analyzed to see if they match the themes of misinterpreting social cues.

Social cognition for categorization

Individuals were not able to be categorized into violent or non-violent groups based on performance on social cognition tasks. When categorizing based on responses from the faux pas task, significance was almost reached for interpreting the faux pas as a joke; only violent individuals tried to explain the faux pas as a joke instead of a social transgression.

Emotion Recognition and Confidence

There was no significant difference on the emotion recognition performance between violent and non-violent individuals. Previous research has shown that in nonmentally disordered offenders violent individuals underperform on emotion recognition tasks when compared to non-violent individuals (Hoaken, Allaby, & Earle, 2007; Gery et al., 2009), but no literature has compared violent and nonviolent individuals with psychosis on emotion recognition tasks. Interestingly, there was no correlation between confidence and actual performance on RMET; no matter how confident the individual was in their own performance there was no relationship to their actual performance (this was true for both violent and non-violent participants). The real-

world implications are interesting – at what level of confidence do people act on their judgements? Violent individuals may just have a lower threshold of choosing when to act; they could be more impulsive in their decision making which leads them to act on their incorrect interpretations of emotions that they may not be overly confident in. Majorek and colleagues (2009) illustrated how impulsivity was a key difference between the violent and non-violent individuals. Adding a measure of impulsivity would allow for the investigation of this relationship. If the violent group was more impulsive than the non-violent group this could potentially explain how individuals with the same confidence level and same emotion recognition accuracy could end up in two completely different scenarios (violent vs. non-violent). It may not be the mismatch of confidence and accuracy (or rather no relationship based on this study), but the impulsivity of the individual and what they choose to act on.

Limitations

The positive aspect of this study was the abundance of information that was provided from one session; multiple aspects of social cognition were assessed for every participant. This resulted in very rich data that, even for the small sample size, allowed for some unique analyses. The major limitations for the study are the sample size and recruitment. Twenty-two individuals is a small sample and many aspects of the analysis had to be changed. There was also a potential selection bias in participants; participation was socially focused and required the participant to interact with the interviewer for over an hour. Individuals who are not as socially inclined (and may possess greater social cognition deficits) may have been disinclined to participate. The projected sample size was between 45-60 participants. Barriers to recruitment mainly centred around lack of interest in participating. Attrition was also a problem, as people would complete half of the assessment and then decide they no long wanted to complete the second half.

The measures themselves also provided limitations. The quality of responses given during the faux pas task were not as rich as expected. Due to the nature of the tasks the participants did not have to expand upon their answers. This made analyzing the answers qualitatively rather difficult as very little detail was given. The faux pas task also consisted of 20 scenarios and can take anywhere from 20-45 minutes. Theoretically, someone with limited investment in the task could respond "no" to every single question (did anything awkward happen?). Individuals also had problems understanding the attribution style task and would often require the interviewer to clarify each individual question, which would result in longer sessions, and suggests the task may present challenges for comprehension in this population.

It is interesting that there was no significant difference on empathy performance between the violent and non-violent individuals, as this is the most common theme in the literature (Abu-Akel & Abushua'leh, 2004; Majorek at el., 2009). The current problem with the faux pas task is the limited amount of information that can be provided to achieve a correct score: to receive a correct mark for an empathetic response the individual just needed to recognize that the other person would feel a negative emotion. Most responses consisted of a simple "bad" when asked how the other individual would feel in that situation. While it is a positive thing that they could recognize that someone would feel a negative emotion, from a research perspective it does not provide a complex response that yields fruitful analysis. This response pattern could be due to a poverty of thought or deficits in the language used to describe emotion (but not deficits in language itself).

Adding a scale to assess the sociality of the participation to be completed by clinical staff familiar with the patient would have been useful to include. Research has focused on how social cognition deficits are associated with functional outcomes in schizophrenia. Much of the

previous literature used either a self-report scale or nurse rated scale to assess the functioning of the individual on a social level. Adding a scale of this nature would have allowed for the assess of level of functioning between each group.

