

Do Sex Offenders Against Adults, Sex Offenders Against Children, and Non-sex Offenders Differ in Impulsivity?

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[Sexual Offender Treatment, Volume 11 (2016), Issue 2]

Abstract

Aim/Background. Impulsivity, defined as acting without forethought and having poor response inhibition, is a key correlate of crime and a multidimensional construct. Despite its importance, there is neither a unifying theory nor a consistency in its measurement. Understanding impulsivity differences among offender types (e.g., non-sex offenders, sex offenders against adults versus children) and with different measures may help advance criminal behaviour theories and target assessment and management strategies.

Material/Methods. Participants were adult male non-sex offenders ($n = 75$), sex offenders against adults ($n = 9$), and sex offenders against children ($n = 37$) serving prison sentences of at least two years. Impulsivity was measured using five self-report questionnaires (Impulsiveness Scale-7; Barratt Impulsiveness Scale-11; Grasmick Self-control Scale; Sensation Seeking Scale-Form V; Tangney Self-control Scale), third-party ratings (Dynamic Factors Identification and Analysis [DFIA]), and a computer task (GoStop Impulsivity Paradigm).

Results. Self-reported impulsivity was generally highest for sex offenders against adults and lowest for sex offenders against children; however, only 5 of the 69 effect sizes were statistically significant, most of which could likely be attributed to Type I errors. Group comparisons for the DFIA composite score and the GoStop Paradigm were non-significant. The DFIA items showed differing patterns of impulsivity among groups depending on the item, and the number of significant findings (2 out of 30) were roughly consistent with the expected Type I error rate.

Conclusions. There were little to no group differences in impulsivity for the three measurement methods. Despite these findings, previous studies suggest that further research in this area is still warranted. The overall pattern in the current study (i.e., sex offenders against adults were often the most impulsive and sex offenders against children were the least) indicates that investigators should examine impulsivity separately for different types of sex offenders to avoid masking important group differences.

Keywords: sex offenders, non-sex offenders, impulsivity, assessment

Impulsivity (also referred to as low self-control, poor self-regulation, or poor inhibitory control) is a well-documented predictor of criminal behaviour. Impulse control problems are among the primary personality correlates of crime and are implicated in the development of stable, long-term, serious antisocial behaviour (Moffitt, 1993; White et al., 1994). There is also meta-analytic evidence for low self-control as one of the strongest predictors of crime (Pratt & Cullen, 2000). Further, impulsivity is identified as a key feature of antisocial personality pattern, which is one of the "Big Four" predictors of criminal behaviour (Andrews & Bonta, 2010).

Impulsivity predicts crime with both men and women (Keane, Maxim, & Teevan, 1993), as well as

with youth (Sullivan, 2014) and adults (Andrews & Bonta, 2010). Many negative factors that are linked to crime, such as aggression (Dolan & Anderson, 2002), psychoticism, and anger/hostility (Tangney, Baumeister, & Boone, 2004), are also predicted by impulsivity. In a large study of sex offenders, impulsivity predicted childhood aggression, running away, contacts with youth services, and getting into fights (for child molesters and rapists), as well as arson and animal cruelty (for child molesters; Prentky & Knight, 1986).

Although impulsivity is a key correlate of crime, levels of impulsivity differ across offender types; non-sex offenders appear to be more impulsive than rapists, who are more impulsive than child molesters, for example. Snoymen and Aicken (2011) provided support for this phenomenon in their study on offenders with low cognitive abilities. They found sex offenders to be significantly less impulsive than non-sex offenders (both violent and general). Differences in recidivism rates can also be used to infer differences in impulsivity, as criminal behaviour itself is viewed as impulsive behaviour. For instance, Hanson, Scott, and Steffy (1995) found significantly fewer child molesters (61.8%) recidivated with any new offence compared to non-sex offenders (83.2%). Rapists have been found to reoffend faster than child molesters as well (for both sex and non-sex offences; Quinsey, Rice, & Harris, 1995). These findings suggest that child molesters behave less impulsively than rapists and non-sex offenders.

In a recent meta-analysis on adolescent offenders, Seto and Lalumière (2010) found that non-sex offenders scored significantly higher than sex offenders on several factors linked to impulsivity (e.g., aggression, antisocial behaviour, truancy; see the following studies for evidence of these predictive relationships: Dolan & Anderson, 2002; Romero, Gomez-Fraguela, Lungo, & Sobral, 2003; Stylianou, 2002). Studies included in this meta-analysis with explicit measures of impulsivity suggested that sex and non-sex offenders do indeed differ on this construct. Etherington (1993) reported that sex offenders scored significantly lower on impulsivity measures of the Psychopathy Checklist-Revised than violent non-sex offenders, for example. Sex offenders also scored significantly lower on disinhibition, as measured by the Adolescent Temperament Questionnaire, than did non-sex offenders (van Wijk, Vreugdenhil, van Horn, Vermeiren, & Doreleijers, 2007).

It is important to note that several studies included in Seto and Lalumière's (2010) meta-analysis yielded null findings. For instance, Mattingly (2000) and Barham (2000) reported non-significant differences in impulsivity between the two offender groups (as measured by various assessment tools). Leguizamo (2000) found that sex offenders scored higher on impulsivity on the Millon Adolescent Clinical Inventory; these results approached statistical significance. As discussed later in this section, the overall discrepancy in these findings could be explained by the fact that different measures used to assess impulsivity likely tap into different aspects of the construct.

Impulsivity is clearly an important factor that underlies crime. Understanding differences in impulsivity among offender groups may help advance theory and interventions with specific types of offenders (e.g., sex offenders). However, there is a lack of consensus on the construct's definition and theoretical orientation. Divergent views of impulsivity have also resulted in divergent approaches to its measurement. It is therefore necessary to address how impulsivity is defined and explained, as well as how it is measured.

