

IMPULSIVITY, SOCIAL PROBLEM SOLVING AND ALCOHOL DEPENDENCY AS  
CONTRIBUTORS TO AGGRESSION IN A SAMPLE OF PROVINCIALY  
INCARCERATED OFFENDERS

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By

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## ABSTRACT

Numerous cognitive, personality and situational factors have been found to be related to aggression. Understanding how these factors interrelate is essential to predicting violence and critical to the assessment and treatment of offenders with violent histories. Previous research has suggested a potential role for social problem solving as a mediator between impulsivity and aggression (McMurrin et al., 2002). Additionally, it is well established that aggression is more likely to occur in the context of alcohol use (Collins, 1993; Reiss & Roth, 1993; Lipsey, Wilson, Cohen & Derzon 1997). Based on existing literature, a model of aggression was developed involving impulsivity, social problem solving and alcohol dependency. Utilizing path analysis with multiple regression, a mediational model of aggression was assessed on a sample of 179 provincially incarcerated offenders, 87% of whom were Aboriginal and 45% of whom had a previous conviction of domestic abuse. The data suggest that social problem solving, alcohol dependency and impulsivity are all important in understanding and predicting aggression. Social problem solving does not appear to act as a mediator in the relationship between impulsivity and aggression, although preliminary results suggest that impulsivity, may serve the function in this relationship and in the manifestation of aggression. The implications of these findings for our understanding about human factors contributing to aggression and for further advancement of treatment programs are provided.

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## LIST OF ABBREVIATIONS

AG	Anger Subscale of BPAQ
ABQ	Antisocial Behavior Questionnaire
AIC	Akaike Information Criterion
AMOS	Analysis of Moment Structures
AS	Avoidance Style Subscale of SPSI-R:S
BDHI	Buss Durkee Hostility Inventory
BIDR	Balanced Inventory of Desirable Responding
BIS-11	Barratt Impulsivity Scale - 11
BPAQ	Buss Perry Aggression Questionnaire
CFI	Comparative Fit Index
DV	Dependent Variable
HT	Hostility Subscale of BPAQ
IM	Short Impression Management Scale from BIDR
ICS	Impulsivity/Carelessness Style Subscale of SPSI-R:S
IPAS	Impulsive/Premeditated Aggression Scale
IPAS: IM	Impulsivity Subscales of IPAS
IPAS: PM	Premeditated Subscale of IPAS
IV	Independent Variable
NFI	Normed Fit Index
NPO	Negative Problem Orientation Subscale of SPSI-R:S
PA	Physical Aggression Subscale of BPAQ
PACC	Prince Albert Correctional Centre
PPO	Positive Problem Orientation Subscales of SPSI-R:S
PSAP	Point Subtraction Aggression Paradigm
RMSEA	Root Mean Square Error of Approximation
RPS	Rational Problem Orientation Subscale of SPSI-R:S
SADD	Short Alcohol Dependency Data Questionnaire
SCC	Saskatoon Correctional Centre
SD	Standard Deviation
SPSI-R:S	Social Problem Solving Inventory – Revised Short Form
SPSS	Statistical Package for the Social Sciences
SQRT	Square Root Transformation
SRMR	Standardized Root Mean Square Residual
TAP	Taylor Aggression Paradigm
TR	Transformed
VA	Verbal Aggression Subscale of BPAQ
ZRES	Standardized Residuals

## CHAPTER 1 LITERATURE REVIEW

“Violence is a complex and multifaceted form of behaviour.

It is likely that there is no simple explanation of violence”

(National Research Council, 1993)

Aggression is a complex area of human behaviour and experience. It incorporates human violence, mental disorders, and criminality. Violent aggression has become one of the most prevalent and persistent public health and social problems in North America, as well as elsewhere around the world. A large amount of research exists on this topic; our understanding of its genesis and influence, however, remains modest.

The study of aggression is complicated by a number of factors. One of the major challenges in research into violence and aggression is that of defining the construct. With the many diverse causes and manifestations of aggression, it is not surprising that researchers of various disciplines have defined it differently. A profusion of data exists on aggression from disciplines such as psychology, criminology, law enforcement, and zoology, but a consensual definition of aggression between disciplines is seldom observed. Social scientists even may focus on different elements such as the form of the behaviour, the goal of the behaviour or the overall results of the event (Blackburn, 1993). All contribute to various permutations of how one defines aggression. For the purposes of this discussion, aggression will be considered as “any form of behaviour directed towards the goal of harming or injuring another living being which is motivated to avoid such treatment” (Baron & Richardson, 1994 (pp. 7); Bartol, 2002).

A number of cognitive, personality and situational factors have been found to influence or impact aggression and its subtypes. This study describes previous research on aggression and its relations with a number of these factors, specifically impulsivity, social problem solving, and alcohol use. A discussion of these findings in relation to a model based upon work by McMurran, Blair and Egan (2002) is presented. This will be followed by the current research study, which attempts to examine and extend our knowledge of the influence of the aforementioned factors on aggression.

### *1.1. Impulsivity and Aggression*

Impulsivity is a multidimensional concept related to an individual's ability to restrain or regulate one's behaviour. Impulsivity is acknowledged as a deficit phenomenon: that is, it appears when "normal" regulation is not functioning properly. Individuals exhibiting this deficit are poor at delaying gratifications, are often overly concerned with novelty seeking, and have difficulty showing emotions in a socially appropriate manner, particularly aggressive or sexual emotions (Barratt, 1985; Patton, Stanford, & Barratt, 1995; Plutchik & van Praag, 1995). Impulsivity has both biological and social-cognitive determinants. It is a defining feature of several neurological disorders: hyperactive syndrome in children, antisocial personality disorder, borderline personality disorder, delinquency, and alcohol and substance abuse (Plutchik & van Praag, 1995).

Support has been provided for a relationship between impulsivity and aggression; a precise understanding of the association, however, is unknown (Gray, Owen, Davis & Tsaltas, 1983). Furthermore, little effort has been made to distinguish between impulsive behaviour with an aggressive tendency and impulsive behaviour without aggressive inclination (Seroczynski, Bergeman & Coccaro, 1999). Distinctions have been made concerning different types of

aggression, and one important element of their descriptions is in their relation to impulsivity. Two of these common categories are reactive aggression and premeditated (or proactive) aggression. Impulsive aggression is related to the former and is defined as “hostile, angry reaction to perceived frustration” (Seroczynski et al., pp. 42). An individual exhibiting such aggression overreacts to minor provocations, is volatile and short-tempered. This category of aggression is often present in individuals characterized as “having a short fuse” (Barratt, Stanford, Kent & Felthous, 1997). Conversely, nonimpulsive aggression has various labels, such as premeditated, predatory, instrumental, or proactive aggression. Typically, less emotion is involved in these acts, as it is conceived as a premeditated means of obtaining a goal (Barratt et al., 1997). Reactive or impulsive aggression is often coupled with impulsive behaviour, whereas proactive aggression, by nature of its definition, is more premeditated and less impulsive (Seroczynski et al., 1999).

Several studies have found support for a relationship between impulsivity and both antisocial behaviour and aggression. Luengo, Carrillo de-la-Pena, Otero, and Romero (1994) examined these relationships in adolescents in the community. A sample of 1226 males and females, ranging in age from 12-18, completed a battery of self-report measures; included in this battery was a measure of impulsivity (Barratt Impulsivity Scale, BIS-10; Barratt, 1985) and the Antisocial Behavior Questionnaire (ABQ; Carrillo-de-la-Pena, 1993). Subscales of the ABQ include Aggression, Theft, Drug Abuse and Rule Breaking. Correlational analyses supported a positive relationship between impulsivity and antisocial behaviour, as well as impulsivity and aggression.

Vitacco, Neumann, Robertson, and Durrant (2002) suggest that adolescents high on impulsivity have more police contacts, engage in behaviour that is more violent, and present with

a greater number and variation of criminal offences. White et al., (1994) similarly assessed impulsivity in delinquents and found further support for a relationship. More specifically, impulsivity strongly differentiates stable, serious delinquents from other delinquents in adolescence. Both behavioural measures and cognitive measures of impulsivity were employed in this sample of over 400 adolescent males. The authors propose that, “Impulsivity may be related to the development of stable, long-term serious antisocial behaviour” (pp. 202).

Seager (2005) assessed the relations between impulsivity and a self-schema for a hostile world in a sample of violent offenders at a medium-security federal Canadian institution. A self-schema was assessed with social vignettes in which offenders were asked to make attributions on the motives of individuals in the vignette (Serin, 1988; Seager, 2005) Each were coded for hostile responses. Correlations of impulsivity and the self-schema measures were positive, indicating that high impulsivity was related to a high self-schema for a hostile world. Additionally, impulsivity was positively correlated with all measures of violent behaviour. Regression analysis indicated that 31% of the variance in violent offence history was accounted for by the combination of impulsivity and self-schemas for a hostile world.

Cherek, Moeller, Dougherty and Rhoades (1997) explored impulsivity and aggression in male violent and nonviolent parolees. A Delay of Gratification Task, involving a small monetary reward, and a self-report measure of impulsivity (Barratt Impulsivity Scale – 11, BIS-11; Barratt, 1985) were administered to the parolees. Results indicated that violent parolees scored higher or more impulsively on the BIS and selected the impulsive option more frequently on the Delay of Gratification Task than their nonviolent counterparts. Also, the number of impulsive choices was significantly correlated with the psychometric measure of impulsivity (BIS-11).

Examining impulsivity in relation to behavioural measures of aggression, Cherek, Moeller, Schnapp and Dougherty (1997b) administered the Point Subtraction Aggression Paradigm (PSAP; Cherek, 1981) to a sample of nonviolent and violent parolees. Within this paradigm, participants are asked to choose one of two options for each trial of the experiment: 1) Press button A to accumulate points exchangeable for money, or 2) Press button B to ostensibly subtract points from a fictitious person (this being the aggressive response). Results indicated that the violent parolees responded more aggressively, choosing button B more often, than the nonviolent parolees.

With respect to impulsivity, there was no significant difference in impulsivity scores (BIS-11; Barratt, 1985) between the violent and nonviolent parolees (Cherek, Moeller, Schnapp and Dougherty, 1997b). This is consistent with previous findings by Cherek, Schnapp, Moeller and Dougherty, (1996), but inconsistent with Cherek, Moeller, Dougherty and Rhoades (1997a). Research concerning psychometric self-report measures of impulsivity and its relations with measures of aggression based upon criminal history appear mixed. However, examining only behavioural measures of impulsivity and aggression, Cherek et al., (1997a) correlated the number of impulsive choices for both violent and nonviolent parolees in the original sample with the number of aggressive responses reported in the Cherek et al., (1997b) sample. Results indicated a significant positive correlation between impulsive choices and aggressive responses in both the violent and nonviolent parolees.

Summarizing both the behavioural and the psychometric data, Cherek et al., (1996; 1997a; 1997b) reported that parolees with violent criminal histories respond more impulsively and exhibit more aggressive responses than nonviolent parolees. Therefore, Cherek and colleagues

suggest that “a very fundamental mechanism that acts to inhibit behaviour in a variety of situations may be less operative” in violent parolees (pp. 529; Cherek et al 1997a).

The majority of the studies examining impulsivity and its relation to aggression, however, have examined impulsivity as a unidimensional concept, ignoring the multidimensional nature of this construct. It has been proposed that some subtypes of impulsivity may correlate stronger with criminality and aggression than other subtypes (Fink & McCown, 1993). The Barratt Impulsivity Scale-11 (BIS; Barratt, 1985; Patton, Stanford, & Barratt, 1995) described these subtypes of impulsivity; 1) motor impulsivity—acting on the spur of the moment; 2) cognitive/attention impulsivity—not focusing on the task at hand; and 3) nonplanning impulsivity—not planning and thinking carefully.

Findings are mixed concerning the success of measuring each of these subtypes. Patton et al., (1995) have been consistent in their assessment of motor and nonplanning impulsivity, but support for subtype of cognitive/attention impulsivity has been discrepant. There are two possible explanations for these inconsistent findings. First, because cognitive/attention impulsivity loaded on all of the factors, it is thought that this factor may be measuring the general cognitive process underlying impulsivity. That is, the “thought processes” underlying the trait of impulsivity, which ultimately may be difficult to differentiate or pull apart from the others. Second, because the BIS-11 is a self-report measure, subjects may lack the ability to independently assess thought processes that characterize impulsivity, and therefore findings of this factor may not be assessed accurately. Regardless, two subtypes of impulsivity are apparent in the common impulsivity measure the BIS-11 (Patton et al., 1995).

Further examining these subtypes of impulsivity, Barratt (1985, 1990) revealed that levels of impulsivity are higher for motor and cognitive impulsivity in delinquents when compared to

nondelinquents and that no difference appears to exist in nonplanning impulsivity between delinquents and nondelinquents. More recently, Luengo, Carrillo-de-la-Pena, Otero and Romero (1994) examined a similar theme in adolescents; their findings, however, were incongruous with Barratt's (1985; 1990). Although the overall impulsivity scores on the BIS were correlated with antisocial behaviour and aggression, the nonplanning component demonstrated the strongest relationship with antisocial behaviour and the cognitive component demonstrated the weakest relationship.

Having discussed the subtypes of impulsivity, how do the subtypes of reactive and premeditated aggression relate to impulsivity? Reactive, by the nature of its definition, is more impulsive and is therefore expected to correlate highly with impulsivity. Stanford, Greve and Dickens (1995) examined impulsive/reactive aggression (BDHI; Buss & Durkee, 1957) and impulsivity (BIS-11; Patton et al., 1995) in a sample of 214 university students. Group classification, impulsive aggressive versus nonaggressive, was determined by self-report identification of impulsive aggressive episodes in the last 6 months. The impulsive aggressive individuals scored significantly higher on both the aggression measure (BDHI) and the impulsivity measure (BIS-11) than the nonaggressive participants. A second analysis examined the number of impulsive aggressive episodes in relation to the aggression and impulsivity. The number of impulsive aggressive episodes was positively correlated with impulsivity and the overall score of the BDHI. Impulsivity has been clearly defined here as an important dimension in the control of behaviour involved in the inhibition of aggressive impulsive acts. What, then, is the role of impulsivity in premeditated aggression?

Barratt, Stanford, Kent and Felthous (1997) examined various neuropsychological, personality and psychophysiological measures of impulsive aggressive and premeditated

aggressive inmates and a noninmate control group. Results were contrary to the original prediction: there were no differences in impulsivity, as measured by the BIS, between the impulsive and premeditated groups. There were as predicted, however, significant differences between each of the aggressive subtypes and the nonaggressive control. That is, the aggressive subtypes exhibited a higher level of behaviourally measured impulsivity. Furthermore, one of the most notable findings was a significant difference between the two aggressive subtypes with respect to verbal skills. The impulsive aggressive group exhibited more deficits on verbal information processing than the premeditated group. Related to this finding is a deficit in attention and concentration between the two groups, as well as a difference between each of the two groups and the nonaggressive control. The authors suggest that deficits with respect to an individual's reading and verbal ability may influence everyday activities and result in stressors. These deficits may interact with "differences in arousability thresholds" and may result in a tendency to act aggressively and in an impulsive manner. It is implied that impulsivity on its own may not be sufficient to cause impulsive aggression; rather, its interactions with other factors such as verbal skills and arousal level may have a significant role in contributing to aggression.

Stanford, Houston, Villemarette-Pittman and Greve (2003) in a similar study examined various personality and neuropsychological measures in a sample of aggressive outpatients and a nonaggressive control group. Overall, the aggressive participants scored higher, or more aggressively, on the Buss Perry Aggression Questionnaire (BPAQ), as well as on the impulsivity measure (BIS-11; Patton et al., 1995). Few significant differences however, were found on neuropsychological and psychophysiological measures. Results from this study can only support personality differences between aggressive participants and nonaggressive controls and explain

little in terms of differences between premeditated and reactive aggressive subtypes and impulsivity.

The concept of impulsivity or dyscontrol plays a major role in understanding criminal behaviour. Gottfredson and Hirschi (1990) have proposed impulsivity as the fundamental factor contributing to criminal behaviour. It is argued that criminal behaviour stems from low self-control, as many criminal acts provide immediate or easy gratification of desires either by relieving an irritation or providing some reward (e.g. getting high). However, it is admitted that a lack of self-control does not necessary imply that criminal behaviour will occur.

Few studies have demonstrated a causal relationship between impulsivity and aggression, but a multitude of studies have demonstrated an indirect association between these factors. Researchers have suggested impulsivity as a fundamental factor in aggression and criminal behaviour in general, but at the same time acknowledge various other factors, such as verbal skill or social problem solving, which may contribute to or mediate this relationship (Gottfredson & Hirschi, 1990; McMurrin, Blair & Egan, 2002). A relationship between these factors appears to exist, but the specifics and influences of the relationship between impulsivity and aggression remains unclear. Further research is necessary to understand better the relations of impulsivity and its involvement in offending and violent behaviour in offenders.

This study examines the relationship between aggression and a measure of impulsivity in a cross-section of incarcerated offenders. Aggression will be assessed by two psychometric measures: the Buss-Perry Aggression Questionnaire and the Impulsive/Premeditated Aggression Scale. A common psychometric measure of impulsivity, the BIS-11, will be used to assess individuals' overall level of impulsivity as well as its subtypes of motor, cognitive, and nonplanning impulsivity. Impulsive aggression and premeditated aggression subscales of the

Impulsive/Premeditated Aggression Scale will be examined to assess their relationship with impulsivity. Social problem solving as a potential mediator in this relationship is considered and described in a subsequent section.

### *1.2. Social Problem Solving and Aggression*

Every day we are faced with a multitude of problems, whether it is deciding how to deal with clashing personalities at work, how to balance the budget at home, or what to do when the car will not start. Fortunately, most of the time, individually or collectively, we are able to solve these problems with little conscious effort. From our experiences, we have developed some social cognitive and problem-solving strategies that help us move through our daily lives with little turmoil. Conceivably, some of our problem solving strategies may be so rehearsed that we take them for granted.

Social problem solving is one of the more sophisticated subcategories of social cognition. When we encounter a difficult social situation, we may utilize one or more of the following processes a) discuss the problem and its constraints, and generate a collection of possible plans of action ('alternative thinking'); b) consider the possible consequences that result from each plan of action ('consequential thinking'); c) plan a method to achieve the favoured outcome ('means-end thinking'); and finally, d) decide whether we have the resources to act accordingly to achieve the favoured outcome (Howells, 1986). One's ability to utilize the preceding processes is an indication of one's ability to problem solve.

Social problem solving is central to our everyday functioning yet the question then remains, what happens when an individual is unable to solve social problems effectively. Research on various patient groups has revealed an association between problem solving and their disorders. Generally speaking, deficits in social problem solving ability are related to higher levels of

psychological distress (D’Zurilla, Nezu, & Maydeu-Olivares, 2002). Some of these include Attention Deficit Hyperactive Disorder (ADHD) and conduct disorder (CD) (Matthys, Cuperus, & van Engeland, 1999), depressive symptomatology (Nezu, 1985, 1986a, 1987) heroin abuse (Platt, Scura, & Hannon, 1973) and anxiety (Nezu, 1985, 1986b; Nezu & Carnevale, 1987). More specifically, when examining offender populations, problem solving deficits are present among various types of offenders. Examples include mentally disordered offenders (McMurrin, Egan, Richardson, & Ahmadi, 1999), sex offenders (Grier, 1988), and violent offenders (Crick & Dodge 1994; 1996).

In the current study, we are interested in social problem solving as it relates to offending, particularly violent offending. Research on aggressive adolescents suggests that these youth produce fewer solutions to problems, and the solutions they produce are poor, ineffective, and more aggressive than the solutions of their nonaggressive counterparts (Evans & Short, 1991). Among adult violent offenders, research suggests that aggressive offenders utilize a smaller range of ‘alternative thinking’ to solve problems, consider less the consequences of their actions, and rely more on physical and verbal aggression than nonaggressive controls (Hains & Ryan, 1983; Slaby & Guerra, 1988; Guerra & Slaby, 1990). Further, Howells (1986) has provided evidence to suggest that violent offenders may have difficulty with social skills; in particular, it is thought that when an individual encounters a social problem, it is a combination of frustration, an inability in development, and the use of ‘alternative thinking’ that causes the individual to resort to violence.

Since social problem solving deficits may be implicated in the maintenance and use of aggression and violence, examining interventions addressing this issue is important. Kazdin Esveldt-Dawson, French and Unis (1987) examined the efficacy of a social problem solving

skills program on conduct/antisocial disordered children (7-13 year olds). Notable results included reductions in aggression and overall problem behaviour at school and at home. Results were maintained at a 1-year follow-up (Kazdin et al., 1987).

Evaluations of social problem solving programs for aggressive adolescents have generated similar findings. Guerra and Slaby (1990) assessed the ability of a cognitive mediation intervention program for aggressive offenders to alter social problem solving skills and subsequent aggressive institutional behaviour. Results supported an increase in social problem solving skills, a decrease in endorsement of aggressive and hostile beliefs, and a reduction in aggressive and impulsive behaviour, as rated by staff.

With respect to adult offenders, many of Correctional Service of Canada's Violence Prevention Programs integrate theories of social information processing and social learning theory. Correctional treatment programs such as Reasoning and Rehabilitation (R&R) and Enhanced Thinking Skills (ETS) (Robinson, 1991; Robinson, 1995; Ross, Fabiano & Ross, 1986; McGuire, 2000) provide training on social problem skills as part of a general cognitive skills treatment program. Evaluations of such programs have demonstrated success in improving offenders' problem solving ability and subsequent recidivism. More specifically, for the treated group, pre- and post-intervention difference scores on an impulsivity measure were greater; with respect to recidivism, treatment resulted in a reduction of reconviction by 20% and a reduction of 35% in recidivism when examining high risk violent offenders on their own (Robinson, 1991; Robinson, 1995).

Deficiencies in social problem solving may lead to violent and aggressive criminal behaviours. Treatment programs teaching social problem solving skills show promise in decreasing aggression both in youth and in incarcerated adult offenders (Guerra & Slaby, 1990;

Robinson, 1991; Robinson, 1995). Additional examination of social problem solving in criminal behaviour and aggression remains essential to understanding how all factors interact. The current study examines further the relationship between social problem solving and aggression in a cross-section of offenders. Specific relationships examined will include the association between social problem solving ability and aggression, as well as social problem solving and its potential role as a mediator in the relationship between impulsivity and aggression.