Conclusion

This study sought to answer if social cognition deficits exist between violent and non-violent individuals diagnosed with a psychotic disorder. If they did exist, could these differences distinguish or categorize individuals as violent or non-violent. The final question was if confidence in emotion recognition ability was related to violent behaviour. There were no significant differences between violent and non-violent individuals on any measure of social cognition ability. There was a moderate relationship between the presence of using joking as an explanation for a social faux pas and the presence of violence. There was no correlation between perceived and actual performance on the emotion recognition task. An exploratory logistic regression was not significant in predicting violence based on the emotion recognition task and confidence. This was the first study to highlight joking as an explanation of a social faux pas. While the proportion of violence committed by individuals with a psychotic disorder is very low, they are still at an increased risk of engaging in violence (Walsh, Buchanan, & Fahy, 2002). Future studies should investigate the role of misunderstanding social interactions and how this effects real world scenarios, such as the perpetration of violence among individuals with a psychotic illness.

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APPENDIX I – THE FAUX PAS TASK

Story 1.
Vicky was at a party at her friend Oliver's house. She was talking to Oliver when another woman came up to them. She was one of Oliver's neighbours. The woman said, "Hello," then turned to Vicky and said, "I don't think we've met. I'm Maria, what's your name?"
"I'm Vicky."
"Would anyone like something to drink?" Oliver asked.

1. Did anyone say something they shouldn't have said or something awkward?

If yes, ask:

2. Who said something they shouldn't have said or something awkward?

3. Why shouldn't he/she have said it or why was it awkward?

4. Why do you think he/she said it?

5. Did Vicky and Maria know each other?

6. How do you think Vicky felt?

Control questions: 7. In the story, where was Vicky?

8. Who was hosting the party?

Story 2.
Helen's husband was throwing a surprise party for her birthday. He invited Sarah, a friend of Helen's, and said, "Don't tell anyone, especially Helen." The day before the party, Helen was over at Sarah's and Sarah spilled some coffee on a new dress that was hanging over her chair.
"Oh!" said Sarah, "I was going to wear this to your party!"
"What party?" said Helen.
"Come on," said Sarah, "Let's go see if we can get the stain out."

1. Did anyone say something they shouldn't have said or something awkward?

If yes, ask:

2. Who said something they shouldn't have said or something awkward?

3. Why shouldn't he/she have said it or why was it awkward?

4. Why do you think he/she said it?

5. Did Sarah remember that the party was a surprise party?

6. How do you think Helen felt?

Control question: 7. In the story, who was the surprise party for?

8. What got spilled on the dress?

Story 3.
Jim was shopping for a shirt to match his suit. The salesman showed him several shirts. Jim looked at them and finally found one that was the right colour. But when he went to the fitting room and tried it on, it didn't fit. "I'm afraid it's too small," he said to the salesman.
"Not too worry," the salesman said. "We'll get some in next week in a larger size."
"Great. I'll just come back then," Jim said.

1. Did anyone say something they shouldn't have said or something awkward?

If yes, ask:

2. Who said something they shouldn't have said or something awkward?

3. Why shouldn't he/she have said it or why was it awkward?

4. Why do you think he/she said it?

5. When he tried on the shirt, did Jim know they didn't have it in his size?

6. How do you think Jim felt?

Control question: 7. In the story, what was Jim shopping for?

8. Why was he going to come back next week?

Story 4.
Jill had just moved into a new flat. Jill went shopping and bought some new curtains for her bedroom. When she had just finished decorating the flat, her best friend, Lisa, came over. Jill gave her a tour of the flat and asked, “How do you like my bedroom?”
“Those curtains are horrible,” Lisa said. “I hope you’re going to get some new ones!”

1. Did anyone say something they shouldn't have said or something awkward?

If yes, ask:

2. Who said something they shouldn't have said or something awkward?

3. Why shouldn't he/she have said it or why was it awkward?

4. Why do you think he/she said it?

5. Did Lisa know who had bought the curtains?

6. How do you think Jill felt?

Control question: 7. In the story, what had Jill just bought?

8. How long had Jill lived in this flat?

Story 5.
Bob went to the barber for a haircut. “How would you like it cut?” the barber asked.
“I’d like the same style as I have now, only take about an inch off,” Bob replied.
The barber cut it a little uneven in the front, so he had to cut it shorter to even it out. “I’m afraid it’s a bit shorter than you asked for,” said the barber.
“Oh well,” Bob said, “it’ll grow out.”

1. Did anyone say something they shouldn't have said or something awkward?

If yes, ask:

2. Who said something they shouldn't have said or something awkward?

3. Why shouldn't he/she have said it or why was it awkward?

4. Why do you think he/she said it?

5. While he was getting the haircut, did Bob know the barber was cutting it too short?

6. How do you think Bob felt?

Control question: 7. In the story, how did Bob want his hair cut?

