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A systematic Review on: A Longitudinal Analysis of Psychological Risk Factors for Prospective Drug Offending in Young Offenders in Hong Kong

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Abstract

Drug abuse is seldom discussed in isolation from drug offending, which refers to the "possession, use, sale or furnishing of any drug or intoxicating substance or drug paraphernalia that is prohibited by law". Drug offending is an alarming specific type of offending because increased drug use was associated with increased drug availability. In the process of drug consumption, drug offending such as processing, manufacturing and selling drugs, has a crucial role in sustaining habitual drug use and causing drug addiction. Among all age groups, illicit drugs act in a more potent way on adolescents than adults. Comorbid offending and substance misuse in delinquents engaged in more subsequent crime and experienced more social problems and addiction symptoms than those who merely offended.

Keywords: Addiction research, Addiction therapy, Young offenders; Drug offending, Drug

Introduction

According to the World Health Organization, an estimate of 275 million people used illicit drugs, such as cannabis, amphetamines, opioids, and cocaine, and some 31 million of people who use drugs suffer from drug use disorders. According to the National Survey on Drug Use and Health (NSDUH), 19.7 million American adults (aged 12 and older) battled a substance use disorder in 2017; and approximately 4% that equals 992,000 of the American adolescent population age 12 to 17 suffered from a substance use disorder. Consistently, drug-involved citizens in Hong Kong are statistically shown to be over-represented in the offender population. Based on records of the Hong Kong Correctional Services (HKCS), some 80 percent of prisoners in high-security institutions in 2017 had committed serious drug offences directly related to drugs. Ex-prisoners placed under statutory post-release supervision were recalled to prisons mainly because of drug abuse during the supervision period.

Drug abuse is seldom discussed in isolation from drug offending, which refers to the "possession, use, sale or furnishing of any drug or intoxicating substance or drug paraphernalia that is prohibited by law". Drug offending is an alarming specific type of offending because increased drug use was associated with increased drug availability. In the process of drug consumption, drug offending such as processing, manufacturing and selling drugs, has a crucial role in sustaining habitual drug use and causing drug addiction. Among all age groups, illicit drugs act in a more potent way on adolescents than adults. Comorbid offending and substance misuse in delinquents engaged in more subsequent crime and experienced more social problems and addiction symptoms than those who merely offended [1-3]. More importantly, chronic drug use can cause brain changes leading to inability to resist drugs and inhibit further offending [4]. The present study attempts to deepen our understanding of the psychological risk factors of drug offending among a high-risk population in a Chinese community: young offenders in Hong Kong within the context of adolescent offending and re-offending. The issue as to whether some well-known variables constitute common risk factors to general offending, or in fact drug offending has specific risk factors, has not been systematically addressed in prior research. Six psychological factors that potentially contribute to later offending and drug-involvement in delinquents, namely, impulsiveness, empathy, aggressiveness, social problem-solving, future time perspective and assertiveness, are identified for investigation based on two highly relevant theoretical models: the diathesis-stress theory (DST) [5,6] and the externalization spectrum conceptualization (ESC).

The DST postulates a predisposition to develop certain types of mental or behavioral disorder which is activated by certain environmental stress factors. It postulates that a general vulnerability to offending is formed by a combination of many vulnerability or psychological risk factors, such as cognitive and behavioral skill deficits, emotion dysregulation, and cognitions. The more vulnerable individuals possessing a greater number of risk factors commit offences upon triggers by less intense stressors, such as a high-stress family environment [7,8]. Once the pertinent risk factors have been identified, intervention could be directed at them in members of a problematic segment of the adjudicated delinquent population that tend to persist in crime beyond adolescence [1-3]. Besides, as the risk factors that it addresses can exert distal influences and have limited variability without target-specific intervention, extreme scores on those factors may account for the etiology of criminal behavior in specific circumstances. Identifying risk factors that differentiate offenders from non-offenders are promising tools for assessing offenders' risk for offending [9]. This research is an attempt to identify risk factors of drug offending through differentiation of drug offenders from other non-drug offenders.

The ESC emphasizes on a coherent and genetically-based liability dimension causing an individual to act in an unconstrained manner towards "externalizing" or acting out. It posits that impulsiveness and aggressiveness, the "big two", are the "most relevant specific traits" associating with externalizing behavior. In a representative research

effort that proved the existence of a general externalizing spectrum, factor analysis revealed that there are two largest factors: 1) drug-related problems; and 2) aggression-related problems. Accordingly, it is expected that there are specific psychological risk factors for drug offending akin to other types of specific offending, such as sexual and violent offending, who had received much more attention than drug offending in prior risk factor research [10].

Consistent with the ESC, longitudinal studies on juvenile delinquency revealed that early impulsiveness during childhood predicted later offending [11]. It was found to be a risk factor of drug experimentation and drug use [12]; and to predict drug use severity and lifetime drug usage. Most of previous research had focused on childhood aggressiveness that predicted adolescent offending and drug abuse and fewer studies had been conducted to study whether adolescent aggressiveness predicted adult offending or drug abuse. Nevertheless, the importance of aggressiveness as a risk factor for later offending could not be denied, as Tremblay and LeMarquand have concluded in a review that "the best social behavior characteristic to predict delinquent behavior before age 13 appears to be aggression".