Definitions and Theories of Impulsivity

Impulsivity is commonly viewed as acting without considering the associated outcomes or consequences (Coscina, 1997). It is also seen as encompassing emotional, behavioural, and cognitive regulation and inhibition issues (Bowman, 1997). Thus, for the purposes of this study, impulsivity will be broadly considered as acting without forethought and poor response inhibition,

which involves a preference for immediate rewards as opposed to long-term gains (i.e., poor delay of gratification).

Numerous psychological perspectives have attempted to explain impulsivity. They view this construct either as a personality trait, a cognitive style, often resulting from psychobiological processes, or as a pathology (analogous to mental disorders or as a maladaptive trait underlying crime). Although these theories are divided into categories, there are commonalities among them and, as such, three overarching perspectives on impulsivity can be inferred: personality, cognitive/psychobiological, and behavioural.

Personality. This perspective views impulsivity as a personality trait on which people exhibit individual differences. This trait is related to extraversion and/or psychoticism and is orthogonal to anxiety (Eysenck, Easting, & Pearson, 1984; Patton, Stanford, & Barratt, 1995). As described by Gottfredson and Hirschi (1990), impulsivity is a key feature of low self-control, which they assert is a stable personality trait manifested early and largely caused by ineffective child rearing. According to this theory, people with low self-control enjoy taking risks and are likely to engage in behaviours with immediate rewards (e.g., crime, drinking, gambling).

Gray (1987) proposes that impulsivity is caused by two distinct, but interacting, systems in the central nervous system: the Behavioural Inhibition System (BIS; associated with Anxiety) and the Behavioural Activation System (BAS; associated with Impulsivity). The BIS responds to cues of punishment and thus involves avoidance behaviour, whereas the BAS involves approach behaviour because it is sensitive to reward signals. Impulsivity can occur due to combinations of high reward sensitivity (BAS) and lowered sensitivity to punishment (BIS). This theory blends personality and psychobiological perspectives.

Cognitive/psychobiological. This perspective views impulsivity as a manifestation of cognitive or psychobiological features. In other words, impulsivity is brain-based or biological. For example, the central nervous system (Gray, 1987) and/or certain parts of the brain (i.e., the frontal lobe and prefrontal cortex, which play a key role in planning, controlling, and coordinating behaviour; Santrock & Mitterer, 2006; Van den Broek & Bradshaw, 1993) are thought to regulate impulsive behaviours. Neurotransmitters have also been linked with impulsivity in that high levels of dopamine (associated with approach behaviour) and low levels of 5-HT (found in serotonin; associated with avoidance behaviour) may cause impulsive behaviour (Nussbaum, 2008). As demonstrated by Stanton, Liening, and Schultheiss (2011), who found a correlation between testosterone (part of the approach system) and impulsivity in a gambling task, hormones may further influence impulsivity. At a basic biological (i.e., pre-conscious) level, individuals are assumed to vary in their ability to inhibit responses.

Behavioural. This perspective views impulsivity as a maladaptive behaviour pattern, in which afflicted individuals behave in inappropriate ways, either through aggression and criminal behaviour (Gottfredson & Hirschi, 1990), addictions and excesses of various kinds (Baumeister, Heatherton, & Tice, 1994), or through behaviours indicative of mental illness (Coles, 1997). These individuals exhibit a generalized lifestyle impulsivity (as opposed to offence-specific impulsivity; Prentky & Knight, 1986), which is characterized by deficient long-term relationships, poor academic/work history, transiency, irresponsibility, distorted self-esteem, aimlessness, and risk-taking (Gottfredson & Hirschi, 1990; Prentky & Knight, 1986; Webster & Jackson, 1997).

Measuring Impulsivity

Numerous methods are available to assess impulsivity. The most common measures are self-report questionnaires, some of which are based on specific theoretical orientations. Several scales are designed to test Gottfredson and Hirschi's (1990) concept of low self-control (which they hypothesize is a central cause of crime), for example, with the Grasmick scale (Grasmick, Tittle, Bursik, & Arneklev, 1993) being the most frequently used. Scales are also available for Eysenck's (Eysenck, Pearson, Easting, & Allsopp, 1985) and Barratt's (Patton et al., 1995) conceptualizations, as well as scales without explicit ties to theory (Tangney et al., 2004; Zuckerman, 1996). While most self-report methods involve questionnaires, self-report information on impulsivity can also be obtained through interviews.

Other measures of impulsivity include third-party ratings (e.g., teacher, caregiver, examiner) and cognitive tasks (e.g., GoStop Paradigm; Dougherty, Mathias, & Marsh, 2005). The latter examine directly observable behaviour in order to make inferences about the cognitive processes underlying that behaviour. Task-based measures offer a more objective form of behavioural assessment than self-report measures according to Dougherty et al., (2005); however, some may have low external validity (i.e., decisions made on a computer task may not generalize to decisions made in everyday life). Research on the GoStop Task showed that pathological gamblers made significantly more inhibition errors than did a control group (Billieux et al., 2012) and inhibition failure was correlated with disruptive behaviour disorders in adolescents (Dougherty et al., 2003).

While several studies have found correlations among some impulsivity measures or subscales (Cyders & Coskunpinar, 2011; Lloyd, Chadwick, & Serin, 2014), correlations among measures are often weak, inconsistent, or non-existent (Dick et al., 2010). Within-category impulsivity measures (e.g., self-report versus self-report) also tend to correlate more highly than between-category measures (e.g., self-report versus performance based tasks; White et al., 1994). This could be due to assessment methods measuring qualitatively different components of the construct. This explanation is probable given the variety of features (e.g., personality, behavioural) emphasized in different theoretical approaches to impulsivity, as well as the multifaceted nature of individual theories. In fact, much of the current research provides evidence for a multidimensional model of impulsivity (e.g., Derkzen, 2014; Klonsky & May, 2010; Reise, Moore, Sabb, Brown, & London, 2013), suggesting that different measures are likely assessing different aspects of impulsivity.