### *1.3. Impulsivity and Social Problem Solving*

There is agreement on a relationship between impulsivity and aggression; the relationship, however, may not necessarily be a simple one-to-one association as potential mediating variables may contribute to the link. Social problem solving is one of these potential mediating variables.

Shure and Spivack (1982), pioneers in this field, postulated that improving a child's problem solving ability might decrease the rate and intensity of impulsive and dysfunctional behaviour. These researchers developed the Interpersonal Cognitive Problem Solving (ICPS) program, a program designed to teach children fundamental skills related to problem solving. Dialogues and role-playing offer the children the opportunity to practice these complex skills. Results have demonstrated that, improving a child's problem solving skills reduces impulsivity, as measures of impulsivity remained lower at a 1-year follow up (Shure, 1997; Shure & Spivack, 1988). The program and its ability to reduce aggression were not discussed.

Brennan and Raine (1997) claimed that impulsivity is a strong predictor of later aggression and violence. Further investigation into this relationship has suggested that poor verbal skills mediate the relationship between impulsivity and aggression (Barratt, Stanford, Kent, & Felthous, 1997). Developmentally, it is thought that poor verbal skills in conjunction with impulsivity and low intelligence present great difficulty for an individual attempting to learn

adequate problem solving skills. Since the individual is unable to utilize or develop adequate thinking and behaviour skills to defuse a problematic situation, as the child ages and encounters ambiguous situations, these encounters may escalate to aggression and violence (McMurrin, Blair, & Egan, 2002).

McMurrin, Blair and Egan (2002), a British research group, investigated the inter-correlations between impulsivity, social problem solving, alcohol use, and aggression in a male university student sample ( $N=70$ ). In this correlational study, the relationships between the aforementioned factors were examined by administering a series of self-report questionnaires, with one questionnaire assessing each factor. McMurrin et al.'s (2002) preliminary model is portrayed in Figure 1. The following self-report questionnaires were utilized to assess the relationship among: Aggression: Buss Perry Aggression Questionnaire (BPAQ; Buss & Perry, 1992); Impulsivity: Barratt Impulsiveness Scale- 11 (BIS-11); Patton, Stanford, & Barratt, 1995); Social Problem Solving: Social Problem Solving Inventory – Revised (SPSI-R; D’Zurilla, Nezu, & Maydeu-Olivares, 2000) and; Alcohol Dependency: Short Alcohol Dependence Data Questionnaire (SADD; Davidson & Raistrick, 1986; Raistrick, Dunbar, & Davidson, 1983).

Results of the McMurrin, Blair and Egan, (2002) study, although based on an undergraduate university sample, provide an understanding into issues relating to offenders and offending. Additionally, they help to point to where personality influences criminal behaviour and where it does not. Of the three proposed relationships among social problem solving, impulsivity, and aggression, only two were significant, as the association between impulsivity and aggression was not supported. Significant negative correlations were found between impulsivity and social problem solving, and between social problem solving and aggression. That is, a higher level of impulsivity is related to lower levels of social problem solving ability. Similarly, lower levels of

social problem solving are related to higher level of aggression. By partially out the influence of aggression or impulsivity in this triad of variables, it was discovered, that problem solving ability had a mediating effect on the relationship between impulsivity and aggression. The noteworthy finding from this research is that poor social problem solving, not impulsivity, exerts the most influence over aggression.

McMurrin et al., (2002) have attempted to provide an explanation for their findings. They proposed that during a child's development, impulsivity might create an obstacle to learning, especially learning how to most effectively problem solve. Because of this obstacle, the child lacks adequate problem solving skills and it is this deficiency that potentially contributes to aggressive outcomes in uncertain interpersonal interactions. Therefore, it is suggested that high levels of impulsivity lead to poor problem solving, which then leads to aggression. This supports previous research, discussed above, that has suggested that problem solving ability influences one's level of aggression. With respect to impulsivity's indirect role in the relationship to aggression, the results do not refute previous research; rather, it further specifies the relationship and how it can be influenced by social problem solving (McMurrin et al., 2002).

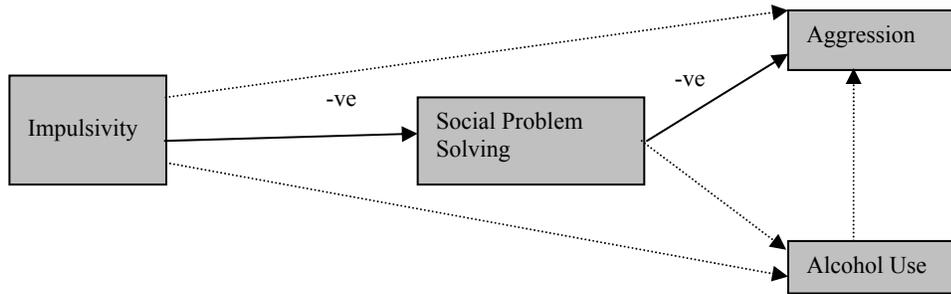


Figure 1.1 Relationships among impulsivity, social problem solving, aggression, and alcohol use. Adapted from McMurrin, Blair, & Egan (2002). Solid lines represent significant associations between the variables. Dashed lines represent nonsignificant associations.

An abundance of literature is available on interventions addressing social problem solving in offenders. Often these programs offer a self-control or impulsivity component to the curriculum. Robinson, Grossman and Porporino (1991) evaluated the effectiveness of a Cognitive Skills Training Program on offenders in Canadian federal institutions. One of the principal targets of this program was to address impulsivity. Outcome measures included an impulsivity measure, cognitive skills measures, and recidivism. Significant positive changes for the treatment group, relative to the control group, were found within most areas. General cognitive ability and impulsivity were both more favourable post-treatment. At a one-year follow up, readmissions rates for new convictions were lower for the treatment group than the control group.

An intervention designed to address social problem solving deficits in mentally disordered offenders was assessed for its effectiveness (McMurrin, Egan, Richardson, & Ahmadi, 1999). The intervention was designed to improve the patients' ability to "define problems clearly, produce and analyze a range of potential solutions, and select and implement an effective action

plan” (p. 318). The Social Problem Solving Inventory – Revised (SPSI-R; D’Zurilla, Nezu, & Maydeu-Olivares, 2000) was utilized as a pre- and post- measure of problem solving ability. The intervention was successful in improving the patients’ overall SPSI-R scores as well as reducing the impulsivity/carelessness subscale of the measure (McMurrin, Egan, Richardson, & Ahmadi, 1999).

#### *1.4. Alcohol Use and Aggression*

A considerable body of research, both nonexperimental and experimental, has investigated the relationship between alcohol use and aggression. Epidemiological studies and nonexperimental studies have consistently found an association between alcohol use and violence (Murdoch, Pihl, & Ross (1990). A study assessing this relationship noted alcohol use in 42% of violent crimes (Pernanen, 1991). It was however, estimated to be as high as 55% to 60% due to the underreporting of alcohol use during such violent exchanges. A review of research from 11 countries by Murdoch, Pihl, and Ross (1990) identified alcohol as a factor in 63% of violent crimes. That is, the majority of offenders convicted of these violent offences had been drinking prior to committing their offence. However, the majority of individuals who use alcohol are not violent (Fagan, 1990). It is also important to consider the quality or type of alcohol abuse typically present in offenders. Collins and Schlenger (1988) ascertain that acute alcohol consumption, rather than chronic alcohol abuse, is more strongly associated with individuals incarcerated for a violent offence. However, neither acute alcohol use nor chronic alcohol abuse are sufficient for aggression to occur: there are many drinking episodes that do not result in violence, and some acts of violence do occur without the influence of alcohol (Chermack & Giancola, 1997). Therefore the question remains, what factors influence the relationship between alcohol and aggression?

A New Zealand longitudinal study followed 1265 males and females from birth to age 15/16. Initial results suggest that individuals who misused alcohol were six times more likely to commit violent offences and 12-13 times more likely to commit property offences. After adjusting for confounding risk factors (social background, family characteristics, etc.) they found that males and females who misused alcohol were three times more likely to commit violent offences. In addition, after the adjustment, no relationship was found between alcohol misuse and property offences. These findings are consistent with literature supporting alcohol consumption increasing aggression.

Many of the experimental studies assessing this relationship have utilized the Taylor Aggression Paradigm (TAP) (Taylor & Chermack, 1993). Within this paradigm, participants are asked to compete on a reaction-time task with a fictitious opponent in another room. Participants are asked to select the intensity, on a scale of 1-10, of shock that they wish to administer to the opponent if he/she loses. The reaction time task occurs and the loser receives the shock. The participant is unaware that the rate of wins and losses are predetermined and distributed evenly. The measure of aggression in this paradigm is the intensity of the shocks selected by the participant (Chermack & Giancola, 1997). The majority of the studies utilizing this paradigm have reported that individuals who received alcohol are more aggressive: they administer a higher intensity of shock than those individuals who received a nonalcoholic beverage or placebo (Chermack & Taylor, 1995; Chermack & Giancola, 1997; Laplace, Chermack, & Taylor, 1994).

Based upon the scores from Buss-Durkee Hostility Inventory, Bailey and Taylor (1991) separated individuals into three groups of low, moderate, and high aggression. These individuals then completed the TAP after consuming either an alcoholic or nonalcoholic beverage. Findings indicated that individuals with high and moderate aggression were more aggressive when

intoxicated than individuals also with high or moderate aggression but sober. Additionally, individuals with low levels of aggression were more aggressive than their sober counterparts; this occurred, however, only under the condition of low provocation.

Utilizing the TAP, Giancola (2003) examined the influence of dispositional aggression on alcohol related aggression. Trait aggression was measured by the Buss-Perry Aggression Questionnaire (BPAQ; Buss & Perry, 1992) in this sample of males and females. Overall, results indicated that individuals with higher trait aggression exhibited more behavioural aggression on the TAP than those with lower dispositional aggression. Moreover, alcohol increased aggression in individuals with a high disposition; however this was not the case for those with a low dispositional aggression. The authors conclude that alcohol consumption does not necessarily result in aggression in everyone in all situations.

Another widely used experimental measure of aggression is the Point Subtraction Aggression Paradigm (Cherek, 1981). In this task each participant sits in front of a computer and mechanical box with two buttons. They are asked to press one of the buttons on the box as fast as possible in order to earn the amount of money displayed on the computer screen. The participants are told that they have been paired up with an opponent, albeit a fictitious opponent, whom they can ostensibly take money away from. This can be done by pressing the second button. The participants are provoked by having money taken away from them, ostensibly by the 'opponent'. The number of times the participant presses the second button to take money from the 'opponent' serves as the participant's measure of aggression.

Bushman and Cooper (1990) reviewed 30 studies that used laboratory based aggression measures such as the Point Subtraction Aggression Paradigm to assess the effects of alcohol use on aggression. Overall, across the majority of the studies, the consumption of alcoholic

beverages resulted in a greater amount of aggression than did the nonalcohol or placebo group. The authors therefore concluded that alcohol increased aggressive behaviour.

Even though research investigating the link between alcohol and aggression has been studied extensively for decades, and both laboratory and epidemiological studies have shown a relationship between these factors, high variability exists in the findings. Various individual, environmental, cultural, and situational factors influence the strength of this relationship. Such factors include previous drinking experience (Laplace, Chermack, & Taylor, 1994), frontal lobe functioning (Lau, Pihl, & Peterson, 1995), problem solving (Chermack & Giancola, 1997) and personality disorders (Moeller & Dougherty, 2001).

In a review, Chermack and Giancola (1997) noted an association between information processing deficits and aggression. Also noted was the ability of alcohol to disrupt executive cognitive functioning and problem solving, and to limit abstract reasoning. Therefore, alcohol consumed by an individual with information processing deficits may increase risk for impulsive aggression. As a result, it is suggested that alcohol abuse is a potential mediating variable in the association between impulsivity and aggression. This relationship will be discussed in more detail in the following section.

Specific interventions designed to control and treat alcohol related violence are scarce. The Control of Violence for Angry Impulsive Drinkers (COVAID) is a cognitive behavioural, community based treatment program addressing alcohol related violence. An evaluation of the COVAID pilot program, administered a battery of pre- and post- psychometric measures and self-report alcohol consumption and aggression measures. Results for program completers ( $N=6$ ) demonstrated improvement on alcohol-related aggression beliefs, anger control, social problem solving and impulsiveness. Recidivism rates for violent offences were lower for the COVAID

treatment group (17%) than the control group (30%). Due to the small sample size, statistical significance could not be tested.

McMurrin et al., (2002) in their preliminary test of their model of aggression found no significant relationship between alcohol use and aggression. The authors provided two potential explanations for why this hypothesis was not supported. First, the sample in this study was undergraduate and post graduate university students with a mean age of twenty-seven. They were assessed as mild to moderate drinkers and were thought to be beyond the “peak age of drinking”. Therefore, their overall low level of drinking is one possible reason for the null results. Secondly, upon further examination, the overall sample was moderate in social problem solving, and it was proposed that moderate social problem solving may be a protective factor against alcohol abuse or problem drinking, regardless of the level of impulsivity. This is an interesting notion that needs further investigation. Although McMurrin et al., (2002) found no association between alcohol dependency and aggression, a relationship between these factors has been found in previous literature, as described above. Therefore, further consideration of the relationship is examined in the present study. More specifically, alcohol use and alcohol dependency are examined in relation to aggression, as measured by three self-report questionnaires, in a cross-section of offenders.

### *1.5. Alcohol Use and Impulsivity*

Similar to the literature on alcohol use and aggression, the literature on alcohol abuse and impulsivity is complicated. Substance abuse, in general, is a complex behaviour that is not innately impulsive (Moeller, Barratt, Dougherty, Schmitz, & Swann, 2001). However, if impulsivity is related in some way to substance abuse, we would expect individuals who exhibited impulsive behaviour to have higher rates of substance use. Brady, Myrick, and

McElroy (1998) reviewed prior studies that examined this association and found that impulsively violent offenders and individuals with intermittent explosive disorder had higher rates of substance dependence than the general population.

Other findings provide further support for this relationship. King, Jones, Scheuer, Curtis, and Zacone (1990) utilized the Eysenck Personality Inventory and compared impulsivity scores between inpatient substance abusers and a nonpatient control group. The substance abusers were found to score significantly more impulsive than controls. Also, individuals who are dependent on multiple substances are more impulsive than those dependent on single substances (McCown, 1988; O'Boyle & Barratt, 1993; Moeller et al., 2001). In terms of personality disorders, individuals with borderline personality disorder (BPD) are more impulsive and use more substances than those not meeting the specific criteria for BPD (Kruendelbach, McCormick, Schulz, & Grueneich 1993; Moeller et al., 2001).

In line with the proposed study, Klinteberg, Andersson, Magusson, and Stattin, (1993) noted a relationship between impulsivity, drinking, and violence. In this longitudinal study of delinquents and violent offending, it was found that individuals scoring higher on impulsivity and hyperactivity measures were three times more likely to develop an alcohol problem by age 25. Furthermore, individuals high on impulsivity and alcohol problems were ten times more likely to have been arrested for a violent offence than those individual not exhibiting impulsivity or alcohol problems. Evidently, they found that delinquents who are impulsive and drink heavily are most likely to be violent.

The abovementioned research suggests a positive relationship between alcohol use and impulsivity. Physiologically, the relationship between impulsivity, alcohol use and aggression may occur under two conditions. The first is when a low amount of alcohol is consumed, as this

may reduce inhibitory factors, thereby facilitating aggression; the second condition occurs under large amounts of alcohol consumption, as this may cause a sedative effect and impair one's ability to make judgments, which may also lead to aggression (Swann & Hollander, 2000).

Dougherty et al., (1999) utilizing a common behavioural measure of impulsivity, the Continuous Performance Task, provides further support for belief that substance abuse disinhibits impulses. Results indicate that alcohol use increased reward-delay impulsivity in a nonpatient group. More explicitly, individuals using alcohol were more likely to choose the most immediate reward, even if it was a smaller reward versus a larger reward in which they had to delay their response.

Petry (2001) compared alcohol dependent individuals, alcohol abstainers (formally dependent) and controls on a delayed-reward laboratory measure of impulsivity. Results showed that alcohol-dependent participants were more impulsive than controls. The alcohol dependent individuals were also more impulsive than the alcohol abstainers suggesting a direct relationship with alcohol use and impulsivity.

Utilizing the Point Subtraction Aggression Paradigm (PSAP) as described earlier, Fulwiler, Eckstine and Kalsy (2005) examined aggression, impulsivity, serotonin function and alcohol use in a sample of healthy normal males. Participants were administered the PSAP, an impulsivity measure (BIS-11), and an aggression measure (BPAQ). All tests and measures were administered over two days. Administration during the first day did not involve the consumption of alcohol, and therefore provided a baseline for the psychometric and behavioural measures. Administration on the second day involved the behavioural measure of aggression after the consumption of an alcoholic beverage. Correlations were used to examine the relationship between scores on the psychometric measures and the change in aggressive responding after the

consumption of alcohol. Results demonstrated that only impulsivity (BIS) correlated with the increase in aggressive responding during the alcohol condition. More specifically, the subscales of cognitive and nonplanning impulsivity were the most prominent. The authors conclude that impulsivity plays a mediating role in the effects of alcohol on aggression.

From the multitude of research, we know that a high level of impulsivity exists in substance dependent individuals. We do not know, however, if the high level of impulsivity is a result of substance abuse, or if it is a factor leading individuals to abuse. Furthermore, the specific role impulsivity plays in either the understanding or the treatment of substance abuse is unclear.

Only one study was found that examined how impulsivity was related to treatment outcome. Fifty cocaine-dependent individuals were assessed for their level of impulsivity (BIS-11) and their current cocaine usage (Moeller, Dougherty, Barratt et al., 2001). A significant positive correlation between BIS-11 scores and average daily cocaine use was found. After a 12-week, double blind group therapy treatment program, individuals with a lower impulsivity score stayed in treatment for a significantly longer period of time than those with a high level of impulsivity. Therefore the authors concluded that impulsivity was not only a predictor of substance abuse but it was also a negative predictor for treatment retention (Moeller & Dougherty, 2002; Moeller, Dougherty, Barratt et al., 2001).

Impulsivity, assessed by either psychometric or behavioural measures, has demonstrated a positive relationship with alcohol use. There also appears to be a relationship between these two factors and aggression, as individuals with higher impulsivity and alcohol use were ten times more likely to be arrested for a violent offence. Although it is evident that a relationship between impulsivity, alcohol use and aggression exists, the specifics of this relationship are not apparent. In the current study, I attempted to examine further the role alcohol plays in aggression by

assessing the relations of alcohol use and impulsivity in a cross section of offenders.

Psychometric measures of each factor, impulsivity and alcohol use, are utilized to examine their relation to an individuals' level of aggression.

### *1.6. Purpose and Hypotheses of the Research*

The purpose of this study was to examine how impulsivity, social problem solving and alcohol use contribute to aggression in a sample of provincially incarcerated offenders. The specific research questions that are addressed include the following:

- a) To what extent and with what predictive ability does impulsivity, social problem solving and alcohol dependency relate to aggression in a sample of incarcerated offenders?;
- b) Does social problem solving act as a mediator in the relationship between impulsivity and aggression?;
- c) How do these variables, interact in their contribution to aggression?

Based on the abovementioned literature, the following hypotheses, are tested in an effort to understand better the relationships among impulsivity, social problem solving, alcohol dependency and aggression in a sample of incarcerated offenders:

*Hypothesis 1:* It is hypothesized that high levels of impulsivity should be related to greater levels of general aggression.

*Hypothesis 2:* It is hypothesized that high levels of each impulsivity subtype (motor, cognitive/attention and nonplanning) should be related to greater levels of general aggression.

*Hypothesis 3:* It is hypothesized that levels of impulsivity should be greater for those individuals classified as exhibiting impulsive aggression than for those individuals classified as exhibiting premeditated aggression.

Hypothesis 4: It is hypothesized that lower levels of social problem solving should be related to higher levels of impulsivity.

*Hypothesis 5:* It is hypothesized that lower levels of social problem solving should be related to higher levels of general aggression.

*Hypothesis 6:* Higher levels of alcohol dependency should be related to higher levels of general aggression.

*Hypothesis 7:* Higher levels of alcohol dependency should be related to higher levels of impulsivity.

### *Proposed Model of Aggression*

The aforementioned hypotheses provide the foundation for a testable model of aggression

The only known research study to examine all relationships among social problem solving, alcohol dependency, impulsivity and aggression was conducted by McMurrin, Blair, and Egan (2002). This British research group investigated the inter-correlations between these variables in a university male sample. Positive correlations were found between impulsivity and social problem solving, and between social problem solving and aggression. Social problem solving

established itself as an effective mediator between impulsivity and aggression. There were, however, no relationships between alcohol and any of the other factors. McMurrin et al., (2002) has provided valuable insights into the associations between impulsivity, social problem solving, drinking, and aggression. Furthermore, they have provided the foundation for future researchers interested in this area. In addition to McMurrin et al., (2002), the collection of aforementioned studies provided the framework for the current study and provided the basis for the development of the proposed model on the relationships between impulsivity, social problem solving, alcohol dependency and aggression in offenders.

(Figure 1.2).