8. How did the barber cut his hair?

Story 6.
John stopped off at the gas station on the way home to fill up his car. He gave the cashier his credit card. The cashier ran it through the machine at the counter. “I’m sorry,” she said, “the machine won’t accept your card.”
“Hmmm, that’s funny,” John said. “Well, I’ll just pay in cash.” He gave her fifty and said, “I filled up the tank with unleaded.”

1. Did anyone say something they shouldn't have said or something awkward?

If yes, ask:

2. Who said something they shouldn't have said or something awkward?

3. Why shouldn't he/she have said it or why was it awkward?

4. Why do you think he/she said it?

5. When he handed his card to the cashier, did John know the machine wouldn’t take his card?

6. How do you think John felt?

Control question: 7. In the story, what did John stop off to buy?

8. Why did he pay in cash?

Story 7.
Sally is a three-year-old girl with a round face and short blonde hair. She was at her Aunt Carol's house. The doorbell rang and her Aunt Carol answered it. It was Mary, a neighbour.
"Hi," Aunt Carol said, "Nice of you to stop by."
Mary said, "Hello," then looked at Sally and said, "Oh, I don't think I've met this little boy. What's your name?"

1. Did anyone say something they shouldn't have said or something awkward?

If yes, ask:

2. Who said something they shouldn't have said or something awkward?

3. Why shouldn't he/she have said it or why was it awkward?

4. Why do you think he/she said it?

5. Did Mary know that Sally was a girl?

6. How do you think Sally felt?

Control question: 7. In the story, where was Sally?

8. Who came to visit?

Story 8.
Joan took her dog, Zack, out to the park. She threw a stick for him to chase.
When they had been there a while, Pam, a neighbour of hers, passed by. They chatted for a few minutes. Then Pam asked, “Are you heading home? Would you like to walk together?”
“Sure,” Joan said. She called Zack, but he was busy chasing pigeons and didn’t come. “It looks like he’s not ready to go,” she said. “I think we’ll stay.”
“OK,” Pam said. “I’ll see you later.”

1. Did anyone say something they shouldn't have said or something awkward?

If yes, ask:

2. Who said something they shouldn't have said or something awkward?

3. Why shouldn't he/she have said it or why was it awkward?

4. Why do you think he/she said it?

5. When she invited her, did Pam know that Joan wouldn’t be able to walk home with her?

6. How do you think Pam felt?

Control question: 7. In the story, where had Joan taken Zack?

8. Why didn’t she walk with her friend Pam?

Story 9.
Joanne had had a major role in last year's school play and she really wanted the lead role this year. She took acting classes, and in the spring, she auditioned for the play. The day the decisions were posted, she went before class to check the list of who made the play.
She hadn't made the lead and had instead been cast in a minor role. She ran into her boyfriend in the hall and told him what had happened. "I'm sorry," he said. "You must be disappointed."
"Yes," Joanne answered, "I have to decide whether to take this role."

1. Did anyone say something they shouldn't have said or something awkward?

If yes, ask:

2. Who said something they shouldn't have said or something awkward?

3. Why shouldn't he/she have said it or why was it awkward?

4. Why do you think he/she said it?

5. When he first ran into her in the hall, did Joanne's boyfriend know that she hadn't gotten the role?

6. How do you think Joanne felt?

Control question: 7. In the story, what role did Joanne get?

8. What kind of role had she had the previous year?

Story 10.
Joe was at the library. He found the book he wanted about sailing in the Mediterranean and went up to the front counter to check it out. When he looked in his wallet, he discovered he had left his library card at home. “I’m sorry,” he said to the woman behind the counter. “I seem to have left my library card at home.”
“That’s OK,” she answered. “Tell me your name, and if we have you in the computer, you can check out the book just by showing me your driving license.”

1. Did anyone say something they shouldn't have said or something awkward?

If yes, ask:

2. Who said something they shouldn't have said or something awkward?

3. Why shouldn't he/she have said it or why was it awkward?

4. Why do you think he/she said it?

5. When Joe went into the library, did he realize he didn’t have his library card?

6. How do you think Joe felt?

Control question: 7. In the story, what book did Joe get at the library?

