Journal of
COMMUNITY SAFETY & WELL-BEING

Embracing a multi-disciplinary reality: Introducing our Contributing Editor Community and our continuing LEPH2021 theme

Norman E. Taylor

It is with great pleasure and pride that I open this issue of the Journal with the official introduction of our new Contributing Editor Community (CEC). I wrote more about the rationale for this in my recent *Editor's Corner* piece in our newsletter, **The Dispatch**. I will not repeat much of that background here. Sometimes it is best to let things speak for themselves. Each name below is hyperlinked to the editor's bio. Please welcome:

Ms. Rachel Bromberg, Canada Reach Out Response Network	**Staff Sergeant Dr. Bob Chrismas**, Canada Winnipeg Police Service
Prof. Nick Crofts, Australia University of Melbourne	**Ms. Rachel Huggins**, Canada Ontario Provincial Police
Inspector Daniel Jones, Canada Edmonton Police Service	**Dr. Katy Kamkar**, Canada Centre for Addictions and Mental Health
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Superintendent Bill Spearn, Canada Vancouver Police Department	**Dr. Linna Tam-Seto**, Canada Queen's University
Matthew Torigian, Canada Senior Contributing Editor	

Since our launch five years ago last month, the mission of our Journal has remained focused on research and innovative practice characterized by meaningful collaborations across and among such diverse disciplines as overall health, mental health, public health, child development and education, social services and employment, substance use and addictions, and all aspects of the criminal justice system, including policing, prosecutions, and corrections; an emphasis on victim-centred, trauma-informed, restorative, inclusive, and socially equitable practices; and ongoing attention to the well-being needs of service providers themselves.

During our recent virtual meeting of the full Journal team, it was remarkable to hear the extent to which each of these new CEC members has manifested this same inter-disciplinary commitment in their own career. Their origins, perspectives, life experiences and professional achievements are diverse. Some of their careers already span decades, and some are still emerging. In addition to guiding the peer-review and editorial processes for our submissions, each will also serve as an excellent ambassador for the knowledge-sharing mission of our Journal across their varied networks of policy-makers, practitioners, scholars, and researchers in their respective fields.

DEFYING BOUNDARIES, EXCEEDING EXPECTATIONS

By all accounts, the recent fully virtual 6th International Law Enforcement Public Health (LEPH2021) Conference was another great success. Our Journal team was pleased to both contribute to and participate in the learning and global interaction. The hosts, the organizers, and a rich body of contributors proved again that the pathways to systemic reform and social equity will be best forged where sectoral perspectives converge and where collaboration across disciplines fuses rather than divides the insights and efforts needed to overcome the stickiest problems we face. The response to our themed call for papers was robust, and we are pleased to feature several articles related to the conference in this current issue, in our upcoming September issue, and likely beyond that. We extend our thanks to those who responded with their high-value submissions, and our CEC team and our reviewers continue to work with authors to ensure as many as possible reach a readiness for publication soon.

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We have also been greatly encouraged by a continuing growth in regular submissions not tied to the conference, and in fairness to those contributors, this and subsequent issues will continue to feature a blended assortment of papers.

Our open call for papers is ongoing. Our open access commitment and our social media enhancements, recently announced in **The Dispatch**, will expand the reach and reception for your works. And our new team of Contributing Editors will ensure that our mission is heard more widely so that more and more voices are brought into this global conversation about better ways to achieve community safety and well-being, everywhere.

CONFLICT OF INTEREST DISCLOSURES

The author has continuing business interests that include providing advisory services to communities, police services and related human service agencies.