Apart from the "big two", empathy had always been regarded as strongly associated with prosocial behavior and moral judgment. A lack of empathy is a central component of the concept of psychopathy, which is a constellation of psychological and behavioral traits lined to criminal behavior. Its linkage with higher recidivism among delinquents had been found. Empathy was also positively associated with drug refusal efficacy which was negatively related to past 30-day drug use. There is evidence that there are subtypes of conduct-disordered adolescents with different extents of deficits in empathy (or callous-unemotional traits). A meta-analysis demonstrated that cognitive empathy was more strongly associated with offending than affective empathy. It replicated findings in an earlier meta-analysis conducted by Jolliffe and Farrington [13], who suggested that longitudinal designs should be used to inquire into the relationship between empathy and offending. The present study was an attempt to study about the role of empathy in a longitudinal way.

Another positive attribute that constitute risk for later offending when in deficit was social problem-solving (SPS). Ineffective SPS was found to be associated with interpersonal difficulties, behavioral problems and psychological maladjustment in the West and in Hong Kong. A study conducted by Zamble and Quinsey was frequently quoted as they had specified the role of problem solving in the recidivism process. They interviewed 300 serious offenders and found that re-offences were often preceded by difficulties in coping and poor self-management, and characterized by a lack of a positive problem-oriented approach that allowed problems to accumulate to unbearable levels until they experienced a "breakdown". Consistent with results of this classical study, a recent review of 30 years of empirical evidence revealed that impaired problem solving accompanied some personality disorders such as antisocial personality disorder and substance dependence.

Although future time perspective (FTP) was less frequently included in previous risk factor research, its association with antisocial behavior and recidivism among youngsters was continuously confirmed in updated research. A recent meta-analysis also showed that individuals with higher FTP were less likely to engage in drug use and risk-taking behaviour [14]. The last variable, assertiveness, was the least understood among all variables in this study. It was generally believed that some offences occurred because offenders could not deal effectively with anger or other negative emotions in assertive ways; and

in particular drug-abusing offenders tended to have discomfort and deficiencies in assertive behavior in high-risk situations of relapse and thus easily slip to drug use [15]. Research in the 1908s had indicated that higher assertiveness was desirable in reducing likelihood of antisocial behavior and recidivism in particular to sexual offences. Although recent research gave contradictory results that assertiveness is associated with greater criminal tendency (Salekin, Debus, & Barker, 2010), assertiveness training has been included in many intervention programs for offenders and drug abusers in the West and in Hong Kong.

According to the DST, a combination of the psychological risk factors previously shown to be associated with offending constitutes a general vulnerability to offending and drug abuse. However, the DST has been developed and validated in the Western cultural context, and its generalizability to other cultural contexts may be questionable. Therefore, in this study, we first investigated the association between the psychological risk factors and later offending (of any crimes) to support the application of the DST in young offenders growing up in Hong Kong, which is a unique society of the blending of Chinese and Western cultures. Then, because the relationship of the psychological variables with drug offending may not be the same as those with other offending, we attempted to test out whether the two independent factors, namely "drug-related" and "aggression-related", identified in the ESC would also be applicable in Hong Kong, such that young offenders with drug-related issues could be distinguished from their counterparts with a specific set of psychological risk factors predicting drug offending. As the DST postulates, extreme scores on those specific risk factors may account for the etiology of drug offending. The present attempt involved investigation of the most prominent psychological factors that underlie general and drug offending in the local context.

This study made use of a representative sample of male and female respondents who had initially been assessed when they were incarcerated in correctional institutions for young offenders in Hong Kong in 2004, and followed 11 years later in 2015. Although newly designed cross-sectional research could be conducted to include all interested and relevant variables associating with drug offending on the basis of most updated knowledge, the use of a longitudinal design has the unique indispensable strength in making cause-effect inferences about the relationship between relevant risk factors in adolescence and eventual offending in adulthood. The extended duration over 10 years was necessary given the relative low base rate of recidivism in research on criminal offences. Similar longitudinal research in the field has been rare and the data generated from the present study would certainly fill the gap in current research.

Method

Participants

The participants (*n* = 201, 187 males) were justice-involved youths who were detained in the correctional institutions operated by the HKCS. Convicted youngsters in Hong Kong were put under four different correctional programs, the Rehabilitation Centre Program, Detention Centre Program, Training Centre Program, and Young Prisoner Program, in response to sentencing options determined by the court. All participants were selected through a stratified random sampling procedure, with their registered numbers in the HKCS rolled out from a computer program which ensured that the proportions of participants from each gender and institution were equal to those in the total population on a snapshot, a randomly selected date of reference (03.01.2004). Only illiterate adolescents were excluded, and those in

the same correctional program were randomly selected as substitutes for exclusions. In the stratification process, each correctional program was a relatively homogenous sub-group in terms of background characteristics, including demographics, criminal history, and offence severity. The sample was believed to be representative of the then young offender population in correctional institutions in Hong Kong. The number of participants selected from each correctional program was more or less in proportion with the total population in each program at the time of data collection. The participants were 14 to 22 years old, with a mean age of 17.8 years (SD = 1.62 years). All the participants spoke Cantonese and read the traditional Chinese texts as their primary language. Prior to assessment, all participants consented to provide their information to the use of their information anonymously for research purposes. The data collection was approved by the ethics committee of the department given that the study would do no harm to the offenders and their welfare and rights would not be affected by their participation in the study. Participants were fully briefed about the purpose of the study and the process of data collection.