8. Was he going to be able to check it out?

Story 11.
Jean West, a manager in Abco Software Design, called a meeting for all of the staff. “I have something to tell you,” she said. “John Morehouse, one of our accountants, is very sick with cancer and he’s in the hospital.”
Everyone was quiet, absorbing the news, when Robert, a software engineer, arrived late. “Hey, I heard this great joke last night!” Robert said. “What did the terminally ill patient say to his doctor?”
Jean said, “Okay, let’s get down to business in the meeting.”

1. Did anyone say something they shouldn't have said or something awkward?

If yes, ask:

2. Who said something they shouldn't have said or something awkward?

3. Why shouldn't he/she have said it or why was it awkward?

4. Why do you think he/she said it?

5. When he came in, did Robert know that the accountant was sick with cancer?

6. How do you think Jean, the manager, felt?

Control question: 7. In the story, what did Jean, the manager, tell the people in the meeting?

8. Who arrived late to the meeting?

Story 12.
Mike, a nine-year-old boy, just started at a new school. He was in one of the cubicles in the bathroom at school. Joe and Peter, two other boys, came in and were standing at the sinks talking.
Joe said, “You know that new guy in the class? His name’s Mike. Doesn’t he look weird? And he’s so short!”
Mike came out of the cubicle and Joe and Peter saw him.
Peter said, “Oh hi, Mike! Are you going out to play football now?”

1. Did anyone say something they shouldn't have said or something awkward?

If yes, ask:

2. Who said something they shouldn't have said or something awkward?

3. Why shouldn't he/she have said it or why was it awkward?

4. Why do you think he/she said it?

5. When Joe was talking to Peter, did he know that Mike was in one of the cubicles?

6. How do you think Mike felt?

Control question: 7. In the story, where was Mike while Joe and Peter were talking?

8. What did Joe say about Mike?

Story 13.
Kim's cousin, Scott, was coming to visit and Kim made an apple pie especially for him. After dinner, she said, "I made a pie for you. It's in the kitchen."
"Mmmm," replied Scott, "It smells great! I love pies, except for apple, of course."

1. Did anyone say something they shouldn't have said or something awkward?

If yes, ask:

2. Who said something they shouldn't have said or something awkward?

3. Why shouldn't he/she have said it or why was it awkward?

4. Why do you think he/she said it?

5. When he smelled the pie, did Scott know it was an apple pie?

6. How do you think Kim felt?

Control question: 7. In the story, what kind of pie did Kim make?

8. How did Kim and Scott know each other?

Story 14.
Jeanette bought her friend, Anne, a crystal bowl for a wedding gift. Anne had a big wedding and there were a lot of presents to keep track of.
About a year later, Jeanette was over one night at Anne's for dinner. Jeanette dropped a wine bottle by accident on the crystal bowl and the bowl shattered. "I'm really sorry. I've broken the bowl," said Jeanette.
"Don't worry," said Anne. "I never liked it anyway. Someone gave it to me for my wedding."

1. Did anyone say something they shouldn't have said or something awkward?

If yes, ask:

2. Who said something they shouldn't have said or something awkward?

3. Why shouldn't he/she have said it or why was it awkward?

4. Why do you think he/she said it?

5. Did Anne remember that Jeannette had given her the bowl?

6. How do you think Jeanette felt?

Control question: 7. In the story, what did Jeanette give Anne for her wedding?

8. How did the bowl get broken?

Story 15.
At Fernhaven Elementary School, there was a story competition. Everyone was invited to enter. Several of the fifth graders did so. Christine, a fifth grader, loved the story she had entered in the competition.
A few days later, the results of the competition were announced: Christine's story had not won anything and a classmate, Jake, had won first prize. The following day, Christine was sitting on a bench with Jake. They were looking at his first prize trophy. Jake said, "It was so easy to win that contest. All of the other stories in the competition were terrible."
"Where are you going to put your trophy?" asked Christine.

1. Did anyone say something they shouldn't have said or something awkward?

If yes, ask:

2. Who said something they shouldn't have said or something awkward?

3. Why shouldn't he/she have said it or why was it awkward?

4. Why do you think he/she said it?

5. Did Jake know that Christine had entered a story in the contest?

6. How do you think Christine felt?

Control question: 7. In the story, who won the contest?