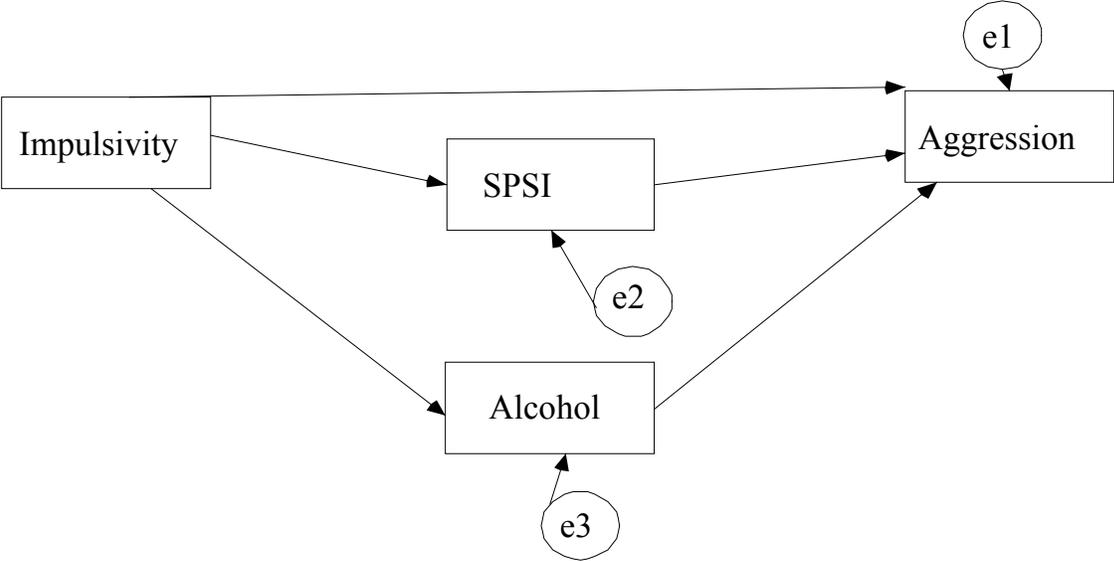


Figure1.2. Proposed Path Analytic Model of Aggression

## CHAPTER 2 METHOD

### *2.1. Participants*

The sample consists of ( $N = 185$ ) provincially incarcerated male offenders from the Saskatoon Provincial Correctional Centre (SCC;  $n = 54$ ; 29%), located in Saskatoon, Saskatchewan, and the Prince Albert Correctional Centre (PACC;  $n = 131$ ; 71%), in Prince Albert, Saskatchewan. All participants were male with a mean age of 29.66 ( $SD = 9.3$ ) and an average of a Grade 10 education ( $SD = 1.7$ ). Regarding ethnicity, 84.3% ( $n = 156$ ) of the sample self-identified as First Nations, Métis or Inuit, 11.9% ( $n = 22$ ) as Caucasian, 1.6% ( $n = 3$ ) as other and 2.2% were unknown ( $n = 4$ ).

Ethical approval from the University of Saskatchewan advisory committee on Ethics in Behavioural Science was obtained. Research Approval was also obtained from the Saskatchewan Department of Corrections and Public Safety. In order to participate, each offender was required to provide informed consent by reading and signing the consent to participate form (see Appendix A).

### *2.2. Procedure*

#### *2.2.1. Recruitment*

Participants were recruited by the student researcher or the Program Coordinator at each institution. Participants were approached and asked to participate in a research study on aggression. In order to partake in the study, individuals had to have been convicted and

sentenced for their current offence(s). Individuals on remand awaiting trial were not permitted to participate. Basic reading ability was a selective criterion for participation and was assessed by self-report when the participants was being asked if they would be interested in be involved in the study. If participants did not meet these criteria, they were thanked for their interest and informed that they were not eligible to participate. Participation was voluntary, and individuals were informed that choosing to participate or not to participate would have no impact on their treatment within the institution.

### *2.2.2. Testing*

*2.2.2.1. Consent to participate.* Upon accepting the invitation to participate, individuals were explained further the details of the study and were asked to read and sign the consent form and assured of the confidentiality of their responses (See Appendix A).

*2.2.2.2. Survey completion.* In order to ensure anonymity, consent forms were collected separately from the questionnaires and participants were asked not to provide any identifying information (i.e. name, inmate number) on the survey. Testing occurred in small groups or individually in a classroom or in the common area on each unit. On average, the questionnaire took 30-40 minutes to complete and the student researcher was available throughout the testing session to address any concerns or queries. Upon completion, participants were provided with a copy of the consent form and any questions about the study were addressed. Furthermore, participants were encouraged to contact the researcher if they had any further concerns.

### 2.3. Measures

For the present study, data were collected by having participants complete an 11-page battery of six self-report measures that are described in the subsequent section. In addition, each individual was asked to complete basic demographic information and questions regarding their offence history. The administration sequence of the seven measures (six self-report, one demographic) were randomized for each set of 25 booklets. Although complete counterbalancing was not possible, efforts were made to minimize such measurement errors. (Appendix B – H).

#### 2.3.1. Demographics and Offence History

Standard questions on age, level of education, ethnicity and current institution were collected with respect to general demographic data (See Appendix H). Regarding self-reported offence history, participants were assessed on (a) the number of categories of violent convictions in the community; (b) occurrence and number of previous domestic violence convictions; (c) occurrence and number of previous institutional misconduct convictions and; (d) current convictions.

#### 2.3.2. Impulsivity Measure

*2.3.2.1. Barratt Impulsiveness Scale – 11 (BIS-11; Patton, Stanford, & Barratt, 1995).* The BIS-11 is a 30-item self-report questionnaire measured on a 4-point Likert scale, assessing the multidimensional nature of impulsivity (see Appendix D). There are three subscales: 1) motor impulsivity (10 items), 2) cognitive/attentional impulsivity (8 items), and 3) nonplanning impulsivity (12 items). A total score of impulsivity, in addition to a subtotal for each subscale was computed. The higher the overall score, the higher the level of impulsiveness. In order to

avoid participants developing a response set, a number of items have been worded to imply a lack of impulsivity and therefore are reversed scored.

Since its original version in the 1950s, the Barratt Impulsivity Scale has gone through many revisions. The majority of the studies describing the reliability and validity of the BIS report findings with earlier versions of the measure. Previous versions have differentiated impulsive offenders and individuals with personality disorders from control groups (Barratt, 1985, 1994). In the development of the most recent version, Patton, Stanford and Barratt (1995) compared BIS-11 scores of a sample of general psychiatric patients, inmates and undergraduates. Inmates were found to have significantly higher scores than both the psychiatric patients and the undergraduates. Reliability has shown to be adequate in both American (Patton, Stanford & Barratt, 1995) and Italian samples (Fossati, De Ceglie, Acquarini & Barratt, 2001). The BIS-11 has a high internal consistency of .80 in a sample of prison inmates (Barratt, 1985; Patton et al., 1995). The internal consistency scores for the groups are as follows: undergraduates .82, substance abusers .79, and general psychiatric patients .83. This measure has also been acknowledged as having clinical utility for assessing impulsivity among patient and inmate populations (Patton et al., 1995).

The factor structure of the BIS-11 however, is inconsistent as a number of items that define each factor (cognitive, nonplanning and motor) load on other factors as well. The subscales of motor and nonplanning have been the strongest and most consistently measured, however the cognitive/attentional factor often fails to be identified as a distinct dimension from the other two factors (Barratt, 1991; Patton et al., 1995; Ramirez & Andreu, 2006). It is proposed that the lack of support for the cognitive dimension might result from an inability of participants to have the insight into the characteristics of impulsivity (Ramirez & Andreu, 2006).

The reliability scores for each subscale of the BIS in the present study ranged from .45 for attentional impulsivity, .54 for non-planning impulsivity and .67 for motor impulsivity. The pattern and magnitude of these reliability scores is consistent with previous work conducted on the BIS-11. Specifically, internal consistency of the motor impulsivity is generally higher than the values for either the attentional or nonplanning subscales. The overall internal consistency for the BIS-11 in the current sample was assessed at a Cronbach's Alpha of .78.

### 2.3.3. Aggression Measures

2.3.3.1. *Buss-Perry Aggression Questionnaire (BPAQ; Buss & Perry, 1992)*. The BPAQ is a 29-item self-report questionnaire, rated on a 5-point Likert scale. Respondents were asked to rate each item on the degree to which that item describes them, from 1 = extremely uncharacteristic of me to 5 = extremely characteristic of me. There are four subscales: physical aggression (PA, 9 items), verbal aggression (VA, 5 items), anger (AG, 7 items), and hostility (HT, 8 items).

The Buss-Perry Aggression questionnaire was developed from revisions of the Buss-Durkee Hostility Inventory (BDHI; Buss & Durkee, 1957). Revisions addressed the inconsistent findings and weak psychometric properties of the true-false format of the BDHI. In the original BPAQ study, utilizing a sample of undergraduates, four subscales were distinct factors with Cronbach's alphas ranging from .72 verbal to .85 physical, and with an overall alpha of .85 (Buss & Perry, 1992). Correlations of the BPAQ with peer rated aggression measures further support the validity as the magnitude for the correlations ranged from .20 for verbal aggression to .45 for physical aggression (Buss & Perry, 1992). Williams, Boyd, Cascardi and Poythress (1996) examined the validity of the BPAQ and in an offender population. Results support concurrent validity as positive correlations of .79 were reported between the Novaco's Anger Scale and the BPAQ.

Subsequent confirmatory factor analyses have confirmed the presence of four factors specifically, physical aggression, verbal aggression, anger and hostility (Archer, Kilpatrick & Bramwell, 1995; Berstin & Gesn, 1997). Comparing the BPAQ with the Aggression Inventory (AI), the authors noted that the physical and verbal scales of the BPAQ correlated with similar scales of the AI. Berstein and Gesn (1997) examined gender differences on the subscales and reported that males tend to score higher than females on all scales, however the only significant difference being for physical aggression.

Smith and Waterman (2006) were able to differentiate among violent, non-violent offenders and undergraduates with the BPAQ. Specifically, violent offenders scored higher on the subscales and the total BPAQ score, than non-violent offenders and undergraduates. Non-violent offenders also scored higher on physical aggression and hostility than undergraduates.

Archer, Holloway and McLoughlin (1995) examined the link between physical aggression and anger as measured by the BPAQ and the presence of a fight during the past 5 years. Results indicated that those who had experienced a fight within the past 5 years scored higher on physical aggression and anger subscales compared with those who had not experienced a fight.

The questionnaire has been developed and predominantly used on student populations, however studies that have used it with inmate samples have reported acceptable levels of reliability, as alphas range from .77 to .84 (Ireland & Archer, 2004; O'Connor, Archer, & Wu, 2001) (Appendix B). Within the present study, reliability values for the subscales of the BPAQ were .66 verbal aggression, .69 anger, .76 physical aggression and .78 hostility. The overall alpha level for the BPAQ was .89 indicating high internal consistency.

### 2.3.3.2. *Impulsive/Premeditated Aggression Scales (IPAS; Stanford et al., 2003).*

The IPAS is a 30-item self-report instrument to assess the impulsive and/or premeditated characteristics associated with an individual's aggression (Appendix C). Participants are asked to recall their previous aggressive acts in the last 6 months and to score each item in relation to these acts. Items are scored on a 5-point Likert scale from 1 – strongly disagree to 5 – strongly agree. This measure was utilized as a secondary measure of aggression to classify individuals as predominately impulsive or premeditated aggressive subtypes.

Classifying an individual's behaviour as either premeditated or impulsive was based on responses from 20 of the 30 items on the IPAS. There are eight items for impulsive (IA: 3, 5, 7, 8, 9, 21, 24, 26) aggression and 12 items for premeditated (PM: 1, 2, 6, 10, 11, 12, 14, 16, 17, 20, 29, 30) aggression. Endorsing either a strongly agree or agree on any of these items is rated as positive, with the exception of items 5 and 8, which are reverse scored. A total number of positive items and percentage is calculated for each subscale (IA and PM). Classification into groups is determined by the category with the highest percentage of positively endorsed items. If an individual scored the same percentage on both subscales they were not classified into either group. In addition, to the classification of each participant as premeditated or impulsive, a total mean score on each subscale was calculated.

Principal Component Analysis with varimax rotation has confirmed the two distinct factors of aggression namely premeditated and impulsive subtypes (Stanford et al., 2003). Examining group differences has suggested that premeditated aggressors have higher levels of hostility, antisocial behaviour and higher levels of general aggression; whereas impulsive aggressors tend to display higher levels of irritability. Concurrent validity has been supported with significant

relationships between related personality inventories (e.g. Life History of Aggression Questionnaire and the State-Trait Anger Expression Inventory).

A number of studies have reported on the internal consistency of the IPAS. Specifically Stanford et al., (2003) reported Cronbach's alphas for the impulsive and premeditated subscales of .77 and .82 respectively. Kockler, Stanford, Nelson, Meloy and Sanford (2006) reported similar values of .81 and .72 respectively, providing further support for the homogeneity of the subscale items. Within the present study, reliability values are lower relative to previous literature for the impulsivity subscale with a value of .63; however they are comparable for the premeditated component at an alpha of .74.

#### *2.3.4. Social Problem Solving Measure*

*2.3.4.1. Social Problem Solving Inventory – Revised Short Form (SPSI-R:S; D’Zurilla, Nezu, & Maydeu-Olivares 2000).* The SPSI-R:S is a self-report questionnaire assessing one's social problem solving skills. The measure is based on previous work by the same authors which examine and assesses the major components of a theoretical model of social problem solving (D’Zurilla & Nezu, 1982, 1999). The SPSI-R:S has five subscales, consisting of 25 items, scored on a 5-point scale from *not at all true of me* to *extremely true of me*. Two of the scales measure problem solving orientation, positive problem orientation (PPO) and negative problem orientation (NPO); and three subscales measure problem solving styles – rational problem solving (RPS), avoidance style (AS) and impulsivity/carelessness style (ICS). Two of the scales, PPO and RPS, measure constructive problem solving and the remaining three scales, NPO, AS, and ICS measure dysfunctional problem solving. By reverse scoring the dysfunctional scales and adding the five subscales, a total social problem-solving scale was calculated. Utilizing the normative data provided in the measures' manual and based upon age, standard scores were

computed for each individual's total score. This provides a standard score to allow for comparison among groups.

Test-retest reliabilities for the SPSI-R:S scale are between .68 and .91 and alpha coefficients and between .69 and .95 (D'Zurilla, Nezu, & Maydeu-Olivares, 2000). Validity of the SPSI-R is supported by way of confirmatory factor analysis and correlations with other problem solving measures and overlapping psychological constructs (D'Zurilla, Nezu & Maydeu-Olivares, 2000). All analyses have upheld the validity of the SPSI-R as an assessment instrument. Alpha levels in the present study provide further support for the reliability of the SPSI. The internal consistency of the SPSI-R:S in the present study was good with an overall alpha level of .74. Cronbach's alpha levels of each subscale are as follows: avoidance style .77, negative problem orientation .76, positive problem orientation .76, rational problem solving .67, and impulsivity/carelessness style .66.

### *2.3.5. Alcohol Use and Dependency Measures*

*2.3.5.1. Short Alcohol Dependence Data Questionnaire (SADD; Davidson & Raistrick, 1986; Raistrick et al., 1983).* The SADD is a 15-item self-report questionnaire, rated on a 4-point scale, which assesses the severity of an individual's dependence on alcohol. The questions cover various subjective, behavioural and psychobiological (i.e. withdrawal) aspects of dependency. The maximum score is 45 with a score in the range of 0-9 considered low dependence, 10-19 medium dependence, and 20-45 high dependence (See Appendix F).

Construct validity of the SADD was supported;  $\rho = .51, p < .05$  in a sample of 127 British outpatients (Davidson & Raistrick, 1986; Davidson, 1987). Support for the homogeneity of the SADD has been provided by a factor analysis indicating its unidimensional nature (Davidson, Bunting & Raistrick, 1989). Test-rest reliability was significant in a sample of incarcerated

young offenders  $r(44) = .87, p < .001$  (McMurrin, Hollin & Bowen, 1990). An overall Cronbach's alpha levels of .93 with the current sample provide strong support for the internal consistency of the SADD.

*2.3.5.2. Alcohol Use.* Based on previous research by McMurrin et al., (2002) participants were asked the following questions based upon their experiences prior to their incarceration while they were in the community:

1. How many days per week did you drink alcohol? 0-7 days
2. How many days per week did you drink more than five drinks?
3. How would you have rated yourself as a drinker: nondrinker, light, moderate, or a heavy drinker? (See Appendix E).

The first two questions were assessed on an eight point scale from 0 days to 7 days. The final question asked the participants to indicate their level of drinking as a nondrinker, light, moderate or heavy drinker.

### *2.3.6. Impression Management*

*2.3.6.1. The Short Impression Management Scale From BIDR Version 6 (IM; Paulhus 1995).* The IM is a 12-item measure assessing Impression Management (IM) (Appendix G). High scores on this scale indicate that the person is trying to present himself in a socially desirable manner or in a more favourable light than he believes to be true, similar to a "lie" scale. Responses to the scales are provided on a 7-point Likert type scale ranging from 1 = not true to 7 = very true.

With respect to reliability, Cronbach's alpha for the IM in a sample of undergraduates was .75 and for prison inmates specifically the Cronbach's alpha was .84. In the current study, the reliability was considerably lower than much of the literature with an alpha level of .52. A

Spearman – Brown correction for the calculation of alpha was conducted as this 12 item version is only 60% as long as the original (D.L. Paulhus, personal communication, October 19<sup>th</sup>, 2007). After the correction, the alpha level was .68, a more acceptable level of internal consistency; however still not as high as the original study conducted with undergraduates. Normative data with male undergraduates support a mean of 2.93 ( $SD = 2.8$ ). Results from the current study 3.87 ( $SD = .89$ ) are significantly higher than the normative data,  $t(187) = -4.07, p < .001$ .

#### *2.4. Research Design and Hypotheses*

*2.4.1. Hypothesis 1:* It was hypothesized that high levels of impulsivity should be related to greater levels of general aggression. To test this hypothesis a Pearson correlational analysis was performed to assess the relationship between the total impulsivity score (BIS-11) and the total score of the general measure of aggression (BPAQ).

*2.4.2. Hypothesis 2:* It was hypothesized that high levels of each impulsivity subtype should be related to greater levels of general aggression. Correlations coefficients were computed between each subscale of the BIS-11 (cognitive/attentional, nonplanning and motor) and the general aggression measure (BPAQ).

*2.4.3. Hypothesis 3:* It was hypothesized that levels of impulsivity should be greater for those individuals classified as exhibiting impulsive aggression than for those individuals classified as exhibiting premeditated aggression. Correlations between general aggression, as measured by the BPAQ and BIS were performed. Additionally, a  $t$ -test was conducted to compare the means of impulsivity for each subtype of aggression, specifically impulsive and premeditated.

*2.4.4. Hypothesis 4:* It was hypothesized that lower levels of social problem solving should be related to higher levels of impulsivity. The standard score of the SPSI-R:S was correlated with

total score on the BIS-11 in order to assess the relationship between social problem solving and impulsivity.

*2.4.5. Hypothesis 5:* It was hypothesized that lower levels of social problem solving should be related to higher levels of general aggression. Pearson correlation coefficients were calculated between the standard score of the SPSI -R:S and the total score of the BPAQ.

*2.4.6. Hypothesis 6:* Higher levels of alcohol dependency should be related to higher levels of general aggression. A total SADD score was calculated and correlated with the sum of the BPAQ in order to assess the relationship between alcohol dependency and general aggression.

*2.4.7. Hypothesis 7:* Higher levels of alcohol dependency should be related to higher levels of impulsivity. Pearson correlation coefficients were calculated between the total scores of the BPAQ and the SADD.

*2.4.8. Social Problem Solving as a Mediating Variable.* Utilizing Baron and Kenny's (1986) method to assess mediation, three separate regression analyses were conducted. The proposed mediator in this study was social problem solving, as it was predicted to mediate the relationship between impulsivity and aggression. The first step was to assess if the independent variable (IV) was related to the proposed mediator. The mediator, in this case being social problem solving, was regressed onto the IV, impulsivity. The second regression analysis involved assessing if the IV: impulsivity was related to the dependent variable (DV: aggression). The final step involved regressing aggression on both the impulsivity and the proposed mediator, social problem solving.

Having conducted these analyses, an examination of the regression coefficients indicates the presence of a mediator. Specifically, if a mediator is present, the coefficient for the relationship between the IV and DV will be significantly reduced when the mediator is present. The Sobel

test was utilized to determine if the indirect effect of impulsivity on aggression via social problem solving was significant (Baron & Kenny, 1986).

*2.4.9. Exploratory analyses of Impulsivity as a Mediating Variable.* Additional regression analyses were conducted to investigate the role of impulsivity as mediator in its relationship to aggression. These analyses were conducted *post hoc* on account of the results of the study and are therefore exploratory. The following regression analyses were conducted: a) regress impulsivity (mediator) on social problem solving (IV); (b) regress aggression (DV) on social problem solving (IV) and (c) regress aggression (DV) on social problem solving (IV) and impulsivity (mediator).

*2.4.10. Model of Aggression.* Formulated from an extensive review of literature on aggression and its influences, the aforementioned hypotheses provided the foundation for a testable model of aggression (Figure 2.1). Path Analysis is a variation of multiple regression that allows for the examination of hypothesised causal pathways among multiple variables (Stage, Carter & Nora, 2004). The goal of the analysis is to estimate the magnitude and significance of relationships among variables by assessing the fit of the variance-covariance matrix of the proposed model. A path diagram was developed in AMOS (Analysis of Moment Structures; Arbuckle 1999) version 6.0. Path analysis was used to test the overall model of aggression as well as the specified causal paths derived from literature on aggression and its influences. In evaluating the fit of the model, five goodness of fit indices were used, Comparative Fit Index, CFI; Normed Fit Index, NFI; Root Mean Squared Error of Approximation, RMSEA, Akaike Information Criterion, AIC; Standardized Root Mean Square Residual, SRMR) in addition to the  $\chi^2$  statistic.