Purpose of the Current Study

Impulsivity is one of the major correlates of criminal behaviour and is therefore an important intervention target with offender populations. Understanding differences in impulsivity among different types of offenders (i.e., non-sex offenders, sex offenders against adults, sex offenders against children) may be helpful in advancing theory of different types of criminal behaviour and in targeting assessment and management strategies. However, despite the importance of impulsivity, there is neither a unifying theory nor a consistency in its measurement, likely due to the multidimensionality of the construct. Examining group differences using different measures of impulsivity may contribute to future efforts to refine our understanding and assessment of impulsivity.

Method

Participants

Participants were 121 adult male offenders recruited in the summer of 2010 from one of three federal prisons in Ontario: a maximum-security ($n = 10$), medium-security ($n = 31$), and minimum-security institution ($n = 79$). In Canada, offenders who receive custodial sentences of two or more years are sent to federal prisons. This reflects approximately 2% of all convictions (Public Safety Canada, 2015). Of 119 offenders with sentence length information available, 31 (25.6%) were serving an indeterminate sentence.

Based on information from offenders' computerized files, they were classified into one of three groups: non-sex offenders ($n = 75$), sex offenders against adults ($n = 9$), and sex offenders against children ($n = 37$). Offenders were classified as sex offenders if any intake assessment information in their file noted a current or prior sexually motivated offence, or if their file had a flag for a sex offence¹. Additionally, offenders were classified as having a child victim if there was a flag in their file for having a sex offence against a child, or if any of their intake assessment information noted a child victim². For 71 non-sex offenders with offence type information, their most serious conviction was for offences such as homicide ($n = 21$, 29.6%), drug offences ($n = 17$, 23.9%), robbery ($n = 9$, 12.7%), and other offences (such as break and enter, fraud, and impaired driving).

Table 1 provides additional descriptive information for the offenders, divided by their offence type classification. Offenders were predominantly Caucasian (although the small group of sex offenders against adults were predominantly Black). The majority of non-sex offenders and sex offenders against adults were single (in contrast, the majority of sex offenders against children were married). The majority of offenders were from the minimum security institution, although sex offenders against adults were evenly split among the three institutions. Offenders were assessed for their overall level of static and dynamic risk using the federal prison system's internal Structured Professional Judgement rating scales (for additional information on the static scale, see Helmus & Forrester, 2014; for additional information on the Dynamic Factors Identification and Analysis scale, see 'measures' section below). Just over 40% of offenders were classified as having high static risk and high dynamic risk. Sex offenders against adults tended to be youngest ($M = 40$ years old), followed by non-sex offenders ($M = 44$), with sex offenders against children being the oldest ($M = 55$). For those with determinate sentences, sentence length was shortest for sex offenders against adults ($M = 2.9$ years), followed by sex offenders against children ($M = 4.4$), and then non-sex offenders ($M = 6.4$).

Table 1: Demographic, Sentence and Risk related Information by Offence Subgroups

Demographic Variable	Non-SOs Frequency (%)	SOs Against Adults Frequency (%)	SOs Against Children Frequency (%)
Ethnicity			
Caucasian	54 (74.0)	2 (22.2)	33 (89.2)
Aboriginal	6 (8.2)	0 (0.0)	1 (2.7)
Black	9 (12.3)	7 (77.8)	1 (2.7)
Other	4 (5.5)	0 (0.0)	2 (5.4)
Marital Status			

Married/Common-Law	17 (23.3)	4 (44.4)	19 (51.4)
Separated/Divorced/Widower	14 (19.2)	0 (0.0)	9 (24.3)
Single	42 (57.5)	5 (55.6)	9 (24.3)
Sentence Type			
Determinate	52 (71.2)	6 (66.7)	30 (81.8)
Indeterminate	21 (28.8)	3 (33.3)	7 (18.9)
Security Level			
Minimum	51 (68.9)	3 (33.3)	25 (67.6)
Medium	21 (28.4)	3 (33.3)	7 (18.9)
Maximum	2 (2.7)	3 (33.3)	5 (13.5)
Overall Static Risk			
Low	15 (20.6)	2 (22.2)	11 (29.7)
Medium	29 (39.7)	3 (33.3)	11 (29.7)
High	29 (39.7)	4 (44.4)	15 (40.5)
Overall Dynamic Risk			
Low	15 (20.5)	0 (0.0)	7 (18.9)
Medium	25 (34.2)	5 (55.6)	14 (37.8)
High	33 (45.2)	4 (44.4)	16 (43.2)
	M (SD)	M (SD)	M (SD)
Age at Testing ^a	44.06 (10.8)	40.25 (12.3)	54.69 (13.5)
Aggregate Sentence Length ^b	6.35 (9.2)	2.90 (1.0)	4.43 (2.3)

Note. SO = sex offender. Percentages do not include missing cases.

^a N = 73 (non-SOs), 9 (SOs against adults), 37 (SOs against children).

^b Aggregate sentence length only provided for individuals serving determinate sentences (52 non-SOs, 6 SOs against adults, and 30 SOs against children).

Measures

Impulsiveness Scale - 7 (I-7; Eysenck et al., 1985). The I-7 is a 54-item (yes/no) questionnaire designed to test impulsivity. It includes three factors (Impulsiveness: 19 items; Venturesomeness: 16 items; Empathy: 19 items), but only the Impulsiveness subscale, in which higher scores reflect greater impulsivity, was used in this study. The I-7 has established norms (Eysenck et al., 1985), as well as good internal reliability (alphas for the Impulsiveness subscale exceeding .80; Caseras, Ávila, & Torrubia, 2003; Claes, Nederkoorn, Vandereycken, Guerrieri, & Vertommen, 2006). It has previously been used with violent offenders (Serin, Gobeil, & Preston, 2009) and sex offenders (Wakeling, 2007).

Barratt Impulsiveness Scale, Version 11 (BIS-11; Patton et al., 1995). The BIS-11 is a 30-item impulsivity scale with three factors: Attentional (rapid decision making; 8 items), Motor (acting without forethought; 11 items), and Non-Planning (present orientation; 11 items). Items are rated on a 7-point Likert scale (*rarely/never to almost always/always*), where higher scores represent greater impulsivity. The BIS-11 has been used with offender samples and has high internal reliability (= .80 to .91; Derkzen, 2014; Lloyd et al., 2014; Patton et al., 1995). In this study, the word

"extraneous" was changed to "unrelated" to make Item 30 more comprehensible.