Measures

Impulsiveness: The Impulsiveness subscale (I-7) of the Impulsiveness Questionnaire (7th Version) assesses one of the three constructs, impulsiveness, included in the original Questionnaire. Support for its psychometric properties in cross-cultural studies was also demonstrated. In this sample, the internal consistency was .72, which indicated good reliability. The two-week stability correlation was .81 (Pearson r) and .80 (ICC), also suggesting good test-retest reliability.

Aggression: The Aggression Questionnaire (AQ; Buss & Perry, 1992) measures four aspects of aggressiveness, namely physical aggressiveness, verbal aggressiveness, anger and hostility. Stability over time and validity was shown by the test authors (Buss & Perry, 1992). In this sample, the internal consistency of the AQ was .86, which indicated excellent reliability. The two-week stability correlation coefficient was .88 (for both Pearson r and ICC), which indicated good test-retest reliability.

Empathy: The Empathic Concern and Perspective Taking subscales (IRI-EP) of the Interpersonal Reactivity Index were selected after careful review of previous research suggesting that they were positively correlated and predictive of later offending. Reliability and validity of the IRI were shown in cross-cultural studies. In this sample, the internal consistency ranged from .73 to .78, indicating good reliability. The test-retest reliability ranged from .72 to .77 for Pearson r and from .71 to .76 for ICC, which were within the acceptable range.

Social Problem Solving: The Social Problem Solving Inventory consists of two major subscales, namely Problem Orientation and Problem Solving Skills. The test authors have shown excellent internal consistency for SPSI, with alphas of .94 and three week test-retest correlations of .87. In this sample, the internal consistency of the SPSI was .93, which indicated excellent reliability. The test-retest reliability was .91 (Pearson r) and .90 (ICC), which indicated high reliability.

Future Time Perspective: The future subscale is one of the five dimensions of time perspectives, namely past positive, past negative, present hedonistic, present fatalistic, and future, measured by the Zimbardo Time Perspective Inventory. In an integrated research on the structural equivalence of the ZTPI across 26 samples from 24 countries (N = 12,200), the ZTPI was proven to be a valid and reliable index of individual differences in time perspectives. In this sample, the internal consistency of the future subscale was .72, which indicated good reliability. The two-week stability correlation coefficient was .81

(for both Pearson r and ICC), suggesting good test-retest reliability.

Assertiveness: The Simple Rathus Assertiveness Scale is a parallel form of the Rathus Assertiveness Schedule, which has established construct validity and an internal consistency of coefficient alpha equal to .90. Evidence of cross-cultural reliability and validity was shown. The SRAS, which was designed for those with low educational attainment, correlates .94 with the original RAS. In this sample, the internal consistency of SRAS was .70, which indicated good reliability. The test-retest reliability was .71 (for both Pearson r and ICC), suggesting acceptable reliability.

Social Desirability: It was commonly believed that self-report measures could be biased by basic human tendency to present oneself in the best possible light for ego defensive or impression management reasons. One of the techniques commonly used by researchers and also employed in this study to mitigate that bias was to include an independent measure on social desirability. The Marlowe-Crowne Social Desirability Scale was one of the most widely used measures for social desirability response style, and its psychometric properties were evaluated in numerous studies. The short form of MCSDS consisting of 13 items was employed in this study. This measure was used as a covariate to be controlled for, such that any relationship identified between the variables and the outcome would not be accountable for by response bias. Reliability coefficients ranged from .59 to .75. In this sample, the internal consistency was .74, which indicated good reliability. The test-retest reliability was .73 (Pearson r) and .72 (ICC), which was within the acceptable range.

Procedures

The seven psychological measures were translated from English to traditional Chinese by a team of clinical psychologists working in the local correctional setting in 2002. The Chinese versions were translated back into English by a professional translator who had no knowledge of the original versions. The team of clinical psychologists then amended the wording of the traditional Chinese versions to reconcile it with the original English version. The final versions of the measures were administered to the participants in 2004 (Time 1) by specially trained correctional officers of the HKCS.

The dependent variables (DVs) were post-release outcomes retrieved from the official offender database of the HKCS in 2015 (Time 2). There were three DVs. The first one was Recidivism. It was a dichotomous and categorical variable consisting of two levels - Recidivist and Desistor. A Recidivist was defined as a previously incarcerated adolescent who had at least one re-conviction of a new offence causing re-incarceration after release. A Desistor was one who had not been re-convicted. The second and the third DVs applied only to the Recidivists. The second DV was prospective Drug Offending. It was also a dichotomous and categorical variable consisting of two levels- Drug offender (DO) and non-Drug offender (nDO). A DO was defined as a Recidivist who had committed one or more drug offence(s) causing re-incarceration after release. An nDO was a Recidivist who had committed any other offence(s) after release. The third DV was Future Crime-Severity, which was operationally defined as: (a) Number of Re-convictions (NoRec); and (b) Total Re-sentence Length (ToRes).