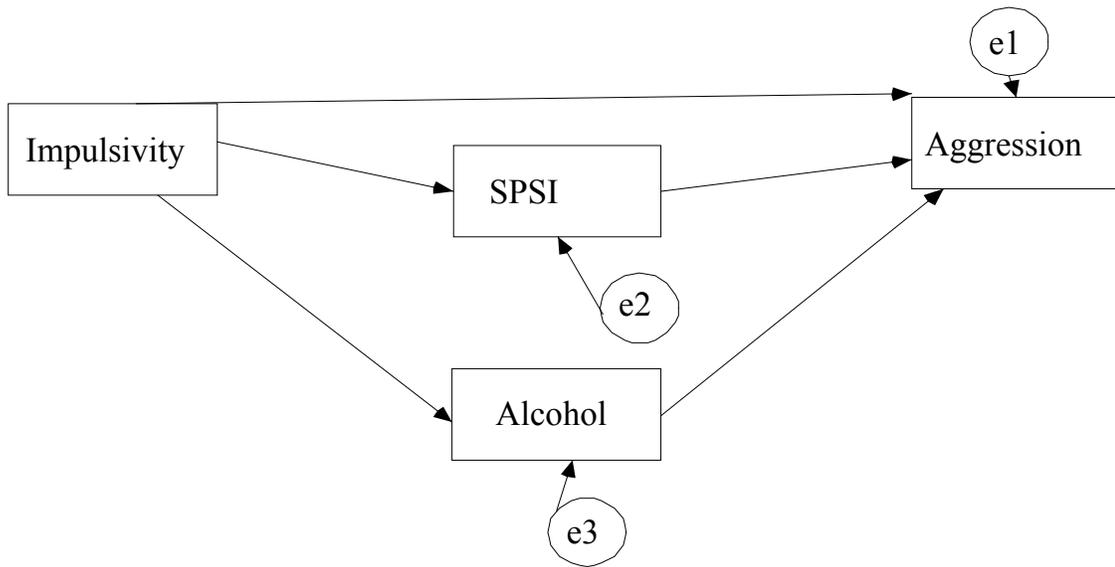


Figure 2.1. Proposed Path Analysis model of Aggression

## CHAPTER 3 RESULTS

### *3.1. Assumptions*

#### *3.1.1. Outliers/Normality*

Prior to the statistical examination of each hypothesis, the raw data were inspected for statistical outliers and normality of distribution. All data was entered and analysed in SPSS (Statistical Package for the Social Sciences) version 15.0. A summary of the normality and kurtosis for the raw data, transformed data and data following the removal of univariate and multivariate outliers is presented in Table 3.1.

The first step in screening the data was to examine each measure for outliers. Standardized scores for each measure were calculated for each of the 185 cases. Z scores of 3.29 or greater indicated an outlier. In total, there were 3 cases identified as univariate outliers. Subsequently individuals identified as outliers were removed from the dataset as they represented extreme scores. Additionally, one participant was removed for an invalid response pattern. This case had a preponderance of responses at either the lower end or the upper end of the scales on several of the measures.

Results of a regression analysis, with a  $p < .001$  criterion for Mahalanobis distance, screened for the presence of multivariate outliers. Two outliers were detected, deleted and excluded from further analyses, leaving 179 cases for analysis.

The variable BIS was normally distributed  $z_s = -0.82, p = 0.412$ , with negative kurtosis  $z_k = -1.98, p = 0.048$  at the  $p < .05$  level.

The IPAS: IA variable was normally distributed  $z_s = 1.76, p = 0.078$  with normal kurtosis  $z_k = 0.08, p = 0.936$ .

The IPAS: PM variable was normally distributed  $z_s = -1.58, p = 0.114$ , with normal kurtosis  $z_k = 1.36, p = 0.174$ .

The variable SPSI was normally distributed  $z_s = 0.88, p = .379$ , with normal kurtosis  $z_k = 0.30, p = 0.764$ .

The IM variable was normally distributed  $z_s = 0.46, p = 0.646$ , with normal kurtosis  $z_k = -0.72, p = 0.472$ .

The SADD variable was normally distributed  $z_s = 1.52, p = 0.129$ , with slightly negative kurtosis  $z_k = -2.23, p = 0.026$  at the  $p < .05$  level.

The dependent variable BPAQ was found to be slightly skewed,  $z_s = -1.96, p = 0.05$  with normal kurtosis  $z_k = -0.58, p = 0.562$ . Although this is a conservative indication of skewness examining the detrended normal plot and the normal probability plot of the BPAQ confirmed the slightly negative distribution. In order to achieve normality, the BPAQ variable was reflected and a Square Root transformation was conducted. After the transformation, the variable was reflected back to ease with interpretation. Normality was achieved  $z_s = -0.53, p = 0.521$  and kurtosis remained within normal range  $z_k = -0.33, p = 0.629$ . Note that BPAQ<sup>TR</sup> was used for all subsequent analyses as no differences were present between the results with the raw or transformed variables. Correlational results with the untransformed BPAQ and all other variables are listed in Appendix I.

In terms of the demographic characteristics of the 6 outliers: 3 out were from Saskatoon Correctional Centre, 3 from Prince Albert Correctional Centre; 4 were Aboriginal, 1 was Caucasian and 1 ethnicity was unknown.

Normality was reassessed following the removal of the 6 outliers and the transformation of the BPAQ. Refer to Table 3.1 for a summary of normality for the raw data, transformed data and data upon removing the outliers. After the removal of the outliers both BIS and SADD were negatively kurtotic at the  $p < .05$  level,  $z_k = -1.98, p = 0.048$  and  $z_k = -2.23, p = 0.026$  respectively. However, both values were normally distributed and the sample size is relatively large which diminishes the effect of the underestimation usually associated with negative kurtosis. Therefore, no further transformations were conducted (Tabachnick & Fidell, 2001) and all subsequent analyses were performed on the transformed variables.

Table 3.1

*Summary of skewness and kurtosis for raw and transformed variables*

		$z_s$	$p$	$z_k$	$p$	Num. of Outliers
Raw Data	Aggression BPAQ	-2.01*	.044	-0.07	.484	0
	Impulsivity BIS	-0.50	.617	-0.93	.352	2
	Alcohol Dependency SADD	2.36*	.018	-1.65	.099	0
	Social Problem Solving SPSI – R:S	1.61	.107	1.99*	.047	1
	Impulsive Aggression IPAS: IA	-1.63	.103	1.09	.276	1
	Premeditated Aggression IPAS: PM	-2.11*	.035	1.32	.187	1
	Impression Management IM	0.08	.934	-0.47	.638	1
	With Outliers Removed	Aggression BPAQ	-1.96*	.050	-0.58	.562
Impulsivity BIS		-0.82	.412	-1.98*	.048	0
Alcohol Dependency SADD		1.52	.129	-2.23*	.026	0
Social Problem Solving SPSI – R:S		0.88	.379	0.30	.764	0
Impulsive Aggression IPAS: IA		1.76	.078	0.08	.936	0
Premeditated Aggression IPAS: PM		-1.58	.114	1.36	.174	0
Impression Management IM		0.46	.646	-0.72	.472	0
Reflected & Square Root		Aggression BPAQ <sup>TR</sup>	-0.53	.521	-0.33	.629

\*z-score significantly differs from 0,  $p < .05$ , indicating skewness or kurtosis in the distribution.

### *3.1.2. Multicollinearity*

Multicollinearity does not appear to be a concern as the Pearson correlation coefficients for all measures are below the .70 level suggested by Tabachnick and Fidell, (2001).

### *3.2. Scale Properties and Intercorrelations among Measures*

The means and standard deviations of each measure and relevant subscales are reported for all participants in Table 3.2. A range of possible scores for each measure is included in order to assess the overall extent of endorsement for each construct.

Table 3.2

*Means and Standard Deviations of each measures (N =179)\**

Measure	Mean	Standard Deviation	Range of Possible Scores
<b>Buss Perry Aggression Questionnaire (BPAQ)</b>			
Anger	19.94	5.23	7 – 35
Hostility	25.65	5.98	8 – 40
Physical Aggression	29.17	6.77	9 – 45
Verbal Aggression	16.47	3.76	5 – 25
<b>Total</b>	<b>91.23</b>	<b>17.70</b>	29 – 145
<b>Impulsive Premeditated Aggression Scale (IPAS)</b>			
Impulsivity Subscale IPAS: IA ( <i>n</i> = 177)	24.59	4.60	8 - 40
Premeditated Subscale IPAS: PM ( <i>n</i> = 178)	34.15	6.93	12 - 60
<b>Barratt Impulsivity Scale (BIS-11)</b>			
Attention/Cognitive	19.10	3.16	8 – 32
Motor	22.66	4.36	10 – 40
Nonplanning	30.58	4.57	12 – 48
<b>Total</b>	<b>72.35</b>	<b>9.86</b>	30 – 120
<b>Short Alcohol Dependency Data (SADD)</b>			
<b>Total (<i>n</i> = 165)</b>	<b>14.24</b>	<b>10.26</b>	0 – 45
<b>Alcohol Use Questions</b>			
Days per week ( <i>n</i> = 163)	2.63	2.21	0 – 7
Days 5+ drinks ( <i>n</i> = 136)	2.35	2.27	0 – 7
Self-rated level ( <i>n</i> = 164)	1.77	1.05	0 – 3
<b>Impression Management (IM)</b>			
<b>Mean Score</b>	<b>3.87</b>	<b>.89</b>	1 – 8
<b>Social Problem Solving Inventory (SPSI – R:S)</b>			
Avoidance Style	104.68	13.64	76 – 157
Impulsivity/Carelessness Style	109.50	13.22	73 – 157
Rational Problem Solving	97.77	12.76	56 – 137
Negative Problem Orientation ( <i>n</i> = 178)	100.74	13.31	74 – 149
Positive Problem Orientation	100.66	14.09	47 – 135
<b>Standard Score (<i>n</i> = 177)</b>	<b>95.65</b>	<b>13.04</b>	<b>29 – 140</b>

*Note.* \* *N* = 179 unless stated otherwise

Intercorrelations among each of the measures are presented in Table 3.3. The impression management scale (IM) significantly correlated with the aggression measure (BPAQ<sup>TR</sup>), impulsive aggression scale (IPAS: IA), premeditated aggression scale (IPAS: PM), impulsivity scale (BIS) and social problem solving measure (SPSI – R:S).

Impression management was controlled for despite its low reliability as its overall mean was high relative to normative data and it significantly correlated with a number of measures. In order to eliminate the influence of IM on each of these variables regression analyses were conducted. The following regression analyses were conducted:

- 1) BPAQ<sup>TR</sup> was regressed on IM;
- 2) IPAS:IA regressed on IM;
- 3) IPAS: PM on IM;
- 4) BIS on IM and;
- 5) SPSI on IM.

The standardized residuals from these analyses were then considered as the adjusted BPAQ<sup>ZRES</sup><sup>TR</sup>, BIS<sup>ZRES</sup>, IPAS: IA<sup>ZRES</sup>, IPAS: PM<sup>ZRES</sup> and SPSI<sup>ZRES</sup> scores and used in each subsequent analysis. Table 3.4 reports the intercorrelations among measures after controlling for IM. Refer to Appendix J for regression results.

Table 3.3

*Pearson Correlation Coefficients Among Variables (N = 179)*

	Aggression BPAQ <sup>TR</sup>	Impulsivity BIS	Alcohol Dependency SADD	Social Problem Solving SPSI	Impulsive Aggression IPAS: IA	Premeditated Aggression IPAS: PM
Aggression BPAQ <sup>TR</sup>	--					
Impulsivity BIS	.461**	--				
Alcohol Dependency SADD	.207**	.231**	--			
Social Problem Solving SPSI	-.350**	-.571**	-.369**	--		
Impulsive Aggression IPAS: IA	.530**	.379**	.339**	-.500**	--	
Premeditated Aggression IPAS: PM	.490**	.391**	.177*	-.321**	.364**	--
Impression Management IM	-.253**	-.190*	.018	.152*	-.158*	-.169*

Note. \*  $p < .05$  \*\*  $p < .01$

Table 3.4

*Pearson Correlation Coefficients Among Variables while controlling for IM (N=179)*

	Aggression BPAQ <sup>ZRES TR</sup>	Impulsivity BIS <sup>ZRES</sup>	Alcohol Dependency SADD	Social Problem Solving SPSI <sup>ZRES</sup>	Impulsive Aggression IPAS: IA
Aggression BPAQ <sup>ZRES TR</sup>	--				
Impulsivity BIS <sup>ZRES</sup>	.431**	--			
Alcohol Dependency SADD	.220**	.235**	--		
Social Problem Solving SPSI <sup>ZRES</sup>	-.336**	-.553**	-.370**	--	
Impulsive Aggression IPAS: IA <sup>ZRES</sup>	.530**	.362**	.344**	-.408**	--
Premeditated Aggression IPAS: PM <sup>ZRES</sup>	.482**	.381**	.188*	-.301**	.364**

Note. \*  $p < .05$  \*\*  $p < .01$ ; <sup>TR</sup> = Transformed; <sup>ZRES</sup> = Standardized Residuals

### 3.3. Analysis of Demographic Difference

Following the screening procedures, of the original 185 participants, a total of 179 participants met the eligibility criteria and were included in the analyses. All participants were male with a mean age of 29.55 ( $SD = 9.2$ ) and an average of a Grade 10 education ( $SD = 1.8$ ). Regarding ethnicity, 84.9% ( $n = 152$ ) of the sample self-identified as First Nations, Métis or Inuit, 11.7% ( $n = 21$ ) as Caucasian, 1.7% ( $n = 3$ ) as other and 1.7% were unknown ( $n = 3$ ). The

sample was collected from two provincial correctional centres in Saskatchewan, Canada. These facilities included the Prince Albert Correctional Centre (PACC;  $n = 128$ ; 71.5%) and the Saskatoon Correctional Centre (SCC;  $n = 51$ ; 28.5%).

For each measure, independent  $t$ -tests were conducted in order to determine whether differences were present with respect to ethnicity. Table 3.5 displays the means, standard deviations and results of these analyses. Differences were observed between Aboriginal and non Aboriginal participants with respect to scores on the alcohol measures. Specifically, Aboriginal offenders indicated a higher self-identified level of alcohol use  $t(172) = 3.32, p = .001$ ; and scored higher on the SADD indicating a higher level of alcohol dependency  $t(172) = 2.39, p = .018$ . Aboriginal participants also scored higher on the IM scale  $t(171) = 2.04, p = .043$ . Bonferroni corrections for the significance levels were utilized as multiple comparisons were conducted (Howell, 2002). The adjusted alpha level was determined by dividing the alpha level by the number of comparisons performed in the current study. After adjusting the significance levels, only the difference between Aboriginal and non Aboriginal offenders on self-identified level of alcohol use was significant.

Similarly, independent  $t$ -tests were conducted to examine potential differences on each measure by institution. The means, standard deviations and results of these analyses are presented in Table 3.6. Offenders incarcerated at the PACC indicated a higher self-identified level of alcohol use  $t(80.1) = -2.94, p = .005$ ; greater number of days per week of alcohol consumption  $t(173) = -2.23, p = .027$ ; greater number of days per week consuming more than 5 drinks  $t(144) = -2.02, p = .045$  and higher on the SADD, indicating an elevated level of alcohol dependency  $t(175) = -2.63, p = .009$ . The sample from SCC exhibited lower levels of impulsive aggression as assessed by the IPAS: IA  $t(158) = -2.72, p = .007$ . Again, Bonferroni corrections

for the significance levels were utilized as multiple comparisons were conducted (Howell, 2002). After adjusting the significance level with Bonferroni corrections, no values between SCC and PACC were significantly different.

Table 3.5

*Means, Standard Deviations and t-test results of each measure as a function of ethnicity.*

Measure	Aboriginal Mean (SD)  <i>n</i> = 152	Non- Aboriginal Mean (SD)  <i>n</i> = 24	<i>t</i>	<i>df</i>	<i>p</i>
Aggression BPAQ <sup>ZRES TR</sup>	91.31 (17.58)	91.25 (19.16)	.495	171	.621
Impulsive Aggression IPAS:IA	24.52 (4.57)	25.39 (4.90)	-.840	172	.402
Premeditated Aggression IPAS: PM	34.26 (6.87)	33.70 (7.51)	.361	173	.719
Impulsivity BIS <sup>ZRES</sup>	71.98 (9.67)	75.62 (10.66)	-1.34	171	.182
Alcohol Dependency SADD	11.98 (9.98)	9.53 (11.60)	2.39	172	.018
Days per week	2.76 (2.21)	1.91 (2.23)	1.70	170	.090
Days 5+ drinks	2.50 (2.27)	1.61 (2.27)	1.74	142	.085
Self-rated level	1.87 (.99)	1.13 (1.19)	3.32	171	.001*
Impression Management IM	3.9 (.88)	3.51 (.80)	2.04	171	.043
Social Problem Solving SPSI <sup>ZRES</sup>	97.09 (13.23)	92.00 (16.87)	1.26	172	.208

Note. \* Bonferroni Correction significant at  $p < .0025$

Table 3.6

*Means, Standard Deviations and t-test results of each measure as a function of institution.*

Measure	SCC Mean (SD) n = 51	PACC Mean (SD) n = 128	t	df	p
Aggression BPAQ <sup>ZRES TR</sup>	92.00 (17.98)	90.93 (17.64)	.109	174	.914
Impulsive Aggression IPAS:IA	23.22 (4.79)	25.13 (4.42)	-2.52	172	.013
Premeditated Aggression IPAS: PM	33.66 (6.94)	34.34 (6.94)	-.848	173	.398
Impulsivity BIS <sup>ZRES</sup>	73.31 (9.80)	71.96 (9.89)	.778	174	.438
Alcohol Dependency SADD	11.04 (10.99)	15.49 (9.72)	-2.63	158	.009
Days per week	2.06 (2.40)	2.83 (2.09)	-2.23	173	.027
Days 5+ drinks	1.81(2.27)	2.61 (2.24)	-2.02	144	.045
Self-rated level	1.39 (1.15)	1.92 (.964)	-2.89	80.10	.005
Impression Management IM	3.78 (.88)	3.90 (.89)	-.784	174	.434
Social Problem Solving SPSI <sup>ZRES</sup>	96.20 (14.22)	95.43 (12.58)	.345	172	.731

Note. \* Bonferroni Correction significant at  $p < .0025$

Note: <sup>a</sup> Levene's test for Equality of Variances significant; equal variances not assumed.

Pearson correlational analyses were performed to assess the intercorrelations among each variable and to test Hypotheses 1 to 7. Refer to Table 3.4 for a correlation matrix.

### 3.4. Hypotheses

*3.4.1. Hypothesis 1: High levels of impulsivity should be related to high levels of general aggression.*

The Buss Perry Aggression Questionnaire (BPAQ) was used to assess one's level of general aggression. Impulsivity was measured from the total score of the Barratt Impulsivity Scale (BIS – 11). As predicted, a significant positive correlation was found between impulsivity and general aggression ( $r = .431, p < .001$ ) indicating a moderate relationship between these variables. This hypothesis was further supported with the raw correlation results between BIS and BPAQ without controlling for impression management ( $r = .461, p < .001$ ).

*3.4.2. Hypothesis 2: Increased levels of impulsivity subtypes should be related to greater levels of general aggression.*

Subtypes of impulsivity include motor, nonplanning and attention/cognitive as measured by the BIS-11. Utilizing the original subscales of the measure, each subscale was found to have a positive relationship with general aggression, motor impulsivity ( $r = .436, p < .001$ ); nonplanning ( $r = .253, p < .001$ ) and attention/cognitive impulsivity ( $r = .297, p < .001$ ).

As reported in the previous chapter, the reliability scores for each of the BIS subscales were .45 for cognitive/attentional impulsivity, .54 for non-planning impulsivity and .67 for motor impulsivity. The pattern of the reliability scores is consistent with previous work conducted on the BIS-11, however the levels of internal consistency are low. Specifically, internal consistency of the motor impulsivity is generally higher than the values for either the attentional or nonplanning subscales. Previous literature has reported inconsistent findings with respect to the number of items that define each factor. Generally speaking, the motor and nonplanning

subscales have consistently been measured, however the cognitive/attention subscale often fails to be identified as a distinct dimension as it tends to load on the other two factors (Barratt, 1991; Patton et al., 1995; Ramirez & Andreu, 2006).

As a result of the poor reliability measures within the subscales of the BIS and on account of the inconsistent factor structures presented in the literature, a series of factor analysis were conducted to assess the underlying factor structure of the measure within this sample. Principal axis factor analysis with oblimin rotation was conducted to assess the underlying structure of the 30 items of the BIS-11. A four factor model was chosen, based on the initial exploratory analysis and scree plot. Other criteria considered in choosing the number of factors included:

- a) examining the size and amount of residuals between the observed and reproduced correlations, the four factor results reported 33% of non-redundant residuals with absolute values greater than .05;
- b) examining the number of complex items as the four factor results had no items greater than .30 loading on more than one factor;
- c) and examining the amount of variance as the factor model accounted for 29% of total variance

Table 3.7 displays each item and their factor loadings. Loadings with less than .30 were omitted for clarity. The first factor grouped items relating to behavioural impulsivity. Most of the items in this factor are from the original motor impulsivity subscale; however, two items are from each of the original cognitive/ attention and nonplanning subscales. The second factor grouped items related to cognitive aspects of impulsivity and was comprised of 6 items.

However, only two of these items have loading above .40. The third factor, grouped items related

to nonplanning and was comprised of 3 items. The fourth factor grouped items related to controlled or cautious behaviour and was comprised of 10 items.

The between-factor correlations were low to moderate ranging from .088 to .285. The highest correlations were found between the first and second factor and the first and fourth factor as they were .245 and .238 respectively. The lowest correlations were found between the second and third factor and the second and fourth factor as they were .089 and -.081 respectively.

Having determined the factor structure of the BIS- 11 within this sample, the reliability for the 4 factors were examined. Question 19, 'I am a steady thinker', in factor 2, had a large negative loading of -.71. This item was reversed scored in the reliability analysis. Cronbach's alpha for Factor 1 was .76, Factor 2 .64, Factor 3 .44, and Factor 4 .63.

The factor analysis results do not support the original factor structure of the BIS-11 with three subscales of motor, nonplanning and cognitive/attention impulsivity (Patton et al., 1995). Nor do they fully support previous findings suggesting that attention/cognitive subscale loads onto the motor and nonplanning subscales (Luengo et al. 1991; Patton et al., 1995). Taken together this suggests that any results regarding the subscales should be interpreted with caution as the underlying structure was not supported.