Grasmick Self-control Scale (Grasmick et al., 1993). This 24-item scale was designed to measure Gottfredson and Hirschi's (1990) concept of self-control. Items are answered on a 4-point Likert scale (*strongly disagree* to *strongly agree*) and higher scores indicate greater impulsivity. The scale measures six aspects of self-control, each comprised of 4 items: Impulsivity, Preference for Simple Tasks, Risk-Seeking, Physical Activity, Self-Centredness, and Temper (minimal tolerance for frustration). It has high internal reliability ($\alpha = .80$ to $.90$; Derkzen, 2014; Gibson, 2005; Grasmick et al., 1993) and is the most frequently used measure to assess the relationship between self-control and crime (Pratt & Cullen, 2000).

Sensation Seeking Scale - Form V (SSS-V; Zuckerman, 1996). This scale was designed to measure individual differences in optimal stimulation (Zuckerman, Kolin, Price, & Zoob, 1964). The SSS-V has 40 pairs of socially desirable statements (participants must choose the one that best describes their attitudes) that are grouped into four 10-item subscales: Thrill and Adventure Seeking, Experience Seeking, Disinhibition, and Boredom Susceptibility (Zuckerman, 2007). Lower scores on this scale represent greater impulsivity and higher scores represent lower sensation-seeking. Internal consistency estimates for the SSS-V are high (e.g., $\alpha = .83$ for females and $.80$ for males; Corulla, 1988) and the scale has been used with offender samples (Lloyd & Serin, 2007). As part of the purpose of a related study, the wording was modified in seven choices of six items to reflect attitudes rather than behaviours (e.g., "I have tried marijuana or would like to" was changed to "I enjoy marijuana or would like to try it").

Tangney Self-Control Scale (Tangney et al., 2004). This scale was designed outside the criminal justice field to measure self-control, defined as an ability to interrupt and override undesirable behaviour. It has 36 items rated on a 5-point Likert scale (*not at all like me* to *very much like me*), where higher scores correspond to greater self-control (i.e., lower impulsivity). Items are grouped into the following subscales: Self-Discipline (11 items), Deliberate/Nonimpulsive Action (10 items), Healthy Habits (7 items); Work Ethic (4 items); and Reliability (4 items; item composition for each subscale was obtained from J. Tangney, personal communication, Sept. 27, 2010). Two tests of the scale yielded high internal reliability ($\alpha = .89$; Tangney et al., 2004). The Brief Self-Control Scale, a shortened version of the Tangney Self-Control Scale, has been used with offender samples (Malouf et al., 2014).

Dynamic Factors Identification and Analysis (DFIA; Brown & Motiuk, 2005). There are two versions of the DFIA. The original DFIA consisted of 197 dichotomous items organized into seven need domains: employment, marital/family, associates/social interaction, substance abuse, community functioning, personal/emotional orientation, and attitude. After rating all items, correctional staff would provide a summary professional judgement rating for each domain, and overall (as either low, moderate, or high risk). The DFIA has demonstrated acceptable levels of internal reliability (with few exceptions) and predictive accuracy, although predictive accuracy was somewhat lower for Aboriginal offenders (Brown & Motiuk 2005). The revised version, the DFIA-R, has a similar structure but only 100 items. Some offenders were scored on the original DFIA and some on the revised.

Selected DFIA items were used to construct a scale of impulsivity as rated by staff. To maximize available sample size, we examined impulsivity items from the original DFIA. Specifically, the following ten items (all from the personal/emotional domain) were identified as possibly measuring impulsivity: unable to recognize problem areas, difficulties solving interpersonal problems, unable to generate choices, impulsive, aggressive, assertion problem, manages time poorly, gambling is problematic, has low frustration tolerance, and thrill-seeking. For offenders with at least eight of the

ten items rated, we calculated an impulsivity score by summing their ratings on these items (note that higher scores reflect greater impulsivity).

GoStop Impulsivity Paradigm (Dougherty et al., 2005). The GoStop Impulsivity Task examines the extent to which individuals are able to inhibit an already initiated response. In this task, a computer screen displays two 5-digit numbers in rapid sequence. Participants are instructed to respond when the numbers match (go signal; occurs in 50% of the trials), but to withhold their response when the matching number changes from the colour black to red (*stop* signal; occurs in 50% of the go trials at intervals ranging from 50 to 350 milliseconds after presented). The primary measure yielded from this task is the percentage of inhibition failures, calculated as the percentage of stop trials where the participant responded to the matching stimuli. Inhibition failures can be measured separately based on the time interval before the stop cue was presented (conceptually, inhibition should become more difficult with greater latency before the stop cue). The task consists of 320 trials and takes approximately 12 minutes to complete. It is expected to measure the cognitive/psychobiological sub-construct of impulsivity because it assesses automatic (i.e., pre-conscious) responses. The GoStop Task has been used with samples that included female offenders (Marsh, Dougherty, Mathias, Moeller, & Hicks, 2002), participants with substance abuse and borderline personality disorders (Coffey, Schumacher, Baschnagel, Hawk, & Holloman, 2011), as well as participants with disruptive behaviour disorders (Dougherty et al., 2003).

Materials and Apparatus

The GoStop Paradigm was administered using a laptop computer. The other measures were scored from paper-and-pencil questionnaires. Offender data were extracted from the Correctional Service of Canada's Offender Management System (OMS), a computerized offender file database.

Procedure

Data collection. Participants were recruited at each institution by the second author. Those willing to participate in the study signed a consent form and then completed the paper-and-pencil questionnaires. Following the questionnaires, participants completed the computerized GoStop Task, which was explained to them using a standardized set of instructions included with the software. No order effects were anticipated; therefore some participants completed the computer task before the questionnaires for practical purposes. After completing all the measures, participants were debriefed.