Data analytic strategy

There were controversies in the research field against the human tendency of dichotomizing results as "significant" and "non-significant" with a number (i.e. $p < 0.05$), which was not intended to be used as it was in contemporary research. Recent debates had called "for an

end to hyped claims" pertinent to statistical significance. Researchers were advised to seek to analyse data in multiple ways to see whether different analyses converge on the same answer. Attempting to address these controversies, the authors of this research had employed two statistical tools for each variable inquiry; whereas a slight extension beyond the conventional statistical level of $p < 0.05$ was adopted, with cautious consideration of all parameters that were highly suggestive of association among the variables.

The Statistical Package for Social Sciences version 19.0 (IBM Corporation, Armonk, NY, USA) was used. *One-way Analysis of Covariance (ANCOVA) with planned orthogonal contrasts* was conducted to compare the psychological risk factors of three distinct groups: 1) Desistors, 2) Recidivist–DO and 3) Recidivist–nDO. A Contrast 1 was a comparison of the Desistors with the Recidivists. Contrast 2 was a comparison of the DO with the nDO. To rule out the possibilities that any difference found might be due to effects of some major extraneous variables, three covariates including age of assessment, educational level and social desirability represented by MCSDS were controlled for. A second statistical tool namely hierarchical discriminant function analysis (DFA) was conducted to differentiate the Desistors from the Recidivists and the DO from the nDO. The logic of use of differentiation was in line with the DST suggesting that it is a promising tool for identifying etiology and assessing risk for future offending. The same three covariates were entered as a block at the first stage, followed by the six IVs that were entered simultaneously. Future Crime-severity represented by two indicators, number of re-convictions (NoRec) and total re-sentence length (ToRes), were analyzed with correlation and hierarchical linear regression analysis (HLRA). All six IVs were included in the HLRA regardless of whether a variable would have manifested any relationship with the DVs in the correlation analysis, with an aim to test out whether the results of correlation would change with variation in the context of variables included in an HLRA, which was the case commonly found in statistical analysis. The same three covariates were controlled for in the HLRA.

Results

Among the 201 participants, 97 (48.3%) were Recidivists and among the Recidivists, 47 (48.5%) were DO. Table 1 showed the descriptive statistics of the scores on the six IVs among the Desistors, the Recidivist–DO and Recidivist–nDO after adjusting for three covariates (Table 1).

One-way ANCOVA with planned orthogonal contrasts were conducted to compare the Desistors with the Recidivists, and the DO with the nDO on the six IVs. Table 2 showed the results. Contrast 1 was a comparison of the Desistors with the Recidivists, and Contrast 2 was a comparison between the DO and the nDO (Table 2).

Contrast 1 revealed that the Recidivists had scored significantly lower in FTP (*Adjusted Means(SD)* (DO & nDO) = 3.10(.48) & 3.15(.45)) than the Desistors (*Adjusted Mean(SD)* = 3.29(.43)) (*Beta* = .17, *SE* = .08, *t* = 2.19, *p* = .030). The mean IRI-EP of the Recidivists (*Adjusted Means(SD)* (DO & nDO) = 30.30(7.83) & 31.04(7.07)) was lower than that of the Desistors (*Adjusted Mean(SD)* = 32.92(7.38)), which just failed to reach conventional statistical significance (*Beta* = 2.32, *SE* = 1.26, *t*= 1.84, *p* = .067). The Recidivists had scored higher on SRAS (*Adjusted Means(SD)* (DO & nDO) = 97.94(13.55) & 99.56(12.09)) than the Desistors (*Adjusted Mean(13.55)* = 93.82) (*Beta* = -4.06, *SE* = 2.33, *t* = -1.74, *p* = .084), which was approaching conventional statistical significance.

Contrast 2 revealed that the DO had scored significantly higher on I-7 (*Adjusted Mean(SD)* = 10.78(3.39)) than the nDO (*Adjusted Mean(SD)* = 9.14(3.69)) (*Beta* = -1.66, *SE* = .67, *t* = -2.18, *p* = .014). The difference in SPSI between the DO (*Adjusted Mean(SD)* = 140.93(26.04)) and the nDO (*Adjusted Mean(SD)* = 150.10(27.10)) was approaching conventional statistical significance (*Beta* = 9.65, *SE* = 5.63, *t* = 1.71, *p*= .088).

Differentiation of recidivists from desistors

In order to examine group differentiation by linear combination of IVs, hierarchical DFA was used to conduct a multivariate analysis of variance test to see whether the Recidivists and the Desistors would differ significantly in the six IVs. The three covariates, age, educational level, and social desirability, were entered in the first stage, followed by the six IVs as a group. The cumulative impact of adding a variable group to each subsequent analysis was assessed and summarized in Table 3, which showed that the amount of variance accounted for grew from 5.2% to 11.1% after the six IVs had been added to the analyses. The inclusion of the two variable groups resulted in two significant discriminant functions (Table 3).

As indicated in Table 4, a rise in the number of Recidivists (from 56.3% to 69.2%) was classified with the inclusion of the second group of IVs (Table 4).

For the full model including the two variable groups, the DFA accounted for 11.1% of the between groups variance (Wilks λ = .889, X^2 (9) = 20.30, p = .016) and correctly classified 65.4% of the cases (69.2% of the Recidivists and 61.4% of the Desistors). A linear combination of the variables, including three covariates and six IVs, could discriminate the Recidivists from the Desistors with the below discriminant function:

Discriminant Function = .67*FTP + .56*Educational level - .37*SRAS - .27*SPSI - .26*AQ + .14*I-7 + .11*IRI-EP + .09*Age of Assessment - .04*MCSDS

The discriminant function indicated that FTP was the most important psychological factor in discrimination of the Desistors and the Recidivists.