AUTHOR AFFILIATIONS

*Editor-in-Chief

ORIGINAL RESEARCH

Journal of
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TRUST

A U-shaped association between depression and vigorous physical activity: A cross-sectional study in a cohort of police officers and staff in England

Rabeea Maqsood,* Sarah Buckingham* and Karyn Morrissey*

ABSTRACT

Policing has become an increasingly sedentary occupation. At the same time, rates of depression are increasing across the police force. Vigorous physical activity (VPA) has been associated with decreasing rates of depression, yet studies of VPA in policing are limited. This study aimed to explore the prevalence of depression and examine its association with VPA in police officers and staff in England, further stratified by gender. A cross-sectional, secondary data analysis of the Airwave dataset was undertaken. The data were analyzed using descriptive statistics and multivariate logistic regression. Of 28,465 police officers and staff in England, 12% reported having doctor-diagnosed depression and 25% were physically inactive. Relative to being physically inactive, undertaking VPA for either four or seven days was significantly associated with having the lowest odds of reporting depression (OR 0.59, 95% CI: 0.51–0.70, $p < 0.001$) (OR 0.59, 95% CI: 0.45–0.77, $p < 0.001$), respectively, suggesting a U-shaped/non-linear relationship. This relationship was also observed in the gender-stratification analysis. While the odds of reporting depression were significantly lower for men than women, VPA was significantly associated with reducing the odds of reporting depression slightly more in women (OR 0.43, 95% CI: 0.27–0.67, $p < 0.001$) than in men (OR 0.50, 95% CI: 0.33–0.75, $p < 0.01$), indicating women may be more likely to benefit from VPA than men. Vigorous physical activity may provide a protective effect against depression. To prevent the onset of depression in the target population, policy-makers should consider designing physical activity guidelines for police officers to promote VPA in the target population.

Key Words Occupational health; mental and physical health; police force; secondary data analysis; psychophysical health; gender disparity.

INTRODUCTION

Policing is regarded as one of the most stressful occupations globally (Santa Maria et al., 2018). Coupled with the organizational challenges (Fox et al., 2012; Garbarino et al., 2013), prolonged exposure to traumatic and violent events increases the vulnerability of police officers to mental health disorders (Karaffa et al., 2015)—which are recognized as a leading cause of retirement in this population (Fox et al., 2012).

The increasing depression rates among police officers have been extensively reported in numerous studies within an occupational stress framework (Lawson et al., 2012; Wang et al., 2010; Wickramasinghe et al., 2016). A survey by English and Welsh policing reported around 80% of police officers feeling stressed or anxious (Houdmont et al., 2020). Costing US $4,489 annually per police officer in the United States, police officers with mental health problems have also been reported to have a significantly higher productivity loss (5.9%) than police officers without any mental health issue (3.4%) (Fox et al., 2012). Indicating depression-related gender disparities, a study reported a two-fold higher prevalence of depressive symptoms in female police officers (12.5%) than in male police officers (6.2%) (Violanti et al., 2009). Overall, this emphasizes the importance of timely assistance of police officers battling with depressive symptoms (Garbarino et al., 2013).

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Traditionally, police work has been associated with physical fitness. However, with the increase in hybrid crimes and especially cybercrimes (Caneppele & Aebi, 2017), police officers are becoming less physically active (Lagestad & Tillaar 2014). Increasingly recognized as a preventive tool for clinical depression (Lambert et al., 2016), physical activity (PA) may mitigate the rising depression rates among police officers. The positive impact of PA on physical and mental health is well established (Noh et al., 2015). In addition to reducing depression (Azevedo et al., 2012) and improving depressive mood (Noh et al., 2015), PA has also been associated with improving life satisfaction, psychological well-being, and cognitive functions (Carek, Laibstain & Carek, 2011).

Research examining the impact of PA on depression in the police force has been limited. Previous research has reported a non-linear or U-shaped association between depression and PA in both occupational (Kuwahara et al., 2015) and non-occupational settings (Kim et al., 2018; Wise et al., 2006). These studies found no further reduction in depressive symptoms after reaching a threshold of PA level, indicating a complex association between depression and PA (Wise et al., 2006). In response, this study sought to explore the prevalence of depression and its association with vigorous physical activity (VPA) in police officers and staff in England.

METHODS

This study was a cross-sectional secondary data analysis of the data from the Airwave Health Monitoring study, an ongoing longitudinal study (Airwave Health Monitoring Study, n.d.). As the Terrestrial Trunked Radio (TETRA) is used for radio communication by the British police forces, the Airwave Health Monitoring study primarily aims at evaluating the impact of TETRA usage on health. Launched in 2004, the Airwave Health Monitoring study constitutes the largest cohort dataset on the police forces in the United Kingdom. At the end of the baseline recruitment in March 2015, 53,114 police officers and staff from the United Kingdom were recruited. A range of health and well-being data were collected from both radio users, and non-users from more than 50 clinics across the United Kingdom. The recruitment of participants and data collection has been described in detail elsewhere (Elliott et al., 2014).

The present study focused on police forces in England, as this constituted the highest number of participants (n = 28,465, 69.4%) in the dataset. The data collected between 2004 and 2015 were used for the present study. Responses for the variables of interest were collected through a touchscreen-based questionnaire administered to the participants by the Airwave team (Elliott et al., 2014).

In this study, participants were categorized into the organizational positions of "inspectors/chief-inspectors/superintendent/above," "police constables/sergeants," "police staff," and "'others." In the UK police forces, chief constable and special constable are the highest and lowest ranks, respectively (Cambridgeshire Constabulary, n.d.). The absence of an internal hierarchy of "police staff" and definition of "others" in the Airwave dataset limited the understanding of these police roles in this study.

The outcome variable selected was self-reported doctor-diagnosed depression, herein referred to simply as depression, with participants asked, "Have you ever been diagnosed by a doctor with depression?" The responses were either "Yes" or "No." Owing to the absence of clinical measures of depression in the Airwave dataset, self-reported depression was used. Regarding the validity of self-reported measures, research has found that self-reported data is a valid method to capture the health outcomes in epidemiology (Morrissey, 2016). As such, self-reported doctor-diagnosed depression is a widely used measure of depression (Bishwajit et al., 2017; Morrissey, 2016). A police study has also used a self-reported measure of depression to study depression in police officers (Wang et al., 2010).

The main explanatory variable—the number of days of VPA in the preceding week, hereafter VPA—was used as a proxy for VPA (Bishwajit et al., 2017). Participants were asked, "During the last 7 days, on how many days did you do vigorous physical activities?" using the International Physical Activity Questionnaire (IPAQ). The IPAQ is a self-report questionnaire which has been used internationally to measure PA levels in adult populations aged 15 to 69 years (Cleland et al., 2018). Researchers suggest that the IPAQ is better implemented when used in larger studies than on individual level studies for within or cross-country comparisons of groups for PA levels (Cleland et al., 2018). Regarding the selection of VPA, recalling PA over the previous 7 days has been used as a standard method for estimating typical PA levels (Bishwajit et al., 2017). This selection was also guided by previous research which reports that VPA is significantly associated with reducing depressive symptoms (Noh et al., 2015; Wise et al., 2006). The Metabolic Equivalent of Task (MET) could not be used due to a lower response rate than VPA.

From a temporal timeframe, we are linking measures taken from the previous 7 days (VPA) with measures that may have been diagnosed at any point in a participant's lifetime (doctor-diagnosed depression). However, self-reported PA in the preceding week has been used in existing studies to understand the association between PA and physical and mental-health outcomes, including self-reported doctor-diagnosed depression (Bishwajit et al., 2017). Indeed, a recent study used self-reported doctor-diagnosed depression and self-reported VPA to study the association between PA and depression among adults in South Asia using the World Health Survey data from the World Health Organization (Bishwajit et al., 2017).

Covariates included age, gender, marital status, organizational position, smoking and alcohol consumption. The inclusion of covariates was guided by previous research in which marital status, smoking, alcohol consumption (Karaffa et al., 2015), and organizational position (Garbarino et al., 2013) have been associated with depression and considered as confounding variables when exploring the association between depression and PA (Kuwahara et al., 2015; Noh et al., 2015). The gender stratification analysis was performed to explore depression-related gender differences and the impact of VPA in the current sample, guided by previous research (Violanti et al., 2009).

Statistical analysis was performed using the statistical package Stata/SE 15.1 (64 bit). Descriptive data analyses, including mean, standard deviation (SD), frequency (n), and range, were employed to study the socio-demographic profile of the participants. To study the relationship between the outcome variable (depression) and explanatory variable (VPA)

and covariates (age, gender, marital status, organizational position, smoking, and alcohol consumption), univariate and multivariate logistic regression was used. The outcome of this analysis was reported as odds ratios (OR) with 95% confidence intervals (CI), where the level of significance was set at 5%.

Three multivariate logistic models were run. The first model was adjusted for age, gender, and marital status. The second model was adjusted for age, gender, marital status and organizational position. The third model was adjusted for age, gender, marital status, organizational position, smoking, and alcohol consumption. The model having the highest R^2 value (representing the model fit) was selected as the final model to be used in the results. The gender-stratified models were run with the same covariates.

RESULTS

Descriptive statistics showed that of 28,465 participants, 62% were men. The average age of the sample was 41.1 years (SD ±9.0). Most participants were in the age band >40 to ≤60 (53%) and were married (59%). Most participants (62%) were police constables or sergeants. In terms of lifestyle factors, 9% of participants reported smoking and 35% reported consuming alcohol two or three times a week.

Twelve percent of participants reported having been diagnosed with depression by a doctor. Of all the participants, 4% engaged in VPA for 7 days of the week as opposed to 25% participants who were not physically active on any day. The average number of days per week for VPA was 2.38 (95% CI: 2.36–2.40). Men were slightly more physically active (average 2.55, 95% CI: 2.52–2.58) than women (average 2.09, 95% CI: 2.05–2.13) (Table I).

The univariate logistic regression analysis revealed that relative to participants who reported zero VPA in the preceding week, participants who engaged in VPA for 7 days had lower odds of reporting being diagnosed with depression by a doctor (OR 0.57, 95% CI: 0.46–0.71). However, participants who did VPA for 4 days, had the lowest odds of reporting depression (OR 0.51, 95% CI: 0.44–0.58) compared with participants with zero VPA.

The fully adjusted multivariate model showed that being physically active for either 4 days or 7 days a week was significantly associated with having the lowest odds of reporting depression compared with participants with zero VPA. Relative to respondents aged ≥17 to ≤40, respondents aged >40 to ≤60 had the highest odds of reporting doctor-diagnosed depression. Compared with female respondents, male respondents had lower odds of reporting doctor-diagnosed depression. Relative to participants who cohabited, the odds of reporting depression were the highest for separated participants, followed by divorced participants. Compared with inspector/chief inspector/superintendent or above, those with the position of police staff had higher odds of reporting doctor-diagnosed depression, followed by police constables/sergeants. Relative to non-smokers, smokers had higher odds of reporting doctor-diagnosed depression. With reference to participants who consumed alcohol daily or almost daily, participants who consumed alcohol two to four times a month had the lowest odds of reporting depression (Table II).

The gender-stratified analysis for male respondents showed that men who engaged in VPA on all 7 days of the

Table I Descriptive statistics of participants

Variable	Frequency (*n*)	Percentage (%)
Gender (*n* = 28,465)		
Male	17,801	62
Female	10,664	37
Age (*n* = 28,465)		
Mean±SD (range)	41.1±9.0 (17.62–74.81)	
≥17 to ≤40	12,702	45
>40 to ≤60	15,190	53
>60	573	2
Depression (*n* = 28,398)		
With depression	3,427	12
Without depression	24,971	88
Organizational position (*n* = 24,732)		
Inspector/Chief Inspector/ Superintendent or above	1,770	7
Police Constable/Sergeant	15,327	62
Police staff	7,160	29
Others	475	2
Marital status (*n* = 28,348)		
Cohabiting	4,968	17
Divorced	1,561	5
Married	16,879	59
Other	738	3
Separated	814	3
Single	3,388	12
Smoking (*n* = 28,421)		
Yes	2,490	9
No	25,931	91
Alcohol consumption (*n* = 25,659)		
Daily or almost daily	1,972	8
Two or three times a week	8,970	35
Four or five times a week	3,079	12
Two to four times a month	7,877	30
Monthly or less	3,761	15
Vigorous Physical Activity (*n* = 28,465)		
0	7,092	25
1	3,832	13
2	4,724	17
3	4,701	16
4	3,373	12
5	2,563	9
6	1,152	4
7	1,028	4

Table II The multivariate logistic regression analysis results for police officers and staff in England

Variable	Unadjusted model	Adjusted Model
Vigorous physical activity		
0	Reference	Reference
1	0.81*** (0.73, 0.91)	0.88 (0.77, 1.00) (NS)
2	0.69*** (0.62, 0.77)	0.75*** (0.66, 0.85)
3	0.62*** (0.55, 0.69)	0.73*** (0.64, 0.83)
4	0.51*** (0.44, 0.58)	0.59*** (0.51, 0.70)
5	0.55*** (0.48, 0.64)	0.65*** (0.54, 0.77)
6	0.52*** (0.42, 0.65)	0.65*** (0.50, 0.84)
7	0.57*** (0.46, 0.71)	0.59*** (0.45, 0.77)
Age		
≥17 to ≤40	Reference	Reference
>40 to ≤60	1.47*** (1.37, 1.59)	1.57*** (1.43, 1.73)
>60	1.25 (0.97, 1.62) (NS)	1.23 (0.90, 1.67) (NS)
Gender		
Female	Reference	Reference
Male	0.37*** (0.35, 0.40)	0.42*** (0.38, 0.46)
Marital status		
Cohabiting	Reference	Reference
Divorced	2.37*** (2.05, 2.75)	1.88*** (1.57, 2.24)
Married	0.90* (0.81, 0.99)	0.90 (0.80, 1.02) (NS)
Other	1.28* (1.02, 1.60)	1.19 (0.91, 1.56) (NS)
Separated	1.98 *** (1.63, 2.40)	1.89*** (1.51, 2.36)
Single	1.27*** (1.11, 1.44)	1.10 (0.94, 1.28) (NS)
Organizational position		
Inspector/Chief Inspector/Superintendent or above	Reference	Reference
Other	1.69** (1.22, 2.34)	1.35 (0.94, 1.93) (NS)
Police constable/sergeant	1.41*** (1.18, 1.70)	1.46*** (1.20, 1.78)
Police staff	2.36*** (1.96, 2.85)	1.74*** (1.41, 2.14)
Smoking		
Yes	1.70*** (1.52, 1.89)	1.36*** (1.19, 1.56)
No	Reference	Reference
Alcohol consumption		
Daily or almost daily	Reference	Reference
Two or three times a week	0.66*** (0.57, 0.75)	0.65*** (0.56, 0.75)
Four or five times a week	0.78** (0.66, 0.91)	0.77** (0.64, 0.91)
Two to four times a month	0.60*** (0.52, 0.69)	0.60*** (0.51, 0.70)
Monthly or less	0.73*** (0.62, 0.85)	0.68 *** (0.57, 0.80)

*$p < 0.05$
**$p < 0.01$
***$p < 0.001$
(NS) = Non-significant; Adjusted model = model adjusted for Age, Gender, Marital status, Organizational position, Smoking and Alcohol consumption (this model had the highest R^2 value compared with the other two adjusted models).

week and consumed alcohol two or three times a week had the lowest odds of reporting depression, relative to their reference groups. Similar to the unstratified model, men aged >40 to ≤60 who were: separated, positioned as police staff, and smokers had the highest odds of reporting depression when compared with their reference groups (Table III).

In contrast, female respondents showed slightly different results with VPA, marital status, and alcohol consumption. Women who performed a VPA 6 days a week and consumed alcohol only two to four times a month had the lowest odds of reporting depression. Moreover, women aged >40 to ≤60 and those who were divorced, positioned as police staff, and smokers had the highest odds of reporting doctor-diagnosed depression, when compared with their reference groups (Table III).

DISCUSSION

Using the Airwave dataset, this study found that 12% of police officers and staff in England reported having doctor-diagnosed depression. The multivariate logistic regression analysis found a significant non-linear (U-shaped) relationship between depression and VPA in the current sample, after adjusting for all confounding variables. With men having lower odds of reporting depression than women, women were more likely to benefit from VPA than men.

The estimated prevalence of depression in the current sample is higher (12%) than that of English adults aged 18 or above (9.9%) who participated in the Mental Health of Children and Young People in England survey in 2017–2018 (Public Health England, 2018) and GP-registered patients aged 18 (9.1%) in 2016–2017 using the data from Quality and Outcomes Framework (QOF) (Health and Social Care Information Centre, 2017). Regarding research in policing, the 12% prevalence of depression in police officers and staff in England indicated by this study may be higher than in the police forces of the United States (9%) (Fox et al., 2012) and Sri Lanka (10%) (Wickramasinghe et al., 2016). In contrast, the estimated prevalence of depression in the current sample was relatively lower than the prevalence of job-related depression reported in the Australian police force (ranging 37.2% to 65.5%) (Lawson, Rodwell, & Noblet, 2012) and British Civil Servants (19.9%) (Azevedo et al., 2012).

The association between depression and VPA observed in this study is similar to previous studies, which report a significant association between VPA and lower odds of reporting depression in occupational (Azevedo et al., 2012) and non-occupational (Noh et al., 2015) settings. This association was also observed in gender-stratified analyses. Explaining this inverse relationship between depression and PA, physiological mechanism suggests that PA stimulates and increases the production of serotonin, a neurotransmitter, in the body, which reduces depressive symptoms (Lambert et al., 2016; Overdorf et al., 2016). With a similar pathway to antidepressant drugs (Lambert et al., 2016), PA can be used as the first-line treatment for mild to moderate depression functions (Carek, Laibstain & Carek, 2011). Regarding the psychological mechanism, the self-efficacy hypothesis suggests that mood and self-confidence may be boosted after regular PA when an individual perceives PA as being a challenge (Azevedo et al., 2012).

Similar to studies on VPA (Wise et al., 2006) or PA (Kim et al., 2018; Kuwahara et al., 2015) and depression, this study found a non-linear relationship between VPA and depression in police officers and staff in England. The lowest odds of reporting depression were for those participants who performed VPA for either 4 or 7 days, indicating that being physically active for 4 days may be as beneficial against depression as being physically active for 7 days. The over-reporting of PA levels by participants has also explained this U-shaped relationship in a non-occupational research setting (Wise et al., 2006).

This is the first study to explore the prevalence of self-reported doctor-diagnosed depression and its U-shaped association with VPA in police officers and staff in England. This exploratory research adds empirical evidence to the limited literature on the association between depression and VPA and highlights depression-related gender disparities within the context of police forces and their staff in England. Another strength is the inclusion of police staff, as the high prevalence of depression reported by this group highlights the importance of including both officers and staff in health promotion policies in the police force. Multiple confounding factors (e.g., socio-demographic and lifestyle factors, organizational position) were adjusted; the effect of VPA on depression remained, even after the adjustment. This study has a large sample size which improves the external validity and potential for generalizing the results more widely.

Regarding the study limitations, this was an opportunistic secondary data analysis of the Airwave dataset rather than a study specifically designed to examine the association between depression and VPA. Using a self-reported measure of depression is another limitation due to recall bias and unreliability of diagnosis (Kuwahara et al., 2015) especially when history of diagnosis (pre/post joining the police force) was unknown. This may have under-represented police populations' mental ill-health burden. Another limitation was not reporting metabolic equivalents of task to quantify VPA, as these had a lower response rate. The cross-sectional study design with fewer participants undertaking VPA hampered the understanding of the causal relationship between depression and VPA. Excluding other potential confounders (e.g., lack of motivation, length of police service, salary) may have impacted the association between depression and VPA.

Regarding policy and practice implications, a significant association between depression and VPA suggests that the introduction of PA guidelines for police officers and staff in England may help to mitigate poor mental health outcomes. Considering the National Police Wellbeing Service (NPWS) to improve psychophysical well-being of police officers and staff (College of Policing, n.d.a), this study recommends augmenting police officers' fitness tests (College of Policing, n.d.b) with mental health assessment tasks. The current Job-Related Fitness Test (JRFT) involves a multistage 15-meter shuttle run which is based on the physiological demands of Personal Safety Training of police officers (College of Policing, n.d.b). Expanding the assessment would allow an evaluation of