Table 3.7

*Factor Loading for the Rotated Factors of the BIS-11*

Item	Factor Loadings				Original Subscale
	1	2	3	4	
I am restless at lectures or talks	.574				Motor
I buy things on impulse	.566				Motor
I act on impulse	.552				Motor
I get easily bored when solving thought problems	.540				Attn
I act on the spur of the moment	.514				Motor
I say things without thinking	.480				Motor
I find it hard to sit still for long periods of time	.467				Motor
I spend or charge more than I earn	.356				Nonplan
I talk fast	.312				Motor
I am a steady thinker		-.712			Attn
I walk and move fast		.590			Motor
I solve problem by trial and error		.384			Attn
I am more interested in the present than the future		.382			Nonplan
I have racing thoughts		.354			Attn
I change where I live		.316			Nonplan
I have outside thoughts when thinking					Attn
I change jobs			.494		Nonplan
I do things without thinking			.447		Motor
I finish what I start			.404		Nonplan
I am self-controlled				.574	Motor
I concentrate easily				.562	Attn
I am a careful thinker				.523	Attn
I save regularly				.490	Nonplan
I plan tasks carefully				.480	Nonplan
I am happy-go-lucky				-.451	Nonplan
I plan trips well ahead of time				.398	Nonplan
I plan for job security				.389	Nonplan
I have regular medical/dental checkups				.361	Nonplan
I like to think about complex problems				.350	Attn
I plan for the future					Nonplan
Eigenvalues	4.89	3.01	1.71	1.64	
% of variance	13.99	8.00	3.37	3.23	

Note. Loadings <.30 are omitted.

3.4.3. *Hypothesis 3: Levels of impulsivity should be greater for those individuals classified as exhibiting impulsive aggression than for those classified as exhibiting premeditated aggression.*

Classification of aggression subtypes was assessed by the Impulsive Premeditated Aggression Scale (IPAS). Correlations between general aggression, as measured by the BPAQ and BIS, were significant for the predominately impulsive aggression group ( $r = .448, p < .001$ ) and predominately premeditated aggression group ( $r = .398, p = .001$ ). An independent  $t$ -test indicates a nonsignificant difference on impulsivity level between the impulsive,  $M = 71.86$  ( $SD = 10.53$ ) and premeditated subtypes,  $M = 73.14$  ( $SD = 9.08$ )  $t(156.6) = -.758, p = .450$ .

A number of exploratory analyses were conducted with respect to group differences between impulsive aggressors and premeditated aggressors. Upon examining the correlations between IPAS subscales in Table 3.3, it noteworthy to report that a significant correlation between the impulsive aggression and premeditated subscales ( $r = .364, p < .001$ ; Table 3.3). This indicates that the subscales are partially confounded. As a result of this finding, partial correlations were conducted for each subtype of aggression with impulsivity controlling for the other subtype of aggression. Partially out the effect of premeditated aggression in the relationship between impulsive aggression and impulsivity decreased the correlation from  $r = .353, p < .001$  to  $r = .265, p < .001$ . Although the magnitude decreased, the relationship remained significant. Similarly, partially out the effect of impulsive aggression in the relationship between premeditated aggression and impulsivity lowered the magnitude of the correlation from  $r = .378, p < .001$  to  $r = .294, p < .001$ . Although the magnitude decreased, the relationship remained significant.

In exploring aggression subtypes and alcohol use, in general it appears that levels of alcohol dependency were moderate for both subtypes and no significant differences were present between groups on SADD scores; impulsive aggressors  $M = 15.15$  ( $SD = 10.03$ ), premeditated aggressors  $M = 13.05$  ( $SD = 10.43$ ),  $t(160) = 1.3$ ,  $p = .197$ . There were however, differences between groups with respect to the following items: number of days per weeks that alcohol was consumed; impulsive aggressors  $M = 2.94$  ( $SD = 2.23$ ), premeditated aggressors  $M = 2.24$  ( $SD = 1.99$ ),  $t(158) = 2.02$ ,  $p = .045$ ; number of days per week that more than five drinks were consumed impulsive aggressors  $M = 2.72$  ( $SD = 2.33$ ), premeditated aggressors  $M = 1.89$  ( $SD = 2.04$ ),  $t(126.1) = 2.18$ ,  $p = .031$ ; self reported level of drinking impulsive aggressors impulsive aggressors  $M = 1.93$  ( $SD = .99$ ), premeditated aggressors  $M = 1.57$  ( $SD = 1.07$ ),  $t(160) = 2.15$ ,  $p = .035$  with the impulsive aggressors scoring higher on all three measures.

*3.4.4. Hypothesis 4: Lower levels of social problem solving should be related to higher levels of impulsivity.*

The Social Problem Solving Inventory – Short Form (SPSI-R:S) was used to assess one's level of social problem solving ability. Impulsivity was measured from the total score of the Barratt Impulsivity Scale (BIS-11). As predicted, a significant negative correlation was found between impulsivity and social problem solving ability ( $r = -.553$ ,  $p < .001$ ) indicating a moderate relationship between these variables. This hypothesis was further supported by the raw correlation results between SPSI-R:S and BIS without controlling for impression management ( $r = -.571$ ,  $p < .001$ ).

The SPSI – R:S has an Impulsivity/Carelessness subscale, therefore a partial correlation between social problem solving and impulsivity while controlling for this subscale was

performed. The correlation remained significant, however was lower in magnitude ( $r = -.350, p < .001$ ).

*3.4.5. Hypothesis 5: Lower levels of social problem solving should be related to higher levels of general aggression.*

As predicted, a significant negative correlation was found between general aggression, as measured by the BPAQ, and social problem solving ability ( $r = -.336, p < .001$ ). This hypothesis was further supported with the raw correlation results between SPSSI-R:S and BPAQ without controlling for impression management ( $r = -.350, p < .001$ ).

*3.4.6. Hypothesis 6: Higher levels of alcohol dependency should be related to higher levels of general aggression.*

A significant positive correlation was found between general aggression and alcohol dependency as assessed by the Short Alcohol Dependency Data (SADD) ( $r = .220, p = .004$ ). This hypothesis was further supported with the raw correlation results between SADD and BPAQ without controlling for impression management ( $r = .207, p = .006$ ).

*3.4.7. Hypothesis 7: Higher levels of alcohol dependency should be related to higher levels of impulsivity.*

As hypothesized, a significant positive relationship was found between impulsivity and SADD ( $r = .235, p = .004$ ). This hypothesis was further supported with the raw correlation results between BIS and SADD without controlling for impression management ( $r = .231, p < .002$ ). Figure 3.1 provides a summary of the relationships between each variable in the study.

Only hypotheses 1 and 4 to 7 are presented in this figure. As predicted, significant positive correlations were found between impulsivity and aggression, impulsivity and alcohol dependency and alcohol dependency and aggression. Significant negative relationships were found between impulsivity and social problem solving and aggression and social problem solving.

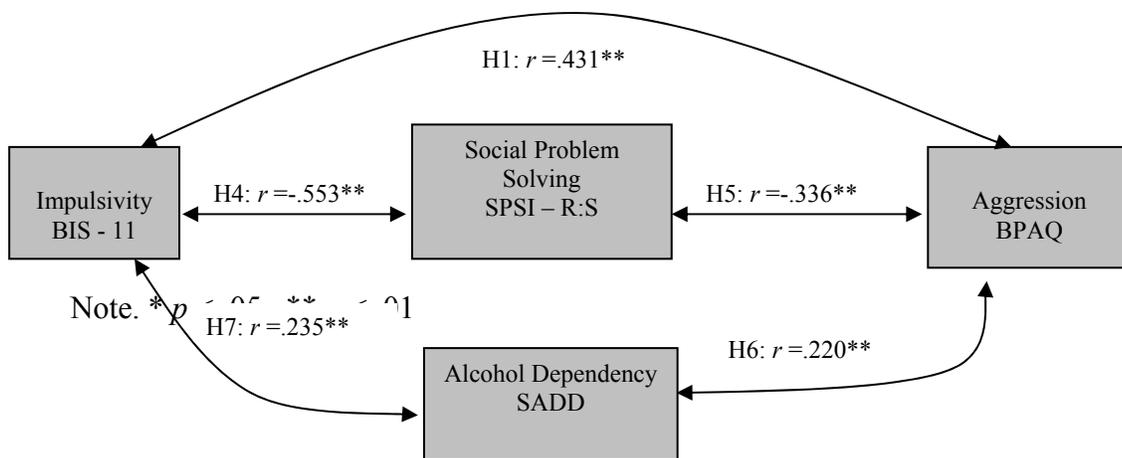


Figure 3.1. Pearson correlation results among impulsivity, social problem solving, alcohol dependency and aggression.

### 3.5. Regression analysis to assess mediation

Social problem solving was predicted to mediate the relationship between impulsivity and aggression. Three regression analyses were computed to assess this relationship: (1) Regress social problem solving (mediator) on impulsivity (IV); (2) Regress aggression (DV) on impulsivity (IV); (3) Regress aggression (DV) on impulsivity (IV) and social problem solving (mediator). Both unstandardized and standardized beta coefficients are reported in Table 3.8. The

unstandardized coefficients are reported within the text as the Sobel test is calculated with the unstandardized values.

Examination of the coefficients for the first regression analyses in Table 3.8 indicate that impulsivity is significantly related to the hypothesized mediator, social problem solving  $b = -.549, p < .001$ . Investigating the second regression analysis, impulsivity is a significant predictor of the dependent variable, aggression  $b = .422, p < .001$ . The third analyses indicates that social problem solving is not a significant predictor of aggression over and above impulsivity,  $b = -.132, p = .107$  a requirement if it was to act as a mediator in this relationship. The original Beta weight value between impulsivity and aggression was  $.422 (p < .001)$  however, when controlling for social problem solving the relationship decreased to  $.352 (p < .001)$ . Although this does indicate that the relationship between impulsivity and aggression was reduced when controlling for social problem solving, results from the Sobel statistic indicate that the relationship remained significant and its value was not greatly reduced. See Table 3.8. Therefore, the hypothesis was not supported for social problem solving acting as a mediator in this relationship.

Table 3.8

*Regression Analyses to assess the role of Social Problem Solving (SPSI) as a mediator with Aggression (BPAQ), and Impulsivity (BIS) (N = 179)*

Regression Analyses	<i>b</i>	<i>SE</i>	$\beta$	<i>t</i>	<i>p</i>
1. Social Problem Solving on Impulsivity	-.549	.063	-.553	-8.71	<.001**
2. Aggression on Impulsivity	.422	.068	.424	6.17	<.001**
3. Aggression on Impulsivity and Social Problem Solving	.352 -.132	.081 .081	.359 -.133	4.37 -1.62	<.001** .107
Sobel Statistic	--	--	--	-1.58	.115

Note. *b* = unstandardized regression coefficient; *SE* = Standard error of unstandardized regression coefficients;  $\beta$  = standardized regression coefficient

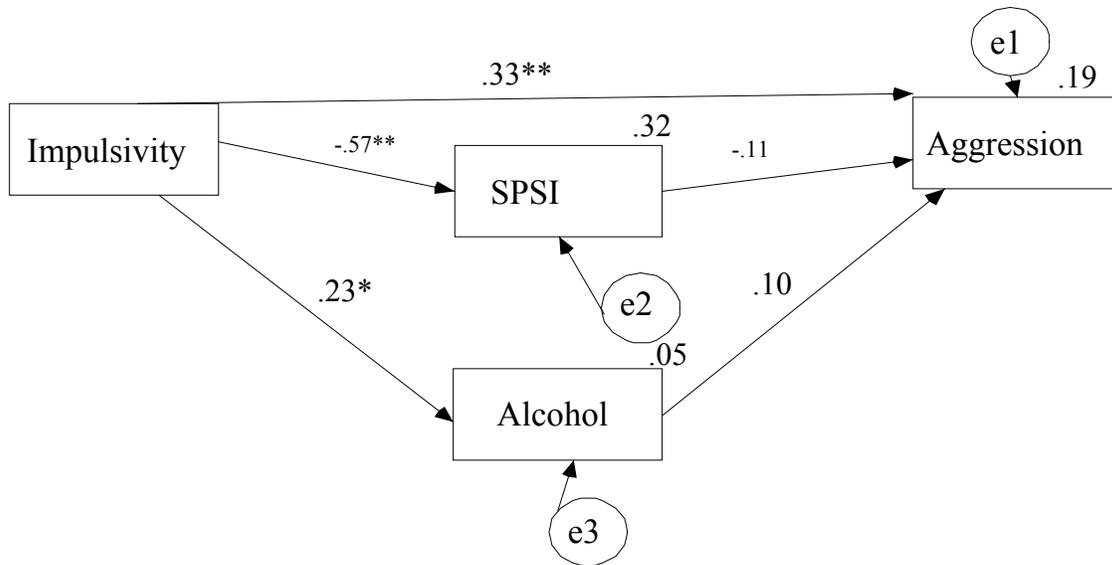
Note. \*  $p < .05$  \*\*  $p < .01$

### 3.6. Path analysis of model

In the present study, four different models of aggression were evaluated for the best fit. Specifically, 1) the proposed model with the full sample; 2) the proposed model with the Aboriginal subsample; 3) the *post hoc* model with the full sample and; 4) the *post hoc* model with the Aboriginal subsample were assessed. Aboriginal offenders were examined as a subsample as this group comprised the majority of the sample. T-test results revealed differences between Aboriginal and non Aboriginal offenders on a number of measure. Conducting a path analysis with this subsample examined whether group differences were affecting the relationship among variables. Path Analysis in AMOS 6 (Arbuckle, 2005) was used to test the overall model

of general aggression as well as the specified causal paths derived from literature on aggression and its influences. The first model, as depicted in Figure 3.2, examined the relationships between impulsivity, social problem solving, alcohol dependency and general aggression. Within path analysis, variables are commonly depicted by rectangles as they are observed or measured variables rather than latent constructs. All path coefficients are standardized beta weights with ranges in value from -1 to 1.

To begin, in the proposed model with the complete sample, impulsivity directly affects general aggression  $b = .33, p < .001$ . Impulsivity also predicts social problem solving  $b = -.57, p < .001$ ; however, social problem solving does not significantly predict aggression  $b = -.11, p = .20$ . Similar results are seen with impulsivity, alcohol dependency and aggression. That is, impulsivity predicts alcohol dependency  $b = .23, p = .002$ ; however, alcohol dependency does not significantly predict aggression  $b = .10, p = .15$ . Results from this model confirm what has previously been determined from the multiple regression analyses. That is, social problem solving does not act as a mediator in this model of aggression as pathways between social problem solving and aggression are not significant. Furthermore, the direct pathway between impulsivity and aggression was significant. If social problem solving was to act as a mediator in this relationship we would expect this pathway to be weak as social problem solving would account for much of the relationship.



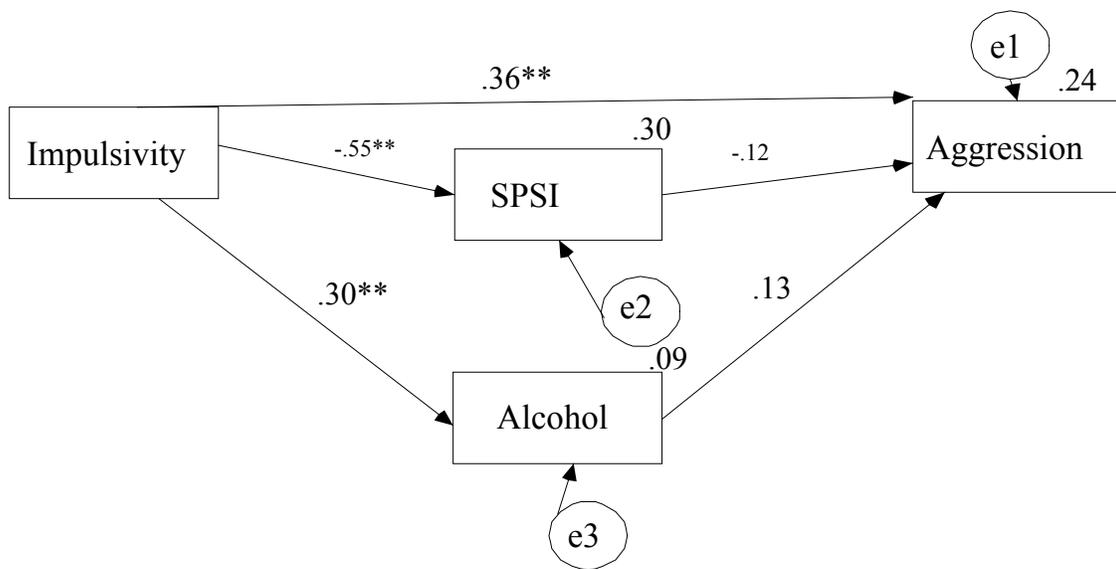
Note. \*  $p < .05$  \*\*  $p < .01$

Figure 3.2. Path analysis results for proposed model of aggression in complete sample  $n = 179$

With respect to the overall fit of the model, results suggest an approximate fit of the data  $\chi^2(1, n = 172) = 16.69, p < .001$ ; CFI = .95; NFI = .95; AIC = 42.65; RMSEA = .300, RMSEALO = .185, RMSEAHI = .434; and SRMR = .067. The NFI, CFI and SRMR indices suggest an acceptable fit of the data with values over .90 for the NFI, .95 for the CFI and a value of SRMR close to zero. However, both the  $\chi^2$  and RMSEA fail to support a good fit for the data as the  $\chi^2$  is significant and the RMSEA value is greater than .05. The  $\chi^2$  however, is sensitive to large sample sizes; therefore, this result is expected due to the moderately sized sample in the present study. With respect to the RMSEA values, reasonable models have levels  $< .05$  with a lower confidence interval below .05 and a higher interval cut-off of .10. The current sample was not successful in achieving a reasonable fit with respect to the RMSEA; however, this index is

classified as a noncentrality based index and is a function of chi-square, df and N which may result in a biased estimate.

Overall, the model accounts for 19% of the variance in general aggression. As mentioned above, impulsivity is the only significant determinant of general aggression in this model, as social problem solving and alcohol dependency are not direct determinants of general aggression.



Note. \*  $p < .05$  \*\*  $p < .01$

Figure 3.3. Path analysis results for proposed model of aggression in Aboriginal subsample  $n = 146$

Generally speaking, results with the Aboriginal subsample are similar to the results with the complete sample. Specifically, impulsivity directly affects general aggression  $b = .36, p < .001$ ; and social problem solving  $b = -.55, p < .001$ ; however, social problem solving does not significantly predict aggression  $b = -.12, p = .172$ ; Similarly, impulsivity predicts alcohol

dependency  $b = .30, p < .001$ . However alcohol dependency does not significantly predict aggression  $b = .13, p = .078$ . Results from this subsample of Aboriginal offenders provide further support that social problem solving does not appear to mediate the relationship between impulsivity and aggression.

With respect to the overall fit of the model, results are similar to the complete sample with an approximate fit of the data,  $\chi^2(1, n = 146) = 16.67, p < .001$ ; CFI = .95; NFI = .944; AIC = 42.67; RMSEA = .325, RMSEALO = .200, RMSEAHI = .471 and SRMR = .110. The NFI, CFI and SRMR indices suggest an acceptable fit of the data. However, both the  $\chi^2$  and RMSEA fail to support a good fit for the data as the  $\chi^2$  is significant and the RMSEA value is greater than .05. The model accounts for 24% of the variance in general aggression. As mentioned above, impulsivity is the only significant determinant of general aggression in this model as social problem solving and alcohol dependency are not direct determinants of general aggression.

### *3.7. Exploratory regression analysis to assess potential mediational role of impulsivity*

A series of regression analyses were conducted to assess the relationship between impulsivity, aggression and social problem solving. These analyses, unlike the previous set of regression analyses, were exploratory and performed to examine the role of impulsivity as mediator in its relationship with aggression and social problem solving. This relationship was examined *post hoc* in light of the strong relationship impulsivity shares with both social problem solving and aggression and in combination with social problem solving failing to be supported as a mediator.

The following regression analyses were conducted: (1) impulsivity (mediator) is regressed on social problem solving (IV); (2) aggression (DV) regressed on social problem solving (IV) and; (3) aggression is regressed on both social problem solving (IV) and impulsivity (mediator). Both unstandardized and standardized beta coefficients are reported in Table 3.9. The unstandardized

coefficients are reported within the text as the Sobel test is calculated with the unstandardized values.

The results for this series of regression analyses suggest that impulsivity, and not social problem solving, may be acting as an important mediator in its relationship with aggression. Examination of the coefficients for the first regression analyses in Table 3.9, indicate that social problem solving is significantly related to impulsivity  $b = -.558, p < .001$ . Investigating the second regression analysis, social problem solving is a significant predictor of the dependent variable, aggression  $b = -.328, p < .001$ . The third analyses indicates that impulsivity is a significant predictor of aggression  $b = -.352, p < .001$ , when controlling for social problem solving, a requirement if it was to act as a mediator in this relationship. The original unstandardized coefficient value between social problem solving and aggression was  $-.328, p < .001$ ; however, when controlling for impulsivity the relationship decreased to  $-.132, p = .107$ . This substantial decrease indicates that the relationship between social problem solving and aggression was reduced when impulsivity was statistically controlled. Results also indicate that the relationship between social problem solving and aggression was no longer significant. Results from the Sobel test of mediated effect reveal that the decrease was significant and provides preliminary support that impulsivity may be acting as a mediator between social problem solving and aggression. See table 3.9 for results.