8. Did Christine's story win anything?

Story 16.
Tim was in a restaurant. He spilled some coffee on the floor by accident. “I’ll get you another cup of coffee,” said the waiter. The waiter was gone for a while.
Jack was another customer in the restaurant, standing by the cashier waiting to pay. Tim went up to Jack and said, “I spilled coffee over by my table. Can you mop it up?”

1. Did anyone say something they shouldn't have said or something awkward?

If yes, ask:

2. Who said something they shouldn't have said or something awkward?

3. Why shouldn't he/she have said it or why was it awkward?

4. Why do you think he/she said it?

5. Did Tim know that Jack was another customer?

6. How do you think Jack felt?

Control question: 7. In the story, why was Jack standing by the cashier?

8. What did Tim spill?

Story 17.
Eleanor was waiting at the bus stop. The bus was late and she had been standing there a long time. She was 65 and it made her tired to stand for so long. When the bus finally came, it was crowded and there were no seats left. She saw a neighbour, Paul, standing in the aisle of the bus.
"Hello, Eleanor," he said. "Were you waiting there long?"
"About 20 minutes," she replied.
A young man who was sitting down got up. "Ma'am, would you like my seat?"

1. Did anyone say something they shouldn't have said or something awkward?

If yes, ask:

2. Who said something they shouldn't have said or something awkward?

3. Why shouldn't he/she have said it or why was it awkward?

4. Why do you think he/she said it?

5. When Eleanor got on the bus, did Paul know how long she had been waiting?

6. How do you think Eleanor felt?

Control question: 7. In the story, why was Eleanor waiting at the bus stop for 20 minutes?

8. Were there any seats available on the bus when she got on?

Story 18.
Roger has just started work at a new office. One day, in the coffee room, he was talking to a new friend, Andrew. “What does your wife do?” Andrew asked.
“She’s a lawyer,” answered Roger.
A few minutes later, Claire came into the coffee room looking irritated. “I just had the worst phone call,” she told them. “Lawyers are all so arrogant and greedy. I can’t stand them.”
“Do you want to come look over these reports?” Andrew asked Claire.
“Not now,” she replied, “I need my coffee.”

1. Did anyone say something they shouldn't have said or something awkward?

If yes, ask:

2. Who said something they shouldn't have said or something awkward?

3. Why shouldn't he/she have said it or why was it awkward?

4. Why do you think he/she said it?

5. Did Claire know that Roger’s wife was a lawyer?

6. How do you think Roger felt?

Control question: 7. In the story, what does Roger's wife do for a living?

8. Where were Roger and Andrew talking?

Story 19.
Richard bought a new car, a red Peugeot. A few weeks after he bought it, he backed it into his neighbour Ted's car, an old beat-up Volvo.
His new car wasn't damaged at all and he didn't do much damage to Ted's car either – just a scratch in the paint above the wheel. Still, he went up and knocked on the door. When Ted answered, Richard said, "I'm really sorry. I've just put a small scratch on your car."
Ted came out and looked at it and said, "Don't worry. It was only an accident."

1. Did anyone say something they shouldn't have said or something awkward?

If yes, ask:

2. Who said something they shouldn't have said or something awkward?

3. Why shouldn't he/she have said it or why was it awkward?

4. Why do you think he/she said it?

5. Did Richard know what his neighbor Ted's reaction would be?

6. How do you think Ted felt?

Control question: 7. In the story, what did Richard do to Ted's car?

8. How did Ted react?

Story 20.
Louise went to the butcher to buy some meat. It was crowded and noisy in the shop. She asked the butcher, “Do you have any free-range chickens?”
He nodded and started to wrap up a roasted chicken for her.
“Excuse me,” she said, “I must not have spoken clearly. I asked if you had any free-range chickens.”
“Oh, sorry,” the butcher said, “we’re all out of them.”

1. Did anyone say something they shouldn't have said or something awkward?

If yes, ask:

2. Who said something they shouldn't have said or something awkward?

3. Why shouldn't he/she have said it or why was it awkward?

4. Why do you think he/she said it?

5. When he started wrapping up a chicken for Louise, did the butcher know that she wanted a

free range

chicken?

6. How do you think Louise felt?

Control question: 7. In the story, where did Louise go?

8. Why did the butcher start to wrap up a roasted chicken for her?

APPENDIX II

ATTRIBUTIONAL STYLE QUESTIONNAIRE

NAME: _____ COURSE/YEAR: _____

DIRECTIONS

1) Read each situation carefully and imagine it happening to you.
2) Decide what you *believe* would be the major cause of the situation if it happened to you.
3) Write this cause in the blank provided.
4) Answer three questions about the cause by circling one number per question. Do not circle the words.
5) Go on to the next situation.