Table 1: Descriptive Statistics of Psychological Risk Factors in Desistors, Recidivist- Drug Offenders and Recidivist- non-Drug Offenders.

	Desistors		Recidivist-DO		Recidivist-nDO	
	Adjusted M (Adjusted SD)	n	Adjusted M (Adjusted SD)	n	Adjusted M (Adjusted SD)	n
I-7	9.98 (3.88)	95	10.78 (3.39)	45	9.14 (3.69)	50
AQ	88.42 (14.26)	100	89.16 (13.68)	44	92.56 (14.41)	50
IRI-EP	32.92 (7.38)	101	30.30 (7.83)	46	31.04 (7.07)	50
SPSI	147.82 (33.54)	99	140.93 (26.04)	45	150.10 (27.10)	50
FTP	3.29 (.43)	100	3.10 (.48)	45	3.15 (.45)	50
SRAS	93.82 (13.55)	100	97.94 (13.55)	46	99.56 (12.09)	50

Table 2: Results of One-way ANCOVA with Planned Orthogonal Contrasts of Psychological Risk Factors by Recidivism (Contrast 1) and Drug Offending (Contrast 2).

	Contrast	Value of Contrast	SE	t	p
I-7	1	-.59	.60	-.97	.332
	2	-1.66	.67	-2.48 *	.014
AQ	1	-.60	2.35	-.25	.800
	2	2.15	2.64	.81	.417
IRI-EP	1	2.32	1.26	1.84 #	.067
	2	.86	1.43	.60	.546
SPSI	1	5.76	4.99	1.16	.250
	2	9.65	5.63	1.71 #	.088
FTP	1	.17	.08	2.19 *	.030
	2	.06	.09	.70	.488
SRAS	1	-4.06	2.33	-1.74 #	.084
	2	1.03	2.64	.39	.696
* p < .05; # p < .1					

Table 3: Differentiation of Recidivists from Desistors - Cumulative Hierarchical Discriminant Function Information.

Variable Group	X^2	df	Significance	R^2
Cov	10.27	3	.016	.052 (5.2%)
Cov + 6 Risk Factors	20.30	9	.016	.111 (11.1%)

Note: Cov = Covariates, including demographics and social desirability; 6 Risk Factors include mean scores on all 6 psychological measures.

Table 4: Differentiation of Recidivists from Desistors - Cumulative Hierarchical Discriminant Function Classification Information.

Variable Group	Percent correctly classified		
	Desistors	Recidivists	Total
Cov	63.4%	56.3%	59.9%
Cov + 6 Risk Factors	61.4%	69.2%	65.4%

Note: Cov = Covariates, including demographics and social desirability; 6 Risk Factors include mean scores on all 6 psychological measures.

Table 5: Differentiation of DO from nDO - Cumulative Hierarchical Discriminant Function Information.

Variable Group	X^2	df	Significance	R^2
Cov	3.91	3	.272 (ns)	.041 (4.1%)
Cov + 3 Risk Factors	12.73	6	.047	.136 (13.6%)

Note: Cov = Covariates, including Demographics and Social Desirability; 3 Risk Factors include mean scores on 3 measures: I-7, AQ and SPSI.

Differentiation of drug offenders from non-drug offenders

Hierarchical DFA was also conducted to see whether the DO and the nDO would differ significantly in the six IVs. The three covariates were entered in the first stage, followed by the six IVs as a group. The two variables groups resulted in a non-significant discriminant function, Wilks λ = .864, X^2 (9) = 12.32, p = .196 (ns). As I-7 and SPSI were found to differ between the DO and the nDO in the ANCOVA with planned orthogonal analysis, a backward elimination procedure was taken to remove irrelevant variables in the DFA. Results showed that three of the six IVs, I-7, AQ and SPSI, contributed to a statistically significant discriminant function (p = .047). The cumulative impact of adding each variable group to the DFA was summarized in Table 5, which showed that the amount of variance accounted for grew from 4.1% to 13.6% after the three IVs had been added to the analysis (Table 5).

As indicated in Table 6, a rise in the number of DO (from 54.3% to 59.5%) was classified with the inclusion of the three IVs (Table 6).

For the full model including the two variable groups, the DFA

Table 6: Differentiation of DO from nDO - Cumulative Hierarchical Discriminant Function Classification Information.

Variable Group	Percent correctly classified		
	nDO	DO	Total
Cov	68.0%	54.3%	59.9%
Cov + 3 Risk Factors	74.0%	59.5%	67.4%

Note: Cov= Covariates, including demographics and social desirability; 3 Risk Factors include mean scores on 3 measures: I-7, AQ and SPSI.

Table 7: Correlation and MLRA of Psychological Risk Factors in Predicting Number of Re-convictions in DO.