Table 3.9

*Regression Analyses for to assess role of Impulsivity (BIS) as a potential mediator with Aggression (BPAQ), and Social Problem Solving (SPSI) (N =179)*

Regression Analyses	<i>b</i>	<i>SE</i>	$\beta$	<i>t</i>	<i>p</i>
1. Impulsivity on Social Problem Solving	-.558	.064	-.553	-8.71	<.001
2. Aggression on Social Problem Solving	-.328	.071	-.332	-4.61	<.001
3. Aggression on Social Problem Solving and Impulsivity	-.132 .352	.081 .081	-.133 .359	-1.62 4.37	.107 <.001
Sobel Statistic	--	--	--	-3.17	.0015

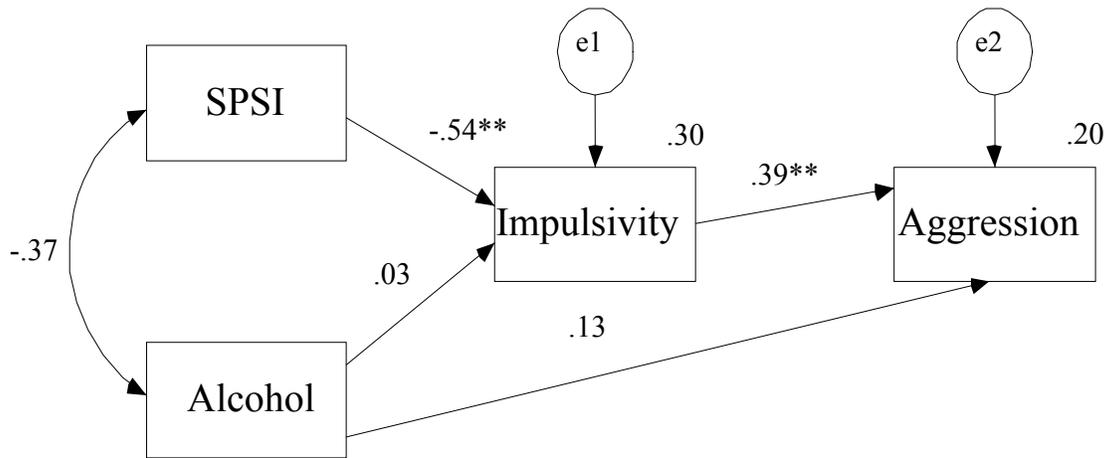
Note. *b* = unstandardized regression coefficient; *SE* = Standard error of unstandardized regression coefficients;  $\beta$ = standardized regression coefficient

Note. \*  $p < .05$  \*\*  $p < .01$

Results suggest that the proposed model of general aggression was an acceptable fit of the data; however, the regression results suggest that social problem solving is not acting as a mediator as presented in the model. In an effort to understand better the interrelations among variables within this model, the regression analyses were re-examined in context of the approximate fit of the proposed model. As previously noted, social problem solving is not acting as a mediator in the relationship between impulsivity and aggression as initially predicted. However, it appears that impulsivity may be playing a significant role in the model and its relationship with aggression. Based upon these results and literature suggesting the considerable role that impulsivity may play with each of these variables a new model was developed.

This *post hoc* model situates impulsivity as the mediating variable between social problem solving and aggression as well as alcohol dependency and aggression. A direct pathway from alcohol dependency to aggression is included. Covariance is assumed between social problem solving and alcohol dependency.

Results from this model maintain significant pathways for impulsivity as a determinant of aggression  $b = .39, p < .001$ . Social problem solving directly predicts impulsivity  $b = -.54, p < .001$ ; however alcohol dependency does not predict impulsivity  $b = .03, p = .673$  nor aggression  $b = .13, p = .067$ . Overall, the model accounts for 20% of the variance in general aggression. A significant correlation  $r = -.37, p < .001$  was found between SPSI and alcohol dependency. With respect to the overall fit of the model, results suggest a good fit to the data  $\chi^2(1, n = 172) = 1.28, p = .26$ ; CFI = .99; NFI = .996; SRMR = .03; AIC, 27.28; RMSEA = .04, RMSEALO = .000, RMSEAH1 = .208. The AIC index is used to compare models, the lower the AIC the value the better the fit of the model. When comparing the proposed model and the *post hoc* model of aggression on this index, the *post hoc* model suggests a better fit of the data as its value of 27.28 is lower than the AIC value 42.69 in the proposed model.

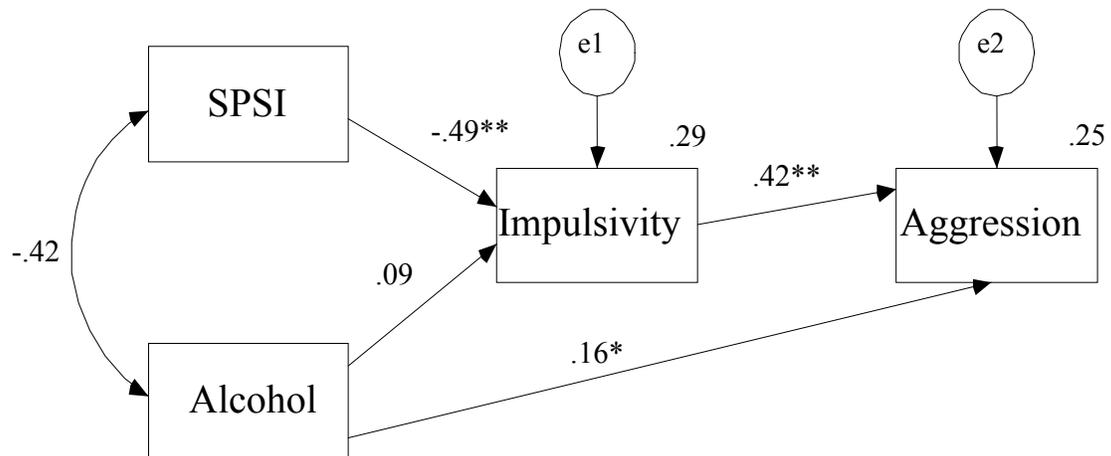


Note. \*  $p < .05$  \*\*  $p < .01$

Figure 3.4. Path analysis results for post hoc model of aggression in complete sample  $n = 175$

Path analyses with the Aboriginal subsample were conducted with the *post hoc* model. Results from this version of the model maintain significant pathways for impulsivity as a determinant of aggression  $b = .42, p < .001$ . Social problem solving again, directly predicts impulsivity  $b = -.49, p < .001$ ; and alcohol dependency does not predict impulsivity  $b = .09, p = .260$ . However, within the Aboriginal sample, alcohol dependency does predict aggression  $b = .16, p = .029$ . In terms of significant pathways, this is the only difference between the Aboriginal and complete sample. Overall, the model accounts for 25% of the variance in general aggression. With respect to the overall fit of the model, results suggest a good fit to the data  $\chi^2$

(1,  $n = 146$ ) = 1.196,  $p = .27$ ; CFI = .99; NFI = .996, SRMR = .01, AIC = 27.20; RMSEA = .036, RMSEALO = .000, RMSEAHI = .223.



Note. \*  $p < .05$  \*\*  $p < .01$

Figure 3.5. Path analysis results for post hoc model of aggression with the Aboriginal subsample  $n = 146$

## CHAPTER 4 DISCUSSION

Numerous cognitive, personality and situational factors have been found to be related to aggression. Understanding how these factors interrelate is essential to predicting violence and critical to the assessment and treatment of offenders with violent histories. The main purpose of this study was to examine the inter-relationships among variables known to influence the likelihood of an aggressive act. Such variables include social problem solving, impulsivity and alcohol dependency.

Whilst many of the hypotheses and relationships among variables emerged as predicted, there were some unanticipated and noteworthy results. These results reveal the intricate relationships among the variables and how collectively and individually they contribute to aggression. The implications of these findings for our understanding of human factors contributing to the study of aggression and for further advancement of treatment programs are provided.

### *4.1. Levels of Endorsement*

Although the levels of impulsivity and aggression in the present study were high relative to a nonoffender sample, they were quite similar to normative data found in previous studies that used these same measures with offender samples (Patton et al., 1995; Cherek, Schnapp, Moeller & Dougherty, 1996). With respect to alcohol dependency, collectively the sample fell within the moderate range. Group differences were present between Aboriginal and non Aboriginal

subsamples with Aboriginal participants endorsing higher levels of alcohol use. Moreover, in terms of social problem solving the overall standard score fell within the normal range of ability.

The impression management scale demonstrated relatively poor reliability in the current study. Overall the current sample had a higher level of impression management than the normative data presented in the original study (Paulhus, 1999). It is not clear as to why the reliability level was low. There were significant differences between Aboriginal and non-Aboriginal offenders on the mean impression management scores, with Aboriginal offenders scoring higher. Currently, normative data is not available for First Nations individuals in Canada. Although it remains unclear as to specific reason for the low reliability, one possible explanation is that the content of the measure may be less appropriate within the current sample of primarily Aboriginal offenders. Perhaps some of the items are not interpreted as intended, as previous research and normative data on this measure has been with undergraduates. For example, the statement “I don’t gossip about other people’s business” may be interpreted differently within an Aboriginal context. Perhaps stronger cultural norms are present with respect to discussing other people’s lives which may then result in a higher endorsement for that item. Other examples include, “I have said something bad about a friend behind his/her back” and “When I hear people talking privately, I avoid listening”. In examining the means for each item, these three items scored higher than the overall mean. If these items, as well as others, are being interpreted differently, then collectively they may contribute to a higher overall mean. The result is an elevated impression management score which may actually represent a difference in cultural interpretation. This may explain the low reliability in that, if some of the items are culturally biased, they may be responded to in a different manner than other items. Therefore, disrupting the internal consistency of the measure and resulting in a lower reliability.

Although the results indicate the impression management scale was not a unitary construct within the current sample, efforts to control for social desirability by partially out its influence were conducted. Only the measures which correlated significantly with impression management were adjusted. Correlations among all of the measures were presented with and without adjusting for impression management. The path analysis results without the adjustment for impression management are presented in Appendix K. Generally speaking, there were few differences in terms of significance between the results with and without the adjustment.

The setting in which the study was conducted is an important element to take into consideration when evaluating impression management and the reliability and validity of responding. Data was collected within two provincial correctional institutions. The researcher was not affiliated with the institution, however worked closely with the program coordinator at each location to help recruit participants. It is possible that the response rate and the specific response style of inmates were affected by the presence of an authoritative figure (i.e. program coordinator) during the data collection. The impression management levels were elevated for Aboriginal offenders, which comprised the majority of the sample, and it is possible that this may have influenced responding. Also, although the participants were explained the confidentiality and anonymity of their responses, there was reluctance to respond and participate in some instances. In a few cases, participants would volunteer to participate, but once beginning to complete the survey they would withdraw from the study, claiming that they were not interested in responding to the questions due to the personal nature of the items. Moreover, a few measures required participants to recall events prior to their incarceration and provide insight as to how they behaved in certain situations. This may have been difficult as participants may not have been able to recall their experiences prior to their incarceration or they may not

have had the insight into their behavior. These are examples of various challenges to the reliability and validity of data within a correctional context.

#### *4.2. Impulsivity*

As predicted, the present study demonstrated a strong positive relationship between impulsivity and aggression in a sample of provincially incarcerated adult male offenders. Coupled with experimental and correlational research, this finding suggests that inhibitory mechanisms which are responsible for controlling or restraining behaviour may be less effective in male offenders with high levels of trait aggression (Cherek et al., 1997a; 1997b; Lane & Cherek, 2000).

Concerning the subtypes of impulsivity, motor, cognitive/attention and nonplanning, all three significantly correlated with aggression. However, due to the low reliability of each subscale in the current study, these results should be interpreted with caution as the purity of the subscales is questionable. Significant correlations with the original BIS subscales suggest that actions associated with impulsivity, versus the unplanned or cognitive components, have the strongest relationship with aggression. Barratt's (1985, 1990) work comparing delinquents and nondelinquents on impulsivity supports the notion that motor impulsivity often displays the highest relationship with aggression. Conversely, other research has maintained that the nonplanning component of impulsivity has the strongest relationship with aggression among delinquents (Luengo et al., 1994). Regardless of the contention that appears with respect to the strongest associated subtypes with aggression, there is a consensus that the cognitive/attention component of impulsivity demonstrates the weakest, albeit still a significant, relationship with aggression. There has been discussion regarding the ability of the BIS-11 to capture the cognitive/attention aspect of impulsivity. A factor analysis of the measure demonstrated that the cognitive/attention subtype loaded on all factors. Luengo et al., (1994) proposed that attempting

to assess the underlying ‘thought processes’ of impulsivity may be difficult to pull apart from the other subtypes especially in a self-report measure (Patton et al., 1995).

Within the current sample, a principal axis factor analysis with oblimin rotation was conducted on the BIS-11 on account of the low reliability scores for each subscales and the inconsistent factor structures presented in the literature (Luengo et al. 1991; Patton et al., 1995). Findings indicate that a four factor structure represents the data in this sample. The four factors include behavioural impulsivity, cognitive aspects, nonplanning aspects and controlled/planned behaviour. The results of the analysis fail to support Barratt’s original factor structure of the BIS (Patton et al., 1995). It does support the notion that subtypes of impulsivity exist; however, the focus of these subtypes is inconsistent with previous literature. Examining the items of the first factor, many of these items are shared with the original motor subscale. Two items, “I spend or charge more than I earn” and “I get easily bored when solving thought problems” are factors from the original nonplanning and cognitive/attention subscales, respectively. The items in this factor tend to focus on behavioural or active aspects of impulsivity. For many of these items the action described is an indication of impulsive behaviour. The fourth factor contains items which are the opposite of impulsive behaviour and represent planned and controlled behaviour. Many of these items are from the original nonplanning subscale; however, they represent the items that are indicating a lack of impulsivity. The internal consistency of factors one and four are acceptable within this sample, .76 and .63 respectively.

The second and third factors are less distinct in terms of what they are capturing. The second factor appears to measure cognitive aspects of impulsivity; however, it does not match up with the original cognitive/attention subscale. Factor 2 appears to represent the negative components of cognitive impulsivity; that is, cognitive items which are related to impulsive actions e.g. “I

have racing thoughts” or “I solve problem by trial and error”. The third factor has three items that appear to represent nonplanning. Although this factor does not represent the original nonplanning subscale, it does share two of the original items. The internal consistency for factors two and three are poor with levels of .22 and .44 respectively.

With some exceptions, the outcome or the valence of the items within each factor appears to be central to each factor. For example, factor one appears to be negative behavioural aspects related to impulsivity; factor two concentrates on negative cognitive aspects of impulsivity; factor three presents as negative nonplanning aspects of impulsivity; and factor four concentrates on positive controlled thoughts related to impulsivity. Many of the factors are not solely based on the process (i.e. cognitive or motor) as in Barratt’s original scales but also on the outcome (i.e. controlled/cautious behaviour, impulsive actions).

Recent work conducted on impulsivity and its subcomponents suggest that instead of the three subcomponents of motor, nonplanning and attention/cognitive impulsivity, impulsivity should be classified as either rapid-response impulsivity or reward-delay impulsivity. Rapid response impulsivity is related to an inability to assess the social context and conform one’s responses to that context. Reward-delay on the other hand, is essentially nonplanning impulsivity and is an inability to delay one’s gratification for a larger reward for a smaller more immediate reward. Research has suggested that rapid response impulsivity is related to trait impulsivity as assessed by an overall BIS scores and has a stronger relationship with personality disturbances (Houston & Stanford, 2005; Houston et al., 2003; Ramirez & Andreu, 2006; Swann et al., 2002).

Although this research fails to support the factor structure of Barratt’s impulsivity scale, it does support the notion that subcomponents of impulsivity exist. Examining each of the four factors it does seem that aspects of cognition, behaviour and nonplanning are related to

impulsivity; however, not in the manner present in the original subscales. Further examination of the BIS factor structure is needed as these results are only supported in the current sample. Furthermore, results regarding the subscales of the BIS are to be interpreted with caution as the underlying subscales are not reliable.

#### *4.3. Social Problem Solving*

The findings of the correlational results in the current study support those of previous studies in that lower levels of social problem solving were associated with higher levels of impulsivity and aggression (Slaby & Guerra, 1988; Evans & Short, 1991; Crick & Dodge, 1994). Much of the literature in this area involves work with adolescent samples. Studies have suggested that adolescents with a history of aggressive acts have deficits in social problem solving ability. Specifically, it is noted that aggressive youths generate fewer effective solutions to problems and the solutions which they offer are qualitatively poor, aggressive and overall ineffective (Akhtaw & Bradley, 1991; Slaby & Guerra, 1988; Evans & Short, 1991; Crick & Dodge, 1994; Keltikangas-Jarvinen, 2001). Of the many qualities of social problem solving, an inability to generate a number of effective nonaggressive solutions, appears to be key in differentiating nonaggressive and aggressive youths (Keltikangas-Jarvinen & Kangas, 1988; Keltikangas-Jarvinen, 2001). Although less research is present on the direct relationship between aggression and social problem solving in adult samples, it has been assumed that a similar link exists. Moreover, many offender treatment interventions are based on the social cognitive or social problem solving framework (Porporino & Beal, 1998). This is in line with the current results indicating a positive relationship between the variables. The results with respect to social problem solving as a mediator were not supported and are described in a subsequent section.

In terms of impulsivity, a relationship with social problem solving was supported. The social problem solving scale utilized in the current study has an impulsivity subscale and even after controlling for the variance affected by the subscale, the negative relationship between impulsivity and social problem solving remains significant. Some researchers have suggested that impulsivity may act as an obstacle in acquiring or utilizing adequate social problem solving skills especially in combination with other deficits such as poor verbal ability or low intelligence (McMurran, Egan, Blair & Richardson, 2001; McMurran et al., 2002).

#### *4.4. Alcohol Dependency*

As predicted, correlations with alcohol dependency exhibited a positive relationship with both aggression and impulsivity. Consistent with previous findings, higher rates of alcohol dependency are commonly found in individuals with higher levels of impulsivity (Patton, Stanford & Barratt, 1995; Allen, Moeller, Rhoades & Cherek, 1998) and aggression (Brady et al., 1998; Moeller, Barratt, Dougherty, Schmitz & Swann, 2001).

The literature offers a number of potential explanations for the relationship between impulsivity and alcohol use or substance abuse more generally. To begin, there is considerable support for the proposition that impulsivity acts as a risk factor for alcohol abuse. Developmental literature has shown that individuals with childhood disorders such as Attention Deficit Hyperactivity Disorder (ADHD) have higher rates of developing substance abuse disorders as adults (Moeller & Dougherty, 2002). ADHD is characterized by impulsivity and it is one of its DSM – IV diagnostic criteria (American Psychiatric Association, 1994). Furthermore, the comorbidity of conduct disorder and ADHD offers an even higher rate of developing a substance abuse disorder as an adult. Clearly, impulsivity appears as a considerable risk factor for the development of substance abuse disorders (Sullivan & Rudnik-Levin, 2001; Moss & Lynch,

2001; Moeller & Dougherty, 2002). Conversely, alcohol abuse has been suggested to increase impulsivity; that is, impulsivity is present because of one's alcohol use or abuse. Both acute and long-term effects have been shown (Giancola, 2000; Dougherty, Moeller, Steinberg et al., 1999; Dougherty, Marsh, Moeller et al., 2000; Moeller & Dougherty, 2002). Again, the results of the alcohol dependency in relation to the model are discussed in a subsequent section.

#### *4.5. Impulsive aggressors versus Premeditated aggressors*

While it was predicted that those individuals classified as impulsive aggressors would score higher on impulsivity than those classified as premeditated, this was not found to be the case. This may have occurred for a number of reasons. To begin, the manner in which individuals were classified as impulsive or premeditated failed to result in two groups that were pure subtypes, as each individual's group assignment was based on the subscale with the highest endorsement. Research on adult and young offenders suggest that approximately 20% of offenders predominately commit either premeditated or impulsive aggressive acts and the remaining 60% commit a combination of these subtypes (Barratt, Feltous, Kent Liebman & Coates, 2000). The classification in the current study has nearly all individuals classified as either impulsive or premeditated aggressors, even though they may represent part of the 60% that commit a combination of subtypes. The resulting groups are therefore not homogenous subtypes as proposed. The heterogeneity of these subgroups may ultimately diminish any differences in impulsivity between true impulsive and premeditated aggressors. In future studies, efforts should be made to triangulate group classification with file reviews examining previous criminal offences. It may be useful to include a third category of individuals who commit both impulsive and premeditated aggression.

Moreover, there is support that impulsivity is not exclusively associated with impulsive aggressors, as research has also linked it with premeditated aggressor subtypes (Barratt et al. 1997; Stanford et al., 2003., Houston & Stanford, 2005). This is supported in the present study, as the relationship between premeditated aggression and impulsivity remains significant while controlling for impulsive aggression and vice versa. That is, high levels of impulsivity are present with elevated levels of either impulsive or premeditated aggression. It is proposed that the key difference between the two groups with respect to impulsivity is the control of one's emotional state. Individuals high on impulsivity and that are premeditated aggressors may participate in aggressive behaviour; however, the action is controlled and not related to their current emotional state. This is in contrast to impulsive aggressors, where it is thought that a lack of control results from the fuelling of emotions and the affective components of aggression such as anger, irritability and hostility (Houston & Stanford, 2005). It appears that higher levels of impulsivity may be present in both subtypes, but it may be the manner in which it manifests itself with respect to aggressive acts that differentiates the subtypes (i.e. level of emotional control). The route in which impulsivity interacts with aggressor subtypes appears to be more complex than originally predicted. Findings are preliminary and further work is needed to replicate this work and to refine these distinctions in aggressive subtypes.

In an exploratory analysis between aggressive subtypes, one significant finding involved participant's level of alcohol use. Those classified as impulsive aggressors had a higher level of self-rated alcohol use. They also drank alcohol more days per week and drank more than 5 drinks more days per week than the premeditated group. If it is known that impulsivity is associated positively with alcohol use and in light of the discussion in the previous section one could speculate, that in a particular situation, alcohol use may contribute to increased impulsivity. This

would result in a lack of behavioural control with respect to one's emotional state, with the outcome potentially resulting in an impulsive aggressive act.

#### *4.6. Mediation Model of Aggression*

Multiple regression was utilized to examine the potential relationships among variables prior to conducting the path analyses for each model of aggression. With respect to the assessing the mediational role of social problem solving with aggression and impulsivity, the multiple regression results would have been sufficient to examine this relationship. That is, there was some redundancy in conducting both types of analyses as they examine and present similar results. Path analyses, being an extension of multiple regression, allows the researcher to examine more complicated relationships, direct and indirect pathways, among social problem solving, alcohol dependency, impulsivity and aggression, and not solely the mediational relationship (Streiner, 2006). Moreover, relationships between the independent variables can also be assessed. In the proposed model, the direct pathway between social problem solving and alcohol dependency was set to zero to allow one degree of freedom in order to test how well the model fit the data. Another benefit of path analysis is assessing competing models as various indices allow for model comparisons to assess the best fit (Streiner, 2006).

Four models of aggression were assessed in the present study utilizing path analysis. Two proposed models were examined to assess the role of social problem solving as a mediating variable in its relationship with impulsivity and aggression. This model was examined with the complete sample and with a subsample of only Aboriginal offenders. Two *post hoc* models were also examined to assess the role of impulsivity as a mediating variable in its relationship with impulsivity and aggression. The *post hoc* model was also examined with both the complete sample and with a subsample of only Aboriginal offenders. For the most part, results between

the complete sample and Aboriginal subsample were quite similar. Therefore, general discussion of the results relate to both samples. Any differences in results between Aboriginal and non Aboriginal subsamples are discussed separately.