Overview of Analyses

The effect size statistic used to compare groups on impulsivity was the standardized mean difference (Cohen's *d*; Cohen, 1988). In this study, Cohen's *d* measured the difference in impulsivity between members of two groups, relative to how much members within each group normally differ in impulsivity. Calculation of Cohen's *d* and its confidence intervals followed the formulas from Borenstein, Hedges, Higgins, and Rothstein (2009), with one exception. For the DFIA items (which were dichotomous), calculation of Cohen's *d* followed the formula suggested by Sánchez-Meca, Chacón-Moscoso, and Marín-Martínez (2003), with 0.5 added to each cell as recommended by Fleiss (1994). As a rough heuristic for interpretation, Cohen (1988) suggested that a *d* of .20 is small, .50 is moderate, and .80 is large. Analyses of the Go-Stop Computer task were conducted using a mixed factorial ANOVA.

Results

Self-Report Measures

Table 2 presents the means and standard deviations for the three groups on the self-report scales and Table 3 presents the effect sizes and confidence intervals corresponding to those differences. Sex offenders against adults scored the highest on the Impulsiveness subscale of the I-7 and on the Grasmick Self-Control Scale, while sex offenders against children scored the lowest. Sex offenders against adults also scored the highest on the BIS-11, with non-sex offenders and sex offenders against children scoring similarly. Note that higher scores for these three measures correspond to greater levels of impulsivity. For the SSS-V and the Tangney Self-control Scale, sex offenders against children scored the highest and sex offenders against adults scored the lowest; however recall that higher scores for these two measures correspond to lower levels of impulsivity.

Table 2: Means and Standard Deviations on the Self-report Impulsivity Measures by Offence Subgroups

Scales and Subscales	Non-SOs			SOs Against Adults			SOs Against Children		
	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>
Impulsiveness Scale-7	-	-	-	-	-	-	-	-	-
Impulsiveness	68	6.69	4.45	8	9.12	4.82	34	6.00	4.94
Barratt Impulsiveness Scale-11	68	61.19	12.75	8	65.88	8.04	34	61.50	14.81
Attentional	71	14.90	3.58	8	16.00	3.07	35	15.22	4.94
Motor	71	22.45	4.83	8	22.00	4.00	36	22.28	5.04
Non-planning	70	23.81	5.79	8	27.88	3.18	34	24.03	6.17
Grasmick Self-control Scale	70	48.24	11.41	8	52.87	11.68	35	46.63	12.34
Impulsivity	72	8.44	2.91	8	8.78	3.09	36	8.69	2.98
Simple Tasks	74	8.14	2.69	9	8.44	2.50	36	7.75	3.42
Risk Taking	72	8.74	2.93	8	9.50	2.56	36	8.06	3.00
Physical Activity	71	10.41	2.81	8	11.12	2.30	36	10.61	3.06
Self-centeredness	74	6.70	2.43	9	7.22	3.34	37	5.81	2.05
Temper	71	6.37	2.55	8	7.50	2.45	36	6.33	2.50
Sensation Seeking Scale-V^a	66	23.12	6.82	8	22.38	9.05	33	26.42	7.53
Thrill and Adventure Seeking	70	3.81	3.00	8	4.00	3.58	35	4.17	3.03
Experience Seeking	68	5.28	2.02	8	4.38	2.26	35	6.51	2.25
Disinhibition	70	7.86	1.96	8	7.50	2.39	36	8.36	1.46
Boredom Susceptibility	68	6.40	2.68	8	6.50	3.21	35	7.40	2.95
Tangney Self-control Scale^a	69	129.62	18.71	8	122.75	19.34	34	132.68	21.68
Self-discipline	69	39.30	7.29	8	37.75	5.36	37	39.03	8.25
Deliberate/Nonimpulsive Action	71	35.35	6.32	8	34.62	7.63	34	35.94	5.89

Healthy Habits	71	25.25	4.92	8	22.75	4.89	37	25.89	5.85
Work Ethic	73	13.55	2.72	8	12.25	3.10	37	15.27	2.62
Reliability	72	16.39	2.66	8	15.37	2.97	37	16.94	3.04

Note. SO = sex offender

^a This scale (including all subscales) are reverse scored, with lower scores reflecting greater impulsivity.

Table 3: Cohen's d and Confidence Intervals for Group Comparisons on the Self-report Scales

Scales and Subscales	Sample Size			Non-SOs vs. SOs Against Adults			Non-SOs vs. SOs Against Children			SOs Against Adults vs. SOs Against Children		
	Non-SOs	SOs against adults	SOs against children	d	95% C.I.		d	95% C.I.		d	95% C.I.	
Impulsiveness Scale-7	-	-	-	-	-	-	-	-	-	-	-	-
Impulsiveness	68	8	34	-0.54	-1.28 0.20		0.15	-0.26 0.56		0.63	-0.15 1.41	
Barratt Impulsiveness Scale-11	68	8	34	-0.38	-1.11 0.36		-0.02	-0.43 0.39		0.31	-0.46 1.09	
Attentional	71	8	35	-0.31	-1.04 0.42		-0.08	-0.48 0.33		0.17	-0.60 0.93	
Motor	71	8	36	-0.09	-0.64 0.83		0.03	-0.37 0.44		-0.06	-0.82 0.71	
Non-planning	70	8	34	-0.72	-1.46 0.02		-0.04	-0.45 0.37		0.67	-0.12 1.45	
Grasmick Self-control Scale	70	8	35	-0.40	-1.14 0.33		0.14	-0.27 0.54		0.50	-0.27 1.28	
Impulsivity	72	8	36	-0.12	-0.85 0.62		-0.08	-0.49 0.32		0.03	-0.74 0.80	
Simple Tasks	74	9	36	-0.11	-0.80 0.58		0.13	-0.27 0.53		0.21	-0.52 0.94	
Risk Taking	72	8	36	-0.26	-0.99 0.47		0.23	-0.17 0.63		0.49	-0.29 1.26	
Physical Activity	71	8	36	-0.25	-0.99 0.48		-0.07	-0.47 0.33		0.17	-0.60 0.94	
Self-centeredness	74	9	37	-0.20	-0.90 0.49		0.38	-0.01 0.78		0.59	-0.15 1.33	
Temper	71	8	36	-0.44	-1.18 0.29		0.02	-0.39 0.42		0.46	-0.31 1.24	
Sensation Seeking Scale-V	66	8	33	0.10	-0.63 0.84		-0.47	-0.89 -0.04		-0.51	-1.29 0.27	
Thrill and Adventure Seeking	70	8	35	-0.06	-0.79 0.67		-0.12	-0.53 0.29		-0.05	-0.82 0.71	
Experience Seeking	68	8	35	0.44	-0.30 1.17		-0.58	-1.00 -0.17		-0.93	-1.73 -0.14	
Disinhibition	70	8	36	0.18	-0.55 0.91		-0.28	-0.68 0.13		-0.51	-1.28 0.27	
Boredom Susceptibility	68	8	35	-0.04	-0.77 0.70		-0.36	-0.77 0.05		-0.30	-1.07 0.47	
Tangney Self-control Scale	69	8	34	0.36	-0.37 1.10		-0.15	-0.57 0.26		-0.46	-1.24 0.31	
Self-discipline	69	8	37	0.22	-0.52 0.95		0.04	-0.36 0.43		-0.16	-0.93 0.60	
	71	8	34	0.11	-0.62 0.84		-0.09	-0.50 0.31		-0.21	-0.98 0.56	