Variables	Correlation with No. of Reconvictions	Multiple Linear Regression Analysis				
	r	B	SE B	β	p	Adjusted R^2 (Sig.)
Step 1						
Age		-.02	.18	-.02	.912	.025
Edu		.59	.31	.321	.065	(p= .270)
MCSD		.03	.13	.033	.847	(ns)
Step 2						
Age		.09	.19	.08	.088	.215 *
Edu		.59	.31	.32	.59	(p= .041)
MCSD		.27	.15	.34	.270	
SPSI	-.43 **	-.05	.01	-.75 **	.001	
AQ	.12	.03	.02	.24	.131	
SRAS	-.35 *	.03	.02	.22	.222	
I-7	.21	-.08	.09	-.17	.350	
IRI-EP	-.19	-.03	.04	-.12	.557	
FTP	-.10	.42	.77	.12	.590	

* p < .05 (two-tailed significance); ** p < .01 (two-tailed significance)
Note: Age = Age of Assessment; Edu = Educational Level

accounted for 13.6% of the between groups variance (Wilks λ = .864, X^2 (6) = 12.73, p = .047), and correctly classified 67.4% of the cases (59.5% of the DO and 74% of the nDO). A linear combination of the six IVs could discriminate the DO from the nDO with the below discriminant function:

Discriminant Function = .91*I-7 - .48*AQ + .44*MCSDS - .38*Age of Assessment - .21*SPSI + .15*Educational Level

The discriminant function showed that I-7 was the most important IV in the discrimination of DO from nDO.

Predicting future crime-severity of drug offenders

Correlation and HLRA were conducted to examine the relationship between the IVs and the two indicators of Future Crime-severity: Number of Re-convictions (NoRec) and Total Re-sentence Length (ToRes). All IVs were included in the HLRA. The three covariates were entered in the first stage, followed by the six IVs as a group. Table 7 summarized the results of correlation and HLRA (Table 7).

Correlation revealed that SPSI (r = - .43, p = .004) and SRAS (r = - .35, p = .017) were significant negative correlates of NoRec among the DO. The full regression model was significant (Adjusted R^2= .215, p = .041). Table 7 showed that at Step 1, the covariates were not significant in contributing to the model. At Step 2, introducing the six IVs explained an additional 19% of variation in NoRec, and this change in adjusted R^2 was statistically significant, F(9, 32) = 2.25, p = .045. Altogether the two groups accounted for 21.5% of the adjusted variance in the model. SPSI was found to be the most important predictor (β = -.75, p = .001). Besides, correlation revealed that SPSI was also a significant negative correlate with ToRes (r = - .45, p = .002) in the DO, whereas I-7 was a

positive correlate close to conventional statistical significance ($r = .24$, $p = .071$). HLRA revealed that the prediction model was not significant, and none of the six IVs was significant. In sum, in the DO, SPSI was a negative correlate with both indicators of Future Crime-severity and a significant predictor in the regression equation for NoRec. SRAS was negatively correlated with NoRec and I-7 was positively correlated with ToRes.

Predicting future crime-severity of non-drug offenders

Although the present study had its major focus on drug offending, corresponding statistical analyses had been conducted on the nDO so that a contrast could be made with the results pertinent to DO. Table 8 summarized the results of correlation and HLRA predicting NoRec in the nDO by the six IVs. Correlation revealed that IRI-EP was a significant negative correlate ($r = -.29$, $p = .041$) of NoRec. The full regression model just failed to reach conventional statistical significance ($Adjusted\ R^2 = .092$, $p= .063$) (Table 8).

Table 8 showed that at Step 1, the three covariates were non-significant in contributing to the model. At Step 2, introducing the six IVs explained an additional 14.6% of variation in the DV, but the change in adjusted R^2 was not significant, $F(9, 39) = 1.54$, $p = .17$ (ns). Altogether the two groups accounted for 9.2% ($p = .063$) of the variance in NoRec in the nDO. IRI-EP was found to be the only significant predictor in the equation ($p =.003$). IRI-EP was the sole predictor for NoRec among the nDO in both correlation and regression analyses. Table 9 summarized the results. Just as for NoRec, correlation revealed that IRI-EP was also a significant negative correlate ($r = -.35$, $p= .014$) of ToRes. The full regression model of prediction yielded a statistically significant model ($Adjusted\ R^2 = .220$, $p = .012$) (Table 9).

Table 9 showed that at Step 1, the covariates had not significantly contributed to the prediction model. At Step 2, introducing the six IVs explained an additional 23% of variation in the DV, and this change in adjusted R^2 was also significant, $F(9, 39) = 2.50$, $p= .023$. Altogether the two groups accounted for 22% of the adjusted variance in ToRes, which was even greater than that in NoRec (9.2%). Just as for NoRec, IRI-EP was the most important predictor ($p = .003$) of ToRes. In sum, both indicators gave convergent results unveiling the important role of

Table 8: Correlation and MLRA of Psychological Risk Factors in Predicting Number of Re-convictions in nDO.

Variables	Correlation with No. of Reconvictions	Multiple Linear Regression Analysis				
	r	B	SE B	β	p	Adjusted R^2 (Sig.)
Step 1						
Age		-.05	.09	-.09	.574	-.054
Edu		-.04	.12	-.06	.723	(p= .907)
MCSD		-.01	.05	-.03	.832	(ns)
Step 2						
Age		.08	.09	.14	.397	.092
Edu		-.05	.12	-.06	.694	(p= .063)
MCSD		-.08	.07	-.22	.290	
IRI-EP	-.29 *	-.07	.02	-.55 **	.003	
FTP	-.10	1.35	.48	.42	.118	
AQ	-.07	-.02	.01	-.38	.132	
SPSI	-.06	-.01	.01	-.31	.159	
SRAS	.06	.00	.01	.04	.794	
I-7	-.00	-.00	.05	-.02	.932	
* p < .05 (two-tailed significance); ** p < .01 (two-tailed significance) Note: Age = Age of Assessment; Edu = Educational level						

Table 9: Correlation and MLRA of Psychological Risk Factors in Predicting Total Re-sentence Length in nDO.