Although the preliminary model resulted in an adequate fit for the data, for both the complete and Aboriginal subsample, (Figure 3.2) the results were not encouraging for the proposition that social problem solving functions as a mediator between impulsivity and aggression. While there were significant relationships between impulsivity and aggression and impulsivity and social problem solving, there were also nonsignificant pathways between social problem solving and aggression and alcohol dependency and aggression.

Despite the documented findings regarding its role with aggression, social problem solving failed to act as a mediator or show a direct relationship with impulsivity within the current sample. These results were confirmed by a series of regression analyses. McMurran et al., (2002) have previously examined similar relationships between social problem solving, alcohol dependency and impulsivity in a sample of undergraduates. Findings suggested that problem solving exerted the most influence on aggression and it was proposed that regardless of impulsivity level, if strong social problem solving skills are present the likelihood of aggression diminishes. There are however, a number of reasons low levels of poor social problem solving may be present in an individual. First, poor social problem solving may be a result of an inhibition of skill; that is, a person may have the ability to problem solving effectively but is not able to implement that knowledge or skill. Another reason may be a true lack or deficit of social problem solving ability. Developmentally, the individual may not have acquired a sufficient ability in order to function effectively (McGuire, 2001). Acknowledging that social problem solving deficits may present in a number of different ways may help us better understand the

dynamics of social problem solving. It appears that being low on social problem solving ability is related to higher levels of aggression and impulsivity, but social problem solving does not appear to account for much of the relationship between impulsivity and aggression.

Despite the contrary findings, McMurrin et al., (2002) acknowledged that impulsivity may contribute to the relationship between social problem solving and aggression developmentally by inhibiting a child's development of effective social problem solving skills. This is in line with the current study and was the impetus for the development of the *post hoc* model. It is thought that one's level of impulsivity could greatly influence one's social problem solving ability and ultimately affect the likelihood of an aggressive act occurring. It is proposed that social problem solving impacts on aggression only in as much as it affects (controls or inhibits) an one's impulsivity, or conversely, that one's degree of impulsivity can negate any progress or ability to problem solving.

The *post hoc* model was developed taking into account much of the literature suggesting impulsivity's prominent role with aggression and its significant relationship with social problem solving (Cherek et al., 1997a; Cherek et al., 1997b; Guerra and Slaby, 1990; Lane & Cherek, 2000; McMurrin et al., 2002). Gottfredson and Hirschi (1990) claim that the concept of impulsivity or dyscontrol plays a major role in understanding criminality and have proposed impulsivity as the fundamental factor contributing to criminal behaviour.

Moreover, exploratory regression analysis indicated that impulsivity may be acting as a mediator in its relationship with social problem solving and aggression. Therefore, a revised *post hoc* model (Figure 3.3) was developed which situates impulsivity as a mediating variable between social problem solving and aggression and between alcohol dependency and aggression.

In terms of considering the role of alcohol dependency in the *post hoc* model, a direct pathway was considered as literature suggests a direct effect on aggression. A number of laboratory studies have examined a causal link with alcohol use and aggression (Bushman & Cooper, 1990; Chermack & Taylor, 1995; Chermack & Giancola, 1997; Laplace, Chermack & Taylor, 1994). Additionally, when conducting a path analysis, it is necessary to allow for at least one degree for freedom in order to test the fit of the model. In order to fulfill the requirement, the pathway from social problem solving and aggression was set to zero. This was evaluated on the basis that social problem solving had no direct effect with aggression in the proposed model and that it was expected to contribute indirectly through its mediational relationship with impulsivity, as discussed above. Examining impulsivity and aggression with similar measures as in the current study, Fulwiter, Eckstein and Kalsy (2005) examined these variables before and after the consumption of alcohol. The authors suggested that impulsivity may play a mediating role in its effects of alcohol on aggression. In evaluating the literature and within the constraints of path analysis, a direct pathway from alcohol to aggression and an indirect pathway from alcohol dependency to aggression were considered in the *post hoc* model.

Results from the path analysis of the *post hoc* model, in both the full sample and Aboriginal subsample, revealed significant pathways between social problem solving and impulsivity and social problem solving and aggression. Broken down these results indicate that social problem solving significantly predicts impulsivity and that impulsivity significantly predicts aggression. It appears from both of these models that impulsivity may be acting as a mediator in its relationship with social problem solving and aggression. Exploratory analyses examining the regression analyses of social problem solving, impulsivity and aggression support this finding. Moreover, fit indices indicated that the revised model was a better fit to the data. It

is thought that one's level of impulsivity could greatly influence one's social problem solving ability and ultimately affect the likelihood of an aggressive act occurring. Although further research and replication is needed, based on these preliminary results it appears that social problem solving impacts aggression only in as much as it affects controls an offender's impulsivity. Impulsivity appears to mediate the relationship in this triad of variables in accounting for much of the relationship. This is groundwork to further examine the notion that one's degree of impulsivity can negate any progress in social problem solving ability and supports previous work by McMurrin et al., (2002) acknowledging the role impulsivity plays in the inhibition of effective social problem solving skills. Results are *post hoc* and these preliminary results must be replicated before conclusive findings may be stated.

With respect to alcohol dependency, in the complete sample with both the proposed and *post hoc* models, neither direct nor indirect relationships were found with alcohol and aggression; although the direct pathway approached significance in the *post hoc* model. This finding counters the current literature which suggests a positive relationship between aggression and alcohol use or even that alcohol may predict aggression (Bushman & Cooper, 1990; Chermack & Taylor, 1995; Chermack & Giancola, 1997; Laplace, Chermack & Taylor, 1994). However, within the subsample of Aboriginal offenders, in the *post hoc* model, the direct pathway from alcohol dependency to aggression was significant. This suggests that alcohol dependency within this sample predicts aggression. This is inline with the literature indicating a relationship between alcohol and aggression (Bushman & Cooper, 1990; Chermack & Taylor, 1995; Chermack & Giancola, 1997; Laplace, Chermack & Taylor, 1994). Again, the results are preliminary and further research is needed before conclusive statements can be made.

Group differences were present in terms of alcohol use between Aboriginal offenders and non Aboriginal offenders. Specifically, the Aboriginal offenders had higher levels of self-reported alcohol use. This is relevant even though the models that were tested were on the complete sample and an Aboriginal subsample and not a comparison of between Aboriginal and non Aboriginal subsamples. This indicates that as a complete sample, group differences weakened the effect of alcohol dependency on aggression. The subsample of Aboriginal offenders is a more homogenous group with elevated levels of alcohol use.

Although only preliminary, it appears that any influence alcohol dependency has on aggression is through a potentially direct relationship. Within the current study, this finding is only present within Aboriginal offenders with high levels of alcohol dependency. Alcohol does not significantly predict impulsivity in either *post hoc* model with either the complete sample nor Aboriginal sample. Correlational results from this study indicate a positive relationship between alcohol dependency and impulsivity. The direction of the relationship from the path analysis results remains uncertain as results are present within a subsample of the population. The proposed model however, indicates that impulsivity significantly predicted alcohol dependency but the reverse is not true, alcohol dependency does not predict impulsivity. The results regarding the direction of the relationship between impulsivity and alcohol need to be replicated before any conclusive statements can be made.

In terms of limitations in assessing alcohol use, the measure utilized in the current study assessed alcohol dependency. Research reports that acute alcohol consumption is more strongly related to aggression than alcohol dependency (Collins & Schlenger, 1988). Therefore, it is possible that assessing acute alcohol consumption rather than alcohol dependency would result in significant results and pathways to aggression within the complete sample or subsequent

samples. This is something to be considered in future studies examining the relationship between aggression and alcohol in offenders.

Taken together these data suggest social problem solving, alcohol dependency and impulsivity are all important in understanding and predicting aggression. Social problem solving does not appear to act as a mediator in the relationship with impulsivity and aggression within this sample. However, preliminary results suggest that impulsivity, may serve the function in this relationship and in the manifestation of aggression. Alcohol dependency appears to play a direct role. Indicated in the *post hoc* model with Aboriginal offenders, alcohol dependency significantly predicted aggression. No such relationship was found with the complete sample. This speaks to the heterogeneity of violent offender and the importance of considering subsample characteristics in order to ensure successful treatment.

#### *4.7. Practical Application of Findings*

If *post hoc* results are replicated, the results of current research may have implications for the assessment and treatment of violent offenders. Findings suggest that social problem solving, alcohol dependency and impulsivity are all important in understanding and predicting aggression. Preliminary results from the current study suggest that impulsivity may have a considerable function in its manifestation. If the results are replicated in subsequent studies, this may suggest that treatment programs should consider assessing the role of impulsivity in an offender's crime cycle and subsequently incorporate behavioural methods to decrease impulsivity as part of the curriculum of violent offender programming. Specifically, the findings of the current study, favouring the *post hoc* model, suggest that clinicians and program developers should consider examining the role of an offender's impulsivity is addressing their needs in treatment. From this model, it is proposed that social problem solving impacts on

aggression only in as much as it affects (controls or inhibits) an offender's impulsivity, or conversely, that one's degree of impulsivity can negate any progress in social problem solving if left unaddressed. If this is truly the case, the sequence of treatment may also be important. It may be beneficial to treat impulsivity first and then social problem solving. Otherwise social problem solving will be ineffective in its impact on aggression.

Also, this study speaks to the heterogeneity of violent offenders and to the importance of responding to specific criminogenic needs in treatment. To exemplify this case, note that the relationship between alcohol dependency and aggression was only present within the subsample of Aboriginal offenders. If treatment was based on the results for the complete sample, where no such relationship was found, the criminogenic need of substance abuse may not have been addressed. In line with the principles of effective correctional treatment, considering the specific needs of a subpopulation or type of offenders is essential to success of treatment programs for violent offending (Andrews & Bonta, 2003).

#### *4.8. Limitations and Future Considerations*

Clearly, there are some limitations to this research. As previously discussed Aboriginal offenders are currently overrepresented in the current sample. Although Aboriginal offenders are overrepresented within the federal and provincial correctional systems in Canada, the magnitude of that overrepresentation is much higher in the current study. Aboriginal offenders represent 18.7% of the incarcerated population in Canada, and within the current study, they account for 85% of the sample (Public Safety and Emergency Preparedness Canada, 2006). The sample may reflect a central and northern Saskatchewan population and therefore these findings are limited in terms of their generalizability to other regions of Canada and their largely Caucasian populations.

It is important to note the differences in alcohol dependency that were present within the sample. Aboriginal offenders, which constituted 85% of the sample, reported a higher level of alcohol dependency and a higher self-rated level of alcohol use, than non Aboriginal offenders. The number of non Aboriginal offenders in the sample was quite small relative to Aboriginal offenders and anecdotal evidence from the data collection support the findings that non-Aboriginal offenders have lower rates of alcohol dependency or use. A number of non Aboriginal offenders, either verbally or by written comments, suggested that drug use and not alcohol use was a concern relating to their offending behaviour. Qualitatively and quantitatively there appears to be differences between these subgroups, which may ultimately affect the interpretation and generalizability of the findings.

Furthermore, the reliance on self-report measures may be a limitation, as participants may be sensitive to social desirability. Attempts were made, however, to control for this by the inclusion of a social desirability measure. It is often noted that participants, when completing self-report measures, may deny the extent of their aggression or other socially undesirable behaviour. A study by Richardson and Green (2003), examining this impression management bias, compared self-report data on aggressive acts with a peer report from an individual who knew the respondent well and with whom they have had a recent angry episode. Results suggested that although rates were lower, that is there was hesitation to reveal aggressive behaviour, rates between self-report and peer reports were positively related. This suggests that self-report measures are adequate in providing valid responses regarding socially unacceptable behaviour.

A further limitation is that the design of the study was cross-sectional. Differences between types of offenders, therefore, were not examined. Research on aggression supports the

heterogeneity of violent offenders and one cannot assume that all violent offender subtypes exhibit the same cognitive and personality characteristics (Serin & Kuriychuk, 1994). Separate path analyses were originally proposed to examine how social problem solving, impulsivity and aggression interact within subsamples of impulsive aggressors and premeditated aggressors. However, the relatively small sample size precluded us from performing these additional analyses for each subtype of aggression and more generally from performing sophisticated analyses such as structural equation modeling. Consequently, future analyses should consider various subgroups such as domestic abusers, impulsive aggressors and premeditated aggressors. In the present study, group categories were based on a self-report measure; however, future research should attempt to triangulate group designation with additional information such as previous convictions and offence history.

In utilizing path analysis with multiple regression or AMOS for the analysis of the models, it is important to note that competing models may be compatible with the same set of data (Hoyle & Panter, 1995; Pedhazur, 1982). In addition, it is important to acknowledge that the second path analysis model was conducted *post hoc* and therefore can only be considered to be preliminary. Future studies should look to replicate the current findings and to assess further the roles of such variables *a priori* and their relation to aggression in an offender sample.

Multiple *t*-tests were used to assess potential differences for each variable with respect to ethnicity (Table 3.5) and institutional location (Table 3.6). These analyses were *post hoc* and involved multiple comparisons. In an attempt to control for Type 1 errors, the critical level was adjusted and all results were assessed against the new critical value which resulted in a more conservative assessment of the comparisons. When designing studies to further examine these variables in relation to aggression, comparisons between ethnic groups and location ought be

considered *a priori*. This is recommended, as offender samples constitute a heterogeneous group and being cognizant of within group differences will provide a more accurate assessment and interpretation of results. It is evident from the Table 3.5 and Table 3.6 that a number of comparisons, namely alcohol dependency and level of impulsive aggression, would have been significant if a critical level of  $\alpha = .05$  had been used. Although we are limited in terms of interpretation based on statistical significance, acknowledging the potential qualitative differences between subsamples, either between ethnicities or institutions, is imperative to our understanding of the findings.

#### *4.9. Future Directions*

In addition, a number of other interesting variables known to influence aggression may be considered in future studies. Such variables include age as a covariate, as impulsivity levels are known to be related to age, specifically higher levels of impulsivity being present in younger individuals (D’Zurilla et al., 2002). Moreover, drug abuse versus alcohol dependency was often discussed by some participants with respect to their aggressive acts. Again, this would speak to the heterogeneity of violent behaviour; perhaps those who consume drugs have different patterns of behaviour than those who solely consume alcohol. Considering drug use as a separate variable in addition to alcohol use, could further supplement our understanding of factors related to aggression.

Furthermore, as stated in a previous section, future studies should look to replicate the current findings and to assess further the roles of social problem solving, impulsivity, alcohol dependency *a priori* and their relation to aggression in an offender sample.

#### 4.10. General Conclusions

Social problem solving, impulsivity and alcohol dependency were all related to aggression in a predictable fashion. Specifically, higher levels of impulsivity and alcohol dependency and lower levels of social problem solving were related to higher levels of aggression. The specifics of how these three variables interacted were not predicted correctly. Particularly, the hypothesis that social problem solving acts as a mediator in its relationship with impulsivity and aggression was not supported in the present study. *Post hoc* analyses suggest that impulsivity may be a key player in this relationship however, until results are replicated and further investigation of its role is conducted, results are only suggestive.

With respect to the relationship between aggression and alcohol dependency, again the evidence indicates a positive correlation between the variables. However, upon examining whether a casual, direct or indirect relationship between these variables was present, results were nonsignificant within the complete sample. However, the direct pathway was significant in the Aboriginal sample whom had a higher level of alcohol use than the non Aboriginal offenders. Alcohol dependency appears to play a role with aggression; however, the results are preliminary and outstanding questions remain regarding its role in predicting aggression in an offender sample

Taken together these findings appear to be consistent with much of the literature supporting relationships among impulsivity, social problem solving, alcohol dependency and aggression. Furthermore, all variables play an important role in understanding and even predicting aggression. These findings reinforce the notion that cognitive, personality and situational variables play a considerable role in the manifestation of aggression. As the quotation at the beginning of the thesis states, there are a multitude of factors which contribute to aggression that do not appear to operate in isolation. Understanding how these factors interrelate

is essential to predicting violence and critical to the assessment and treatment of offenders with violent histories. Efforts to understand these complex relationships will continue to be of interest to researchers in the years to come.



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APPENDIX A  
 CONSENT FORM



**Consent Form**

**Aggression and the inter-relations of impulsivity,  
 social problem solving and alcohol use.**

You are invited to participate in a study about a possible link between violence and factors such as a person's impulsiveness, ability to solve problems and alcohol use. Please read this form carefully and feel free to ask questions you might have. The purpose of this consent form is to describe the study to you and to obtain your permission to take part in it.

<b>Student Researcher:</b>	Dena Derkzen – Tel: (306) 966 – 6719 Email: dena.derkzen@usask.ca Department of Psychology, University of Saskatchewan
<b>Faculty Supervisor:</b>	Dr. Stephen Wormith – Tel: (306) 966 – 6818 Email: wormith@duke.usask.ca Department of Psychology, University of Saskatchewan

**Purpose and Procedure:** The purpose of this study is to understand some of the factors that might be related to aggression in offenders. We would like to give you 6 questionnaires that will require about 45 - 60 minutes to answer.

Some examples of the types of questions that may be asked include:

Please choose the word that describes you the best.

- |  |        |              |       |        |
|--|--------|--------------|-------|--------|
| 1. I have no trouble controlling my temper.                | Rarely | Occasionally | Often | Always |
| 2. I like to spend my money.                               | Rarely | Occasionally | Often | Always |
| 3. I like to move from job to job.                         | Rarely | Occasionally | Often | Always |
| 4. I hate having to solve the problems that occur in life. | Rarely | Occasionally | Often | Always |

**Potential Risks:** You should not experience any negative consequences by participating in this study.

**Potential Benefits:** By taking part in this study, you may help increase our knowledge about the causes of violence and aggression. More specifically, your participation may increase our understanding of the relationship between a person's impulsiveness, ability to solve problems, alcohol use and aggression. This may ultimately help to improve the development and quality of community and facility treatment programs.

**Right to Withdraw:** Your participation in this project is entirely voluntary and you are free to withdraw or choose not to complete these questionnaires at any time. Deciding to withdraw or choosing not to participate in the study will have no negative consequences and will have no affect on your treatment by the staff at your correctional institution. If you withdraw from the study, any information that you have contributed will be destroyed.

**Confidentiality:** Your answers to the questions are private; you are asked to NOT put your name or any other identifying information on the questionnaire. Therefore, nobody, including the researcher, will know how you answered any questions. Although every effort will be made to ensure confidentiality and anonymity, because the questionnaire may be completed in a classroom setting this cannot be assured. During recruitment you may be identified as a participant if you agree to volunteer in this study. The information gathered from this study may be presented in journal articles and conference presentations however; all of the responses will be reported in a summarized/aggregate form which will NOT allow you to be identified. A summary of the results will be provided to your unit and/or institution upon completion of this project.

**Storage of Data:** If you chose to participate your responses will be held confidential and only the researchers will have access to the completed surveys, which will be securely stored by the research supervisor at the University of Saskatchewan for a minimum of five years upon completion of the study.

**Questions:** If you have any questions concerning the study, please feel free to ask at any point; you are also free to contact the researchers at the number provided below if you have any questions at a later time.

This project was approved by the University of Saskatchewan, Behavioural Ethics Research Board on (June 16<sup>th</sup>, 2005). If you have any questions or concerns about this survey or your rights as a participant in this survey or your participation in this study, please contact Dena Derkzen at (306) 966 – 6719 [e-mail: dena.derkzen@usask.ca] or Office of Research Services, (306) 966 – 2084. Collect calls are accepted by the Office of Research Services. You may contact the researcher at the address below if you would like the results of the study. Please take a moment to decide if you want to participate.

**Consent to Participate:** I have read and understood the description provided above. I have been provided with an opportunity to ask questions and my questions have been answered satisfactorily. I consent to participate in the study described above, understanding that I may withdraw this consent at any time. A copy of this consent form has been given to me for my records.

\_\_\_\_\_ Date: \_\_\_\_\_  
Signature of Participant

\_\_\_\_\_  
Signature of Researcher  
Dena Derkzen  
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9 Campus Drive,  
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APPENDIX B

GENERAL AGGRESSION MEASURE

BPAQ (Buss & Perry, 1992).

Instructions: Using the 5 point scale shown below, read the following items and decide to what extent each statement is like or unlike you. Please indicate your rating by circling the corresponding number to the right of each statement.	Very unlike me ▼	Somewhat unlike me ▼	Neither unlike me nor like me ▼	Somewhat like me ▼	Very like me ▼
1. Some of my friends think I am a hothead.	1	2	3	4	5
2. If I have to resort to violence to protect my rights, I will.	1	2	3	4	5
3. When people are especially nice to me, I wonder what they want.	1	2	3	4	5
4. I tell my friends openly when I disagree with them.	1	2	3	4	5
5. I have become so mad that I have broken things.	1	2	3	4	5
6. I can't help getting into arguments when people disagree with me.	1	2	3	4	5
7. I wonder why sometimes I feel so bitter about things.	1	2	3	4	5
8. Once in a while, I can't control the urge to strike another person.	1	2	3	4	5
9. I am an even-tempered person.	1	2	3	4	5
10. I am suspicious of overly friendly strangers.	1	2	3	4	5
11. I have threatened people I know.	1	2	3	4	5
12. I flare up quickly but get over it quickly.	1	2	3	4	5
13. Given enough provocation, I may hit another person.	1	2	3	4	5
14. When people annoy me, I may tell them what I think of them.	1	2	3	4	5
15. I am sometimes eaten up with jealousy.	1	2	3	4	5
16. I can think of no good reason for ever hitting a person.	1	2	3	4	5
17. At times I feel I have gotten a raw deal out of life.	1	2	3	4	5

	Very unlike me ▼	Somewhat unlike me ▼	Neither unlike me nor like me ▼	Somewhat like me ▼	Very like me ▼
18. I have trouble controlling my temper.	1	2	3	4	5
19. When frustrated, I let my irritation show.	1	2	3	4	5
20. I sometimes feel that people are laughing at me behind my back.	1	2	3	4	5
21. I often find myself disagreeing with people.	1	2	3	4	5
22. If somebody hits me, I hit back.	1	2	3	4	5
23. I sometimes feel like a powder keg ready to explode.	1	2	3	4	5
24. Other people always seem to get the breaks.	1	2	3	4	5
25. There are people who pushed me so far that we came to blows.	1	2	3	4	5
26. I know that 'friends' talk about me behind my back.	1	2	3	4	5
27. My friends say that I'm somewhat argumentative.	1	2	3	4	5
28. Sometimes I fly off the handle for no good reason.	1	2	3	4	5
29. I get into fights a little more than the average person.	1	2	3	4	5

## APPENDIX C

### IMPULSIVE PREMEDITATED AGGRESSION SCALE IPAS (Stanford et al., 2003).

Instructions: When people become frustrated, angry or enraged they express that anger in a variety of ways. An aggressive act is defined as striking and/or verbally insulting another person or breaking/throwing objects because you were angry or frustrated. Take a minute and think about your aggressive acts during your last 6 months in the community. Now please answer the following questions with these aggressive acts in mind. Please indicate your rating by circling the corresponding number to the right of each statement.