Deliberate/Nonimpulsive Action

Healthy Habits	71	8	37	0.48	-0.25	1.22	-0.14	-0.54	0.26	-0.55	-1.32	0.23
Work Ethic	73	8	37	0.47	-0.26	1.20	-0.64	-1.04	-0.23	-1.10	-1.90	-0.30
Reliability	72	8	37	0.34	-0.39	1.08	-0.23	-0.63	0.17	-0.51	-1.28	0.26

Note. SO = sex offender. Bold values denote statistically significant effect sizes. For each comparison listed, positive d values can be interpreted as Group A (i.e., the first group listed in the column heading) having higher scores on the measure than Group B (i.e., the second group listed). Note, however, that the Sensation Seeking Scale and the Tangney Self-Control Scale are reverse scored, with lower scores reflecting higher levels of impulsivity.

The pattern of findings for subscales generally mirrored the overall scale results, with impulsivity typically highest for sex offenders against adults and lowest for sex offenders against children. There were, however, a few exceptions to this general pattern. As measured by the Attentional and Non-planning subscales of the BIS-11, sex offenders against adults were the most impulsive and non-sex offenders the least. This difference was reversed for the Motor subscale of the BIS-11, with non-sex offenders scoring the highest and sex offenders against adults scoring the lowest; however these differences were not large. Sex offenders against adults were the most impulsive according to the Impulsivity and Physical Activity subscales of the Grasmick Self-control Scale and non-sex offenders were the least. Lastly, non-sex offenders scored the lowest on the Thrill and Adventure Seeking and Boredom Susceptibility subscales of the SSS-V, while sex offenders against children scored the highest, indicating greater impulsivity levels for the former group.

Of the 69 effect sizes presented for the self-report scales and subscales in Table 3, only 5 were statistically significant, which is not much more than the expected Type I error rate (0.05 of 69 comparisons = 3.4 results expected to be significant by chance alone). Non-sex offenders scored significantly lower than sex offenders against children on the overall SSS-V ($d = -.47$) as well as its subscale, Experience Seeking ($d = -.47$), with roughly moderate effect sizes. Non-sex offenders also scored significantly lower than sex offenders against children on the Work Ethic subscale of the Tangney Self-control Scale. This comparison yielded a d of $-.64$, a moderate effect size. As lower scores on the SSS-V and Tangney Self-control Scale represent greater impulsivity, non-sex offenders were more impulsive than sex offenders against children.

Sex offenders against adults scored significantly lower than sex offenders against children on the Experience Seeking subscale of the SSS-V ($d = -.93$) and the Work Ethic subscale of the Tangney Self-control Scale ($d = -1.10$), with large effect sizes. This suggests that sex offenders against adults were more impulsive than sex offenders against children.

DFIA Third-Party Ratings

Table 4 presents the means and standard deviations for each group on the DFIA impulsivity composite score, as well as the effect sizes and confidence intervals for those differences. Sex offenders against adults scored the highest on these items, while non-sex offenders scored the lowest; however, these group comparisons were non-significant.

Table 4: DFIA Composite Score, Cohen's d and Confidence Intervals (CI) for Group Comparisons

DFIA Composite Score Range (0-10)	
<i>M (SD)</i>	
Non-SOs (<i>n</i> = 33)	3.70 (2.10)
SOs Against Adults (<i>n</i> = 5)	4.00 (3.31)
SOs Against Children (<i>n</i> = 18)	3.94 (2.60)
<i>d</i> (95% CI)	
Non-SOs vs. SOs Against Adults	-0.13 (-1.07, 0.81)
Non-SOs vs. SOs Against Children	-0.10 (-0.68, 0.47)
SOs Against Adults vs. SOs Against Children	0.02 (-0.97, 1.01)

Note. SO = sex offender, DFIA = Dynamic Factors Identification and Analysis.

Table 5 presents subgroup differences on the individual items of the DFIA and Table 6 provides the effect sizes for these differences. Unlike the self-report measures where sex offenders against children tended to report the lowest levels of impulsivity and sex offenders against adults reported the highest, the DFIA items had very inconsistent patterns in group differences. Sex offenders against children were rated as highest on four of the items, whereas the other groups were rated as highest on three items each. Non-sex offenders were rated lowest on four items, whereas the other groups were rated as lowest on three items each. On the item specifically defined as "impulsivity," the groups were rated very similarly: 60.0% of sex offenders against adults were considered impulsive, compared to 54.5% of non-sex offenders and 47.4% of sex offenders against children.