Variables	Correlation with Total Re-sentence Length	Multiple Linear Regression Analysis				
	r	B	SE B	β	p	Adjusted R^2 (sig.)
Step 1						
Age		1.62	2.33	.10	.489	-.01
Edu		-3.67	3.23	-.17	.261	(p = .482)
MCSD		-1.70	1.40	-.18	.233	
Step 2						
Age		4.97	2.30	.32 *	.037	.220
Edu		-4.15	3.08	-.19	.186	(p = .012)
MCSD		-3.67	1.81	-.39 *	.049	
IRI-2sc	-.35 *	-2.03	.59	-.56 **	.001	
FTP	-.06	30.33	11.91	.40	.109	
AQ	-.11	-.72	.34	-.37	.124	
SRAS	.18	.47	.28	.34	.133	
SPSI	-.11	-.29	.19	-.20	.145	
I-7	-.05	-.01	1.26	-.00	.996	
* p < .05 (two-tailed significance); ** p < .01 (two-tailed significance) Note: Age = Age of Assessment; Edu = Educational level						

IRI-EP in predicting Future Crime-severity in nDO.

Discussion

The purpose of the present research was to identify psychological risk factors for drug offending within the context of adolescent offending and re-offending. To achieve this purpose, a longitudinal post-hoc design was applied on analysis of a young offender sample to differentiate recidivists from desistors; and prospective drug offenders from non-drug offenders with six important psychological risk factors. Subgroups of participants spanning 11 years from adolescence through adulthood, based on official criminal record of 201 ex-young-offenders, were identified. About half of them were classified as recidivists, and half of the recidivists were classified as drug offenders. Results of statistical analysis revealed that overall recidivism and drug offending were predicted by different risk factors in different manners.

Consistent with the DST of crime, which suggests that a general vulnerability to offending is formed by a combination of many individual risk factors; half of the psychological risk factors under investigation were predictive of recidivism of young offenders in Hong Kong. The recidivists had lower empathy and future time perspective, and the undesirable role of assertiveness also concurred with recent Western research [16]. The importance of empathy in predicting recidivism suggests that the pathway from adolescent to persistent offending can be reshaped through empathy enhancement, especially for those who were not prone to use illicit drugs in their drug-abuse attitudes and psychological characteristics. Empathy training was widely included in intervention programs which had been proven effective in reducing re-offending. Consistent with prior research that demonstrated the importance of future time perspective in antisocial behavior and recidivism, another implication of our results was that future time perspective deserves more attention in intervention on young offenders than it had received in the past.

Consistent with the ESC, drug offending among local young offenders was predicted by specific psychological risk factors. This implies that etiology of drug offending may be different from that other types of offending. High impulsiveness, social problem-solving

deficits, and low assertiveness were found to be the specific factors characterizing the prospective drug offenders. Among these three factors, the first two also predicted future crime-severity among the drug offenders, suggesting that these two variables are highly relevant to drug involvement as the youths proceeded into adulthood. As one of the "big two" risk factors in the ESC, impulsiveness had exerted powerful influence on future drug offending, possibly because the impulsive system of the young brains may be sensitized towards drug and pertinent cues with their continual drug use; and long-term effects are further impairments of the ability to inhibit and regulate impulsive action tendencies associating with further offending; until they have got trapped in a vicious cycle of persistent drug abuse and offending that they cannot exit. In our sample, impulsiveness that also predicted total re-sentence length in drug offenders might be the reason behind the hasty decisions and higher risk the long-sentence offenders had taken in the process of their decision to commit crimes of more serious consequences, such as those involving a large quantity of drugs. The implication of this finding is that impulsiveness can be placed on a higher treatment priority in intervention efforts aiming at reduction of future drug-involvement in young offenders. Research in the recent decade has shown that impulsiveness in offenders is dynamic and can be reduced by various modes of systematic psychological treatment, including cognitive-behavioral interventions and mindfulness based programs.

As the second most important psychological factor of drug offending, social problem-solving was also found to have diverted local youngsters' path to recidivism *towards* or *against* drug offending and also determined their crime severity. The association may be attributed to the strong linkage between drug abuse and drug offending. There was evidence that initiation or relapse to drug abuse was often linked to problem-solving deficits. Individuals with the deficits might lack the specific skills to identify or negotiate their way out of high-risk situations of drug abuse and offending until it was too late. Besides, deficiencies in problem-solving also led to failures or unsatisfactory interpersonal outcomes that led to negative affective states and then to drug use. The negative affective states and acts of relapse to drug use might then produce a sense of total "giving up" in the individuals, who might soon opt to commit crimes in a state of little concern or contemplation about the consequences of offending. The implication is that enhancing social problem-solving is a promising strategy to divert justice-involved youngsters away from later drug use and drug offending, especially as cognitive problem-solving interventions have been found to be particularly effective in the amelioration of problem and offending behaviours of youngsters.