	Strongly Disagree ▼	Disagree ▼	Neutral ▼	Agree ▼	Strongly Agree ▼
1. I planned when and where my anger was expressed.	1	2	3	4	5
2. I felt my outbursts were justified.	1	2	3	4	5
3. When angry I reacted without thinking.	1	2	3	4	5
4. I typically felt guilty after the aggressive acts.	1	2	3	4	5
5. I was in control during the aggressive acts.	1	2	3	4	5
6. I feel my actions were necessary to get what I wanted.	1	2	3	4	5
7. I usually can't recall the details of the incidents well.	1	2	3	4	5
8. I understood the consequences of the acts before I acted.	1	2	3	4	5
9. I feel I lost control of my temper during the acts.	1	2	3	4	5
10. Sometimes I purposely delayed the acts until a later time.	1	2	3	4	5
11. I felt pressure from others to commit the acts.	1	2	3	4	5
12. I wanted some of the incidents to occur.	1	2	3	4	5
13. I feel some of the incidents went too far.	1	2	3	4	5
14. I think the other person deserved what happened to them during some of the incidents.	1	2	3	4	5
15. I became agitated or emotionally upset prior to the acts.	1	2	3	4	5

	Strongly Disagree ▼	Disagree ▼	Neutral ▼	Agree ▼	Strongly Agree ▼
16. The acts led to power over others or improved social status for me.	1	2	3	4	5
17. I was under the influence of alcohol or other drugs during the acts.	1	2	3	4	5
18. I knew most of the persons involved in the incidents.	1	2	3	4	5
19. I was concerned for my personal safety during the acts.	1	2	3	4	5
20. Some of the acts were attempts at revenge.	1	2	3	4	5
21. I feel I acted out aggressively more than the average person over the last six months.	1	2	3	4	5
22. I was confused during the acts.	1	2	3	4	5
23. Prior to the incidents I knew an altercation was going to occur.	1	2	3	4	5
24. My behaviour was too extreme for the level of provocation.	1	2	3	4	5
25. My aggressive outbursts were usually directed at a specific person.	1	2	3	4	5
26. I consider the acts to have been impulsive.	1	2	3	4	5
27. I was in a bad mood the day of the incident.	1	2	3	4	5
28. The acts were a "release" and I felt better afterwards.	1	2	3	4	5
29. I am glad some of the incidents occurred.	1	2	3	4	5
30. Anything could have set me off prior to the incidents.	1	2	3	4	5

APPENDIX D

IMPULSIVITY MEASURE

BIS – 11 (Patton, Stanford & Barratt, 1995).

<p>Directions: People differ in the ways they act and think in different situations. This is a test to measure some of the ways in which you act and think. Read each statement and place a check in the appropriate box on the right side of the page. Do not spend too much time on any statement. Answer quickly and honestly.</p>		Rarely/Never	Occasionally	Often	Always
1.	I plan tasks carefully.				
2.	I do things without thinking.				
3.	I am happy-go-lucky.				
4.	I have "racing" thoughts.				
5.	I plan trips well ahead of time.				
6.	I am self-controlled.				
7.	I concentrate easily.				
8.	I save regularly.				
9.	I find it hard to sit still for long periods of time.				
10.	I am a careful thinker.				
11.	I plan for job security.				
12.	I say things without thinking.				
13.	I like to think about complex problems.				
14.	I change jobs.				
15.	I act "on impulse".				
16.	I get easily bored when solving thought problems.				
17.	I have regular medical/dental checkups.				
18.	I act on the spur of the moment.				
19.	I am a steady thinker.				
20.	I change where I live.				
21.	I buy things on impulse.				
22.	I finish what I start.				
23.	I walk and move fast.				
24.	I solve problems by trial-and-error.				
25.	I spend or charge more than I earn.				
26.	I talk fast.				
27.	I have outside thoughts when thinking.				
28.	I am more interested in the present than the future.				
29.	I am restless at lectures or talks.				
30.	I plan for the future.				

APPENDIX E

ALCOHOL USE

Alcohol Related Questions (McMurrin et al., 2003)

This section asks you some questions about your drinking habits PRIOR to your custody. Please answer the questions as honestly as you can.

1. How many days per week did you drink alcohol?

0      1      2      3      4      5      6      7

2. How many days per week did you drink more than five drinks?

0      1      2      3      4      5      6      7

3. How would you have rated yourself as a drinker: non-drinker, light drinker, moderate drinker, or a heavy drinker?

Non-Drinker      Light      Moderate      Heavy

## APPENDIX F

### ALCOHOL DEPENDENCY

#### SADD (Davidson & Raistrick, 1986; Raistrick et al., 1983)

**Instructions:** The following questions cover a wide range of topics having to do with drinking. Please read each question carefully, but do not think too much about its exact meaning. Think about your drinking habits PRIOR to your custody and answer each question by circling the most correct answer.

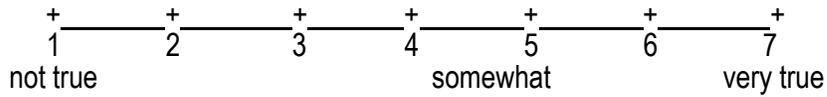
	Never ▼	Sometimes ▼	Often ▼	Nearly Always ▼
1. Do you find difficulty in getting the thought of drinking out of your mind?	0	1	2	3
2. Is getting drunk more important than your next meal?	0	1	2	3
3. Do you plan your day around when and where you can drink?	0	1	2	3
4. Do you drink in the morning, afternoon, and evening?	0	1	2	3
5. Do you drink for the effect of alcohol without caring what the drink is?	0	1	2	3
6. Do you drink as much as you want irrespective of what you are doing the next day?	0	1	2	3
7. Given that many problems might be caused by alcohol, do you still drink too much?	0	1	2	3
8. Do you know that you won't be able to stop drinking once you start?	0	1	2	3
9. Do you try to control your drinking by giving it up completely for days or weeks at a time?	0	1	2	3
10. The morning after a heavy drinking session do you need your first drink to get yourself going?	0	1	2	3
11. The morning after a heavy drinking session do you wake up with a definite shakiness of your hands?	0	1	2	3
12. After a heavy drinking session do you wake up and retch or vomit?	0	1	2	3
13. The morning after a heavy drinking session do you go out of your way to avoid people?	0	1	2	3
14. After a heavy drinking session do you see frightening things that later you realize were imaginary?	0	1	2	3
15. Do you go drinking and the next day and find that you have forgotten what happened the night before?	0	1	2	3

APPENDIX G

IMPRESSION MANAGEMENT

IM scale from BIDR Version 6  
(Paulhus, D.L., 1995)

Using the scale below as a guide, write a number beside each statement to indicate how true it is.



- \_\_\_ 1. I never cover up my mistakes.
- \_\_\_ 2. There have been occasions when I have taken advantage of someone.
- \_\_\_ 3. I always obey laws, even if I'm unlikely to get caught.
- \_\_\_ 4. I have said something bad about a friend behind his/her back.
- \_\_\_ 5. When I hear people talking privately, I avoid listening.
- \_\_\_ 6. I have received too much change from a salesperson without telling him or her.
- \_\_\_ 7. When I was young, I sometimes stole things.
- \_\_\_ 8. I have never dropped litter on the street.
- \_\_\_ 9. I never look at sexy books or magazines.
- \_\_\_ 10. I have done things that I don't tell other people about.
- \_\_\_ 11. I have pretended to be sick to avoid work or school.
- \_\_\_ 12. I don't gossip about other people's business.

## APPENDIX H

### OFFENCE HISTORY AND DEMOGRAPHICS

**General Information.** This section asks some general questions about you. However, the information you provide cannot be used to identify you.

1. Have you ever been convicted of any of the following violent offences. If so, please indicate which offences by checking the appropriate box beside each item. Also, please indicate whether the offence occurred in the community or in an institution by checking the correct box to the right of each item.

Convictions (please check all that apply)	Location of Offence	
<input type="checkbox"/> Armed Robbery	<input type="checkbox"/> Community	<input type="checkbox"/> Institution
<input type="checkbox"/> Robbery with violence	<input type="checkbox"/> Community	<input type="checkbox"/> Institution
<input type="checkbox"/> Attempted Murder	<input type="checkbox"/> Community	<input type="checkbox"/> Institution
<input type="checkbox"/> Causing bodily harm with intent to wound	<input type="checkbox"/> Community	<input type="checkbox"/> Institution
<input type="checkbox"/> Kidnapping	<input type="checkbox"/> Community	<input type="checkbox"/> Institution
<input type="checkbox"/> Abduction	<input type="checkbox"/> Community	<input type="checkbox"/> Institution
<input type="checkbox"/> Forcible Confinement	<input type="checkbox"/> Community	<input type="checkbox"/> Institution
<input type="checkbox"/> Aggravated Assault	<input type="checkbox"/> Community	<input type="checkbox"/> Institution
<input type="checkbox"/> Choking	<input type="checkbox"/> Community	<input type="checkbox"/> Institution
<input type="checkbox"/> Administering a noxious thing	<input type="checkbox"/> Community	<input type="checkbox"/> Institution
<input type="checkbox"/> Assault causing bodily harm	<input type="checkbox"/> Community	<input type="checkbox"/> Institution
<input type="checkbox"/> Assault with a weapon	<input type="checkbox"/> Community	<input type="checkbox"/> Institution
<input type="checkbox"/> Assault	<input type="checkbox"/> Community	<input type="checkbox"/> Institution
<input type="checkbox"/> Assaulting a police officer	<input type="checkbox"/> Community	<input type="checkbox"/> Institution
<input type="checkbox"/> Murder	<input type="checkbox"/> Community	<input type="checkbox"/> Institution
<input type="checkbox"/> Manslaughter	<input type="checkbox"/> Community	<input type="checkbox"/> Institution
<input type="checkbox"/> Criminal negligence causing death	<input type="checkbox"/> Community	<input type="checkbox"/> Institution
<input type="checkbox"/> I have never been convicted of any of the above listed offences		

2. Have you ever had any violent convictions involving domestic violence (wife, spouse or partner)?

Yes                       No

→ a. If yes, how many convictions for domestic violence have you had?  
\_\_\_\_\_

3. Have you ever had any "institutional misconducts" for violent behaviour (e.g. fighting with other inmates, assaulting staff etc.)?

Yes                       No

→ a. If yes, how many violent institutional misconducts have you had?  
\_\_\_\_\_

4. Current Institution:

- Saskatoon Correctional Centre (SCC)
- Prince Albert Correctional Centre (PACC)

5. What are your current charges or convictions?

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6. Please indicate your ethnicity:

- First Nations
- Métis
- Inuit
- Caucasian
- Black
- Hispanic
- East Indian
- Asian: please specify \_\_\_\_\_
- Other: please specify \_\_\_\_\_

7. Highest level of education/grade completed \_\_\_\_\_

8. Please indicate your age: \_\_\_\_\_ years

Thank you for completing this Questionnaire!

APPENDIX I

CORRELATIONS WITH UNTRANSFORMED AGGRESSION MEASURE

Table I.1

	Aggression BPAQ	Impulsivity BIS	Alcohol Dependency SADD	Social Problem Solving SPSI	Impulsive Aggression IPAS: IA	Premeditated Aggression IPAS: PM
Aggression BPAQ	--					
Impulsivity BIS	.424**	--				
Alcohol Dependency SADD	.220**	.231**	--			
Social Problem Solving SPSI	-.332**	-.571**	-.369**	--		
Impulsive Aggression IPAS: IA	.527**	.379**	.339**	-.500**	--	
Premeditated Aggression IPAS: PM	.491**	.391**	.177*	-.321**	.364**	--
Impression Management IM	-.245**	-.190*	.018	.152*	-.158*	-.169*

*Pearson Correlation Coefficients Among Variables (N = 179)*

Note. \*  $p < .05$  \*\*  $p < .01$ ; <sup>TR</sup> = Transformed <sup>ZRES</sup> = Standardized Residuals

APPENDIX J

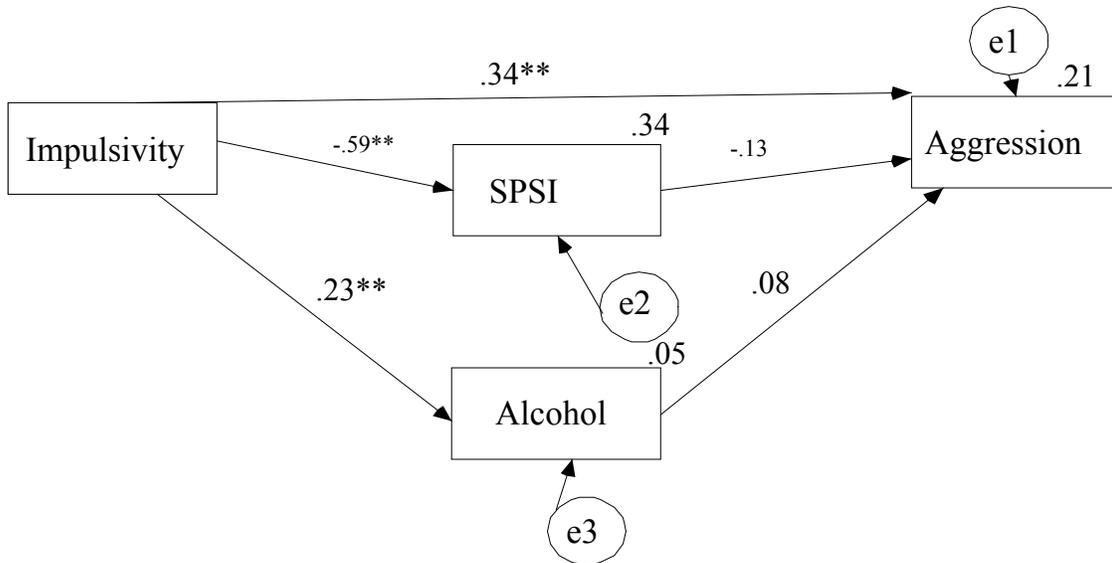
REGRESSION ANALYSIS CONTROLLING FOR IM

*Regression Analyses to control for Impression Management (IM) (N = 179)*

Regression Analyses	<i>B</i>	<i>SE B</i>	$\beta$	<i>t</i>	<i>p</i>
BPAQ on IM	-4.84	1.47	-.245	-3.30	.001
BIS on IM	-2.11	.828	-.190	-2.55	.012
SPSI on IM	2.85	1.10	.194	2.59	.010
IPAS-IM on IM	-.820	.390	-.158	-2.1	.037
IPAS-PM on IM	-1.32	.586	-.169	-2.25	.026

Note. *B* = unstandardized regression coefficient; *SE* = Standard error of unstandardized regression coefficients

APPENDIX K  
 PATH ANALYSIS RESULTS WITHOUT CONTROLLING  
 FOR IMPRESSION MANAGMENT



Note. \*  $p < .05$  \*\*  $p < .01$

Figure K1. Path analysis results for proposed model of aggression with complete sample  $n = 175$

*Fit indices*

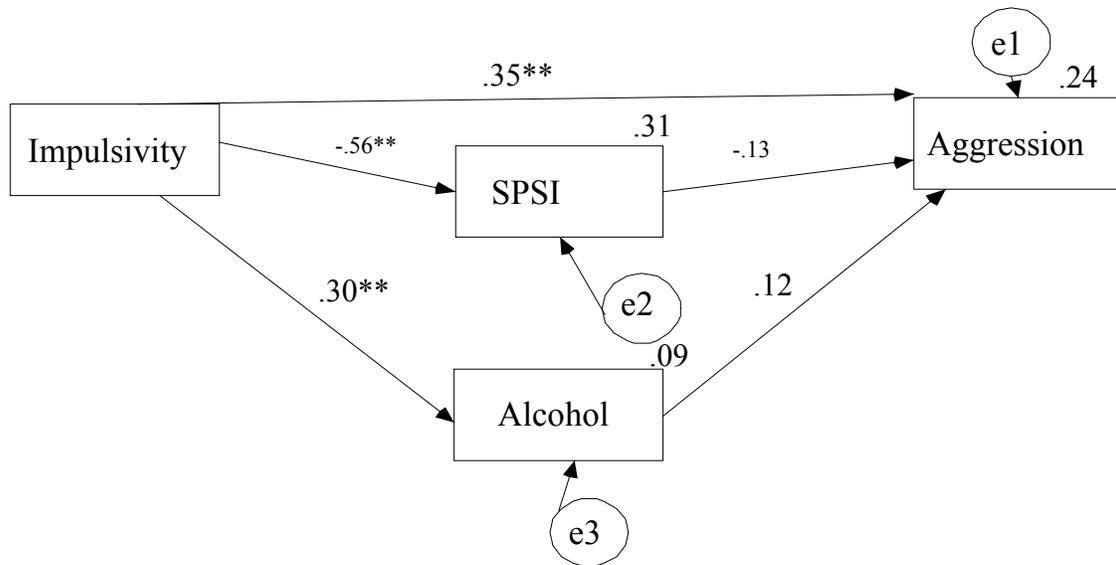
$\chi^2 (1, n = 175) = 15.98, p < .001$

CFI = .89

NFI = .89

AIC = 42.69

RMSEA = .293, RMSEALO = .178, RMSEAHl = .428



Note. \*  $p < .05$  \*\*  $p < .01$

Figure K 2. Path analysis results for proposed model of aggression with Aboriginal subsample  $n = 149$

*Fit indices*

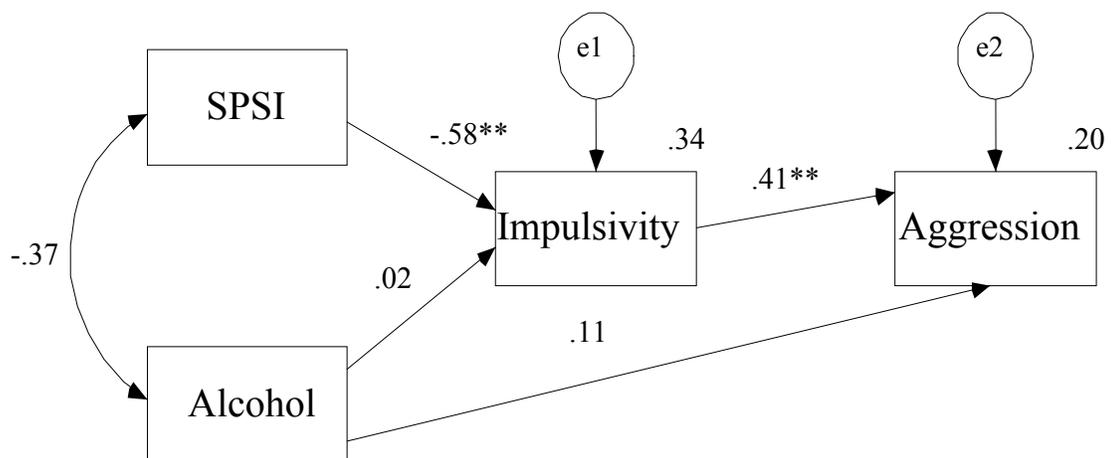
$\chi^2 (1, n = 149) = 16.79, p < .001$

CFI = .87

NFI = .87

AIC = 34.73

RMSEA = .326, RMSEALO = .201, RMSEAHl = .471



Note. \*  $p < .05$  \*\*  $p < .01$

Figure K 3. Path analysis results for post hoc model of aggression with complete sample  $n = 175$

*Fit indices*

$$\chi^2 (1, n = 149) = 2.31, p = .128$$

$$CFI = .99$$

$$NFI = .99$$

$$AIC = 28.31$$

$$RMSEA = .087, RMSEALO = .000, RMSEAHl = .240$$

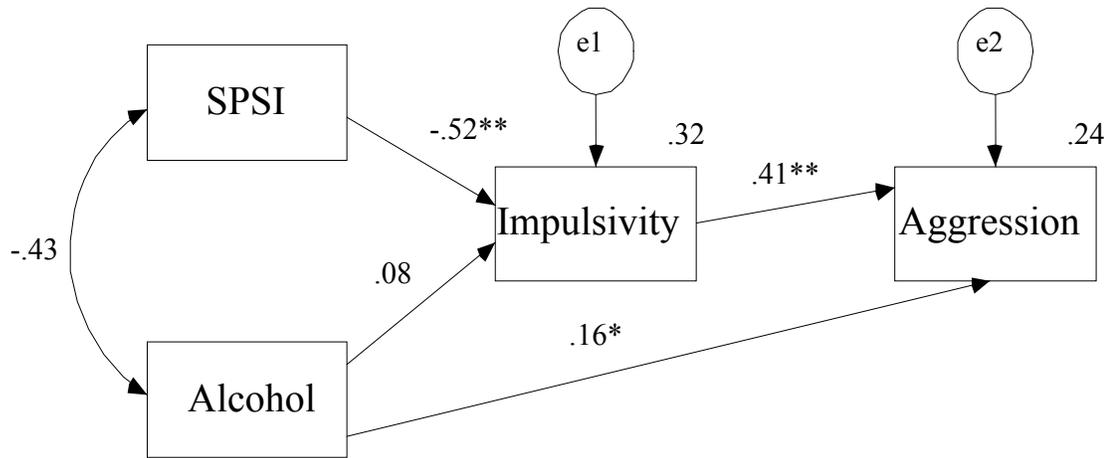


Figure K 4. Path analysis results for post hoc model of aggression with Aboriginal subsample  $n = 149$

*Fit indices*

$\chi^2 (1, n = 149) = 2.14, p = .143$

CFI = .98

NFI = .99

AIC = 20.15

RMSEA = .089, RMSEALO = .000, RMSEAHl = .256