Table 5: Selected DFIA Items by Offence Subgroups

DFIA item	Non-SOs			SOs Against Adults			SOs Against Children		
	<i>N</i>	<i>n</i> with factor (%)		<i>N</i>	<i>n</i> with factor (%)		<i>N</i>	<i>n</i> with factor (%)	
Problem recognition skills are limited	34	17 50.0		5	3 60.0		19	16 84.2	
Difficulty solving interpersonal problems	34	23 67.6		5	3 60.0		18	11 61.1	
Ability to generate choices limited	33	10 30.3		5	2 40.0		19	10 52.6	
Impulsive	33	18 54.5		5	6 60.0		19	9 47.4	
Frequently acts in aggressive manner	33	8 24.2		5	4 80.0		18	5 27.8	
Assertiveness skills are limited	32	13 40.6		5	1 20.0		17	6 35.3	
Time management skills problematic	33	13 39.4		5	0 0.0		19	8 42.1	
Gambling has been problematic	34	1 2.9		5	0 0.0		19	1 5.3	
How low frustration tolerance	33	10 30.3		5	3 60.0		19	5 26.3	
Engages in thrill seeking behaviour	32	11 34.4		5	1 20.0		18	3 16.7	

Note. SO = sex offender, DFIA = Dynamic Factors Identification and Analysis.

Table 6: Cohen's d and Confidence Intervals for Group Comparisons on the DFIA Items

Scales and Subscales	Sample Size			Non-SOs vs. SOs Against Adults			Non-SOs vs. SOs Against Children			SOs Against Adults vs. SOs Against Children		
	Non-SOs	SOs against adults	SOs against children	d	95% C.I.		d	95% C.I.		d	95% C.I.	
Problem recognition skills limited	34	5	19	-0.20	-1.27	0.86	-0.94	-1.75	-0.13	-0.74	-1.94	0.47
Difficulty solving interpersonal problems	34	5	18	0.23	-0.84	1.30	0.17	-0.53	0.88	-0.06	-1.19	1.08
Ability to generate choices limited	33	5	19	-0.28	-1.36	0.79	-0.55	-1.24	0.14	-0.26	-1.38	0.85
Impulsive	33	5	19	-0.10	-1.16	0.97	0.17	-0.50	0.84	0.26	-0.85	1.38
Frequently acts in aggressive manner	33	5	18	-1.33	-2.55	-0.12	-0.12	-0.88	0.64	1.21	-0.06	2.48
Assertiveness skills are limited	32	5	17	0.44	-0.75	1.64	0.12	-0.60	0.84	-0.32	-1.58	0.94
Time management skills problematic	33	5	19	1.20	-0.60	3.00	-0.07	-0.75	0.61	-1.27	-3.11	0.56
Gambling has been problematic	34	5	19	-0.43	-2.44	1.59	-0.36	-1.77	1.05	-0.07	-1.95	2.09
How low frustration tolerance	33	5	19	-0.69	-1.77	0.39	0.10	-0.64	0.84	0.79	-0.36	1.94
Engages in thrill seeking behaviour	32	5	18	0.29	-0.91	1.49	0.52	-0.30	1.35	0.24	-1.09	1.56

Note. SO = sex offender. Bold values denote statistically significant effect sizes. For each comparison listed, positive d values can be interpreted as Group A (i.e., the first group listed in the column heading) having higher scores on the measure than Group B (i.e., the second group listed).

Note, however, that the Sensation Seeking Scale and the Tangney Self-Control Scale are reverse scored, with lower scores reflecting higher levels of impulsivity. DFIA = Dynamic Factors Identification and Analysis.

Of the 30 effect sizes presented for the 10 DFIA items, only 2 were statistically significant, which is consistent with the expected Type I error rate (0.05 of 30 comparisons = 1.5 results expected to be significant by chance alone). Non-sex offenders were significantly less likely than sex offenders against children to be rated as having problem recognition skills ($d = -0.94$) and non-sex offenders were also significantly less likely than sex offenders against adults to be rated as frequently acting in an aggressive manner ($d = -1.33$).

GoStop Computer Task

The main performance index of the GoStop Task was the percentage of correctly inhibited trials (i.e., the percent of stop trials inhibited) for each of the four stop conditions (50 ms, 150 ms, 250 ms, and 350 ms). Specifically, a higher percentage of inhibition indicated better performance and lower levels of impulsivity. A mixed ANOVA was conducted to compare the percentage of inhibited trials across GoStop conditions and offender groups (and to assess the interaction).

Results for all offence subgroups are reported in Figure 1. There was a significant main effect across stop conditions, Pillai's Trace Criterion = .742, $F(3, 114) = 109.46$, $p < .001$, $\eta^2 = .742$. Performance on the stop conditions were in the expected direction; that is the percentage of stop trials correctly inhibited decreased as the length of the stop condition increased from 50ms to 350ms. The main effect of group was non-significant, $F(2, 116) = 1.58$, $p = .211$, $\eta^2 = .026$, meaning that the offender type groups did not differ in their impulsivity profiles on this task. Interaction effects were non-significant, suggesting that participants, regardless of offence type, had similar patterns of increased impulsive responding with increased length of the stop condition (Pillai's Trace Criterion = .061, $F(6, 230) = .299$, $\eta^2 = .031$).

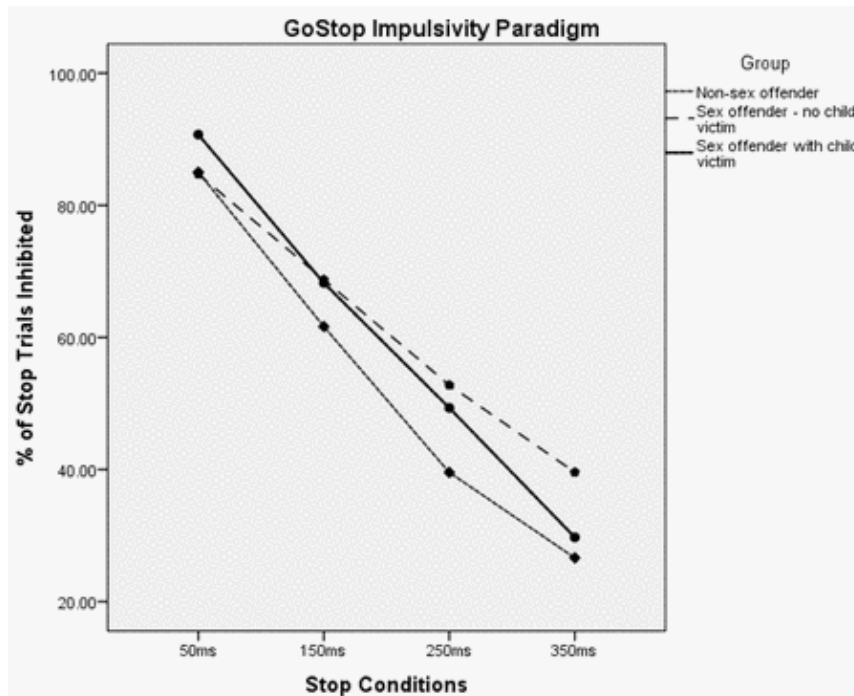


Figure 1: Percentage of correct inhibitions across four stop conditions (50 ms, 150 ms, 250 ms, and 350 ms) for non-sex offenders, sex offenders - no child victim and sex offender with child victim. Broken line with circle markers reflects sex offenders against adults, solid line with circle markers reflects sex offenders against children, and partly broken line with square markers reflects non-sex offenders.

Discussion

This study examined whether non-sex offenders, sex offenders against adults, and sex offenders against children differ in impulsivity using three measurement techniques (self-report, third-party ratings, and a computer task). Overall, sex offenders against adults tended to have the highest levels of impulsivity and sex offenders against children had the lowest (although this pattern was not evident in the third-party ratings). It is important to note, however, that very few differences were significant and most of the differences could likely be attributed to Type I errors.

These results are inconsistent with previous research that suggests sex offenders are less impulsive (Etherington, 1993; Snoymen & Aicken, 2011) and disinhibited (van Wijk et al., 2007) than non-sex offenders, as well as that child molesters may be less impulsive than rapists, as demonstrated by lower rates of general reoffending (Hanson et al., 1995). There are a number of possible explanations for this discrepancy. First, although our samples of non-sex offenders and sex offenders against children were sufficient in size for reliable estimation of means (e.g., > 30), there were too few sex offenders against adults for meaningful comparisons. Given that impulsivity levels varied the most between sex offenders against adults and sex offenders against children, this is likely where the main differences were. Second, our sample was possibly too homogeneous to detect differences between groups, as all participants were from federal prison (only 2.1% of guilty verdicts result in federal incarceration, meaning our sample represented only a minority of offenders; Public Safety Canada, 2015). The majority of participants were also in minimum security institutions and therefore our sample may not be representative of non-sexual and sexual offence

types. Third, a large number of participants in our study were serving life sentences and the average ages for the groups were above 40. Perhaps there were a disproportionate number of participants who had been incarcerated for long periods of time and years of institutional routine resulted in decreased impulsivity. Age is also correlated to a person's degree of self-control and is related to increased levels of aggression; in a number of studies, younger male offenders have demonstrated higher levels of behavioural disinhibition than older offenders (Cherek, Moeller, Dougherty, & Rhoades, 1997; Gottfredson & Hirschi, 1990; Plutchik & van Praag, 1995; Seager, 2005). Further, there are well-documented relationships between impulsivity and both antisocial behaviour and institutional aggression (Barratt, Stanford, Kent, & Felthous, 1997; Wang & Diamond, 1999). Presumably, then, younger offenders are more likely to be impulsive and consequently more likely to engage in institutional misconduct and misbehaviour during the program. It may therefore be beneficial to sample younger offenders and those earlier in their sentences to minimize the potential impact of age and institutional routine on offenders' impulsivity levels. Lastly, it may be possible that less impulsive individuals were most likely to volunteer for the current study. Analyses of third-party ratings of unselected, representative samples of offenders may have yielded stronger differences.

One of the major strengths of this study was the use of multiple methods and scales to assess impulsivity. Convergent results using diverse measurement approaches should increase confidence in the findings. Conversely, however, the small sample size of sex offenders against adults and the potentially non-representative nature of the sample would decrease confidence in the findings and represent meaningful limitations.

Conclusions and Recommendations for Future Research

Overall, there was a consistent pattern of little to no differences in impulsivity across the three offender types examined for self-report measures, DFIA items rated by staff, and the computer task. Although the findings were consistent across diverse measurement methods, these results were surprising given that impulsivity is one of the most well-established predictors of criminal behaviour. Based on research establishing impulsivity as a key risk factor, it should still be included in risk assessments. However, the current study does not provide much guidance about expected differences across groups in levels of impulsivity.

Further research in this area is warranted. And given the complexity of impulsivity as a construct, multi-method assessments are desirable. In conducting future research on group differences, it is important to examine sex offenders against adults separately from sex offenders against children when comparing non-sex to sex offenders. This is because, in the current study, sex offenders with adult victims were the most impulsive, while those with child victims were the least. If sex offenders against adults are combined with sex offenders against children when making comparisons, impulsivity levels may be artificially similar between non-sex and sex offenders. In other words, combining the two types of sex offenders examined in this study and comparing them to non-sex offenders may mask important group differences.

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Author Note

We would like to thank the Correctional Service of Canada for permission to collect these data. Funding for this project was provided in part by the Social Sciences and Humanities Research Council of Canada.

Footnotes

¹ Prison staff can initiate a flag in an inmate's file to highlight information that may be relevant for case management.

² Some of these intake assessment variables defined a child as under 12 years old, but many other variables, including the flag, do not include an age cut-off to define 'child' victim. Presumably the definition of child would vary based on the correctional staff completing the assessment.

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