It must be highlighted here that in this study of local young offenders, severity of prospective drug offending has been predicted by a greater number of psychological risk factors (i.e. impulsiveness, problem solving and assertiveness) than that for non-drug offending (i.e. empathy). It suggests that in general, drug offenders may possess more vulnerability factors that have led to their repeat offending; or in other words, possess more individual needs requiring attention and intervention than their non-drug offending counterparts in their rehabilitation attempts.

Although the DST was found to be largely applicable to young offenders who grew up in Hong Kong, results of this study had not replicated Western research that demonstrated association of the "big two" (impulsiveness, aggressiveness) and social problem-solving with overall recidivism. Besides, our result was contradictory to research evidence in the 1980s suggesting that assertiveness was elevated among

the recidivists. There was likelihood that the cultural context of Hong Kong had exerted an influence on the result. It has been discussed that assertiveness is considered positive and desirable in Western societies but sometimes regarded as negative or undesirable in Chinese societies [17]. Nevertheless, it could not be ruled out that the discrepancy might also be related to a gradual change in the triad subculture from the 1980s, while assertiveness might be desirable to resist crime involvement; to the updated scene that higher assertiveness prevailed among the presentably stronger or tougher "hard core" criminals who had a higher tendency to re-offend [16]. Interestingly, consistent with the literature on drug abuse and relapse that had documented assertiveness as a highly relevant predictor, being more assertive was found to have helped drug offenders in our sample reduce crime-severity, possibly through success in resisting involuntary engagement in crimes or drug-related activities as proven in previous Western research. Our results imply that drug offenders may be different from other offenders in a way that their repeat offending has been influenced to a less extent by the triad subculture and more by individual vulnerability in their path to recidivism. Just as future time perspective and empathy that were found to predict overall recidivism, assertiveness is also worthy of more attention in future research and treatment on local young offenders. A further implication is that assertiveness training may be beneficial only to those who are more prone to drug-involvement as reflected in their drug abuse history and psychological characteristics.

In regard to the "big two" in the ESC, impulsiveness and aggressiveness, our results suggested that the liability dimension causing externalization may be important in predicting adolescent offending but not for their persistent offending in adulthood. One of the possible reasons is that young offenders generally grow out of impulsiveness and aggressiveness as they proceed from adolescence into adulthood, making the effects of the "big two" on recidivism in the age-range covered in this study less prominent than that in the range of childhood to adolescence as always covered in previous research. Our findings have filled the knowledge gap of how the "big two" risk factors of externalization impact on offending in adulthood. Last but not least, our results have confirmed the prediction of the ESC that aggression-related problems is a distinct factor which is independent of drug-related problems predictive of drug offending, and henceforth it has not exerted any effect on prospective drug offending.

Summary

The present research has confirmed that two important theoretical paradigms for offending and drug abuse, the DST and the ESC, are applicable to the young offender population in Hong Kong, although the cultural context and the age group may have compromised its compatibility with the corresponding phenomenon in the West. This research reveals that there are specific psychological risk factors predicting prospective drug offending among young offenders. There were two sets of factors with little overlap in predicting overall recidivism and drug offending. Recidivism was predicted by low empathy (which was particularly relevant to non-drug offending), low future time perspective, and *high* assertiveness. In contrast, drug offending and its crime severity was mainly predicted by high impulsiveness and social problem-solving deficits. Assertiveness was not favorable to general desistance but could lower the severity of prospective drug offending. Drug offenders might be less affected by external factors, such as triad subculture, and more affected by individual vulnerability factors in their repeat offending. They were found to possess more individual needs requiring attention and intervention in rehabilitation attempts.

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Limitations

Owing to its longitudinal nature and lack of control over selection of independent variables, the present research had unavoidably missed some important factors previously found to be strongly associated with adolescent offending and re-offending. Examples were attitudinal variables and drug dependence. Social and criminal psychology research has consistently indicated that criminal attitude or thinking has an important role in association with criminal behavior. Drug dependence has also been investigated as a risk factor of offending. It is likely that some missing psychosocial variables will have significant interactions with the risk factors included this study. Without examination of these variables, how psychological risk factors might work together, for example, with some factors mediating or moderating others to produce certain effects, remained elusive. Future research should consider more sophisticated techniques, such as path analysis, to delineate the relationship among more risk factors and the mechanisms of how they would have contributed to drug offending when a more comprehensive set of predictors can be included.

Conclusion

The present research is one of the first attempts to identify psychological risk factors of prospective drug offending in adolescent offenders in an Asian context. The implications of existence of specific risk factors for drug offending is great both in theoretical and practical realms. To a lot of stakeholders' concern, future rehabilitation for young offenders can be steered towards the most relevant risk factors. Efforts are worthy paying to reduce risk of later drug offending among justice-involved youths through targeting those specific factors. Besides, this research has proven that it is possible to study drug offending as a specific type of offending as other frequently investigated ones (such as sexual and violent offending), and it can be predicted as early as in adolescence. It is hoped that there will be similar research attempts in the future, such that evidence-informed risk assessment tools for drug offending can be developed and applied in early identification of and need-matching intervention for individuals at risk, for the ultimate objective to reduce prospective drug offending, which is difficult to desist from in a long run, among justice-involved and deviant youngsters.

Acknowledgements

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