YOU MEET A FRIEND WHO COMPLIMENTS YOU ON YOUR APPEARANCE

1) Write down the major cause:
   _____
   _____

2) Is the cause of your friend's compliment due to something about you or something about other people or circumstances?

Totally due to other people or circumstance	1	2	3	4	5	6	7	Totally due to me

3) In the future when you are with your friend, will this cause again be present?

Will never again be present	1	2	3	4	5	6	7	Will always be present

4) Is the cause something that just affects interacting with friends or does it also influence other areas of your life?

Influences just this particular situation	1	2	3	4	5	6	7	Influences all situations

YOU HAVE BEEN LOOKING FOR A JOB UNSUCCESSFULLY FOR SOME TIME

5) Write down the major cause:

_____

_____

6) Is the cause of your unsuccessful job search due to something about you or something about other people or circumstances?

Totally due to other people or circumstance	1	2	3	4	5	6	7	Totally due to me

7) In the future when you look for a job, will this cause again be present?

Will never again be present	1	2	3	4	5	6	7	Will always be present

8) Is the cause something that just influences looking for a job or does it also influence other areas of your life?

Influences just this particular situation	1	2	3	4	5	6	7	Influences all situations

YOU BECOME VERY RICH.

9) Write down the major cause:

_____

_____

10) Is the cause of your becoming rich due to something about you or something about other people or circumstances?

Totally due to other people or circumstance	1	2	3	4	5	6	7	Totally due to me

11) In your financial future, will this cause again be present?

Will never again be present	1	2	3	4	5	6	7	Will always be present

12) Is the cause something that just affects obtaining money, or does it also influence other areas of your life?

Influences just this particular situation	1	2	3	4	5	6	7	Influences all situations

A FRIEND COMES TO YOU WITH A PROBLEM AND YOU DONT TRY TO HELP HIM/HER.

13) Write down the major cause:

_____

_____

14) Is the cause of your not helping your friend due to something about you or something about other people or circumstances?

Totally due to other people or circumstance	1	2	3	4	5	6	7	Totally due to me

15) In the future when a friend comes to you with a problem, will this cause again be present?

Will never again be present	1	2	3	4	5	6	7	Will always be present

16) Is the cause something that just affects what happens when a friend comes to you with a problem, or does it also influence other areas of your life?

Influences just this particular situation	1	2	3	4	5	6	7	Influences all situations

YOU GIVE AN IMPORTANT TALK IN FRONT OF A GROUP AND THE AUDIENCE REACTS NEGATIVELY

17) Write down the major cause:

_____

_____

18) Is the cause of the audience's negative reaction due to something about you or something about other people or circumstances?

Totally due to other people or circumstance	1	2	3	4	5	6	7	Totally due to me

19) In the future when you give talks, will this cause again be present?

Will never again be present	1	2	3	4	5	6	7	Will always be present

20) Is the cause something that just influences giving talks, or does it also influence other areas of your life?

Influences just this particular situation	1	2	3	4	5	6	7	Influences all situations

YOU DO A PROJECT WHICH IS HIGHLY PRAISED.

21) Write down the major cause:

_____

_____

22) Is the cause of your being praised due to something about you or something about other people or circumstances?

Totally due to other people or circumstance	1	2	3	4	5	6	7	Totally due to me

23) In the future when you do a project, will this cause again be present?

Will never again be present	1	2	3	4	5	6	7	Will always be present

24) Is the cause something that just affects doing projects, or does it also influence other areas of your life?

Influences just this particular situation	1	2	3	4	5	6	7	Influences all situations

YOU MEET A FRIEND WHO ACTS HOSTILELY TOWARDS YOU

25) Write down one major cause.

_____

_____

26) Is the cause of your friend acting hostile due to something about you or something about other people or circumstances?

Totally due to other people or circumstance	1	2	3	4	5	6	7	Totally due to me

27) In the future when interacting with friends, will this cause again be present?

Will never again be present	1	2	3	4	5	6	7	Will always be present

28) Is the cause something that just affects interacting with friends, or does it also influence other areas of your life?

Influences just this particular situation	1	2	3	4	5	6	7	Influences all situations

YOU CAN'T GET ALL THE WORK DONE THAT OTHERS EXPECT OF YOU.

29) Write down the major cause:

_____

_____

30) Is the cause of your not getting the work done due to something about you or something about other people or circumstances?

Totally due to other people or circumstance	1	2	3	4	5	6	7	Totally due to me

31) In the future when doing work that others expect. will this cause again be present?

Will never again be present	1	2	3	4	5	6	7	Will always be present

32) Is the cause something that just affects doing work that others expect of you, or does it also influence other areas of your life?

Influences just this particular situation	1	2	3	4	5	6	7	Influences all situations

YOUR SPOUSE (BOYFREND/GIRLFRIEND) HAS BEEN TREATING YOU MORE LOVINGLY.

33) Write down the major cause:

_____

_____

34) Is the cause of your spouse (boyfriend/girlfriend) treating you more lovingly due to something about you or something about other people or circumstances?

Totally due to other people or circumstance	1	2	3	4	5	6	7	Totally due to me

35) In future interactions with your spouse (boyfriend/girlfriend) will this cause again be present?

Will never again be present	1	2	3	4	5	6	7	Will always be present

36) Is the cause something that just affects how your spouse (boyfriend/girlfriend) treats you, or does it also influence other areas of your life?

Influences just this particular situation	1	2	3	4	5	6	7	Influences all situations

YOU APPLY FOR A POSITION THAT YOU WANT VERY BADLY (E.G., IMPORTANT JOB,
GRADUATE SCHOOL ADMISSION. ETC.) AND YOU GET IT

37) Write down the *one* major cause:

_____

_____

38) Is the cause of your getting the position due to something about you or something about other people or circumstances?

Totally due to other people or circumstance	1	2	3	4	5	6	7	Totally due to me

39) In the future when you apply for a position, will this cause again be present?

Will never again be present	1	2	3	4	5	6	7	Will always be present

40) Is the cause something that just influences applying for a position or does it also influence other areas of your life?

Influences just this particular situation	1	2	3	4	5	6	7	Influences all situations

YOU GO OUT ON A DATE AND IT GOES BADLY.

41) Write down the *one* major cause:

_____

_____

42) Is the cause of the date going badly due to something about you or something about other people or circumstances?

Totally due to other people or circumstance	1	2	3	4	5	6	7	Totally due to me

43) In the future when you are dating, will this cause again be present?

Will never again be present	1	2	3	4	5	6	7	Will always be present

44) Is the cause something that just influences dating, or does it also influence other areas of your 1ife?

Influences just this particular situation	1	2	3	4	5	6	7	Influences all situations

YOU GET A RAISE.

45) Write down the major cause:

_____

_____

46) Is the cause of your getting a raise due to something about you or something about other people or circumstances?

Totally due to other people or circumstance	1	2	3	4	5	6	7	Totally due to me

47) In the future on your job will this cause again be present?

Will never again be present	1	2	3	4	5	6	7	Will always be present

48) Is this cause something that just affects getting a raise. or does it also influence other areas of your life?

Influences just this particular situation	1	2	3	4	5	6	7	Influences all situations

APPENDIX III

Summary of Correlations on Social Cognition Measures

Measure	1	2	3	4	5	6	7	8	9
1. ASQ Good Events	--	.05	.38*	.38*	.37*	.20	.35*	.19	.17
2. ASQ Bad Events	.05	-	.05	-.10	-.26	-.11	-.05	-.17	-.10
3. Faux Pas Detection	.38*	-.14	-	.77**	.77**	.66**	.68**	.52**	.16
4. Understanding Inappropriateness	.38*	-.10	.77**	-	.63**	.58**	.60**	.44**	.23
5. Intentions	.37*	-.26	.77**	.63**	-	.57**	.49**	.37*	.15
6. Beliefs	.20	-.11	.66**	.58**	.57**	-	.44**	.51**	.03
7. Empathy	.35*	-.05	.68**	.60**	.49**	.44**	-	.55**	.07
8. Emotion Recognition Performance	.19	-.17	.53**	.44**	.37*	.51**	.55**	-	-.01
9. Total Confidence Rating	.17	-.10	.16	.23	.15	.03	.07	-.01	-

Note. N = 22. All correlations are Kendall's tau. * is significant at the 0.05 level. ** is significant at the 0.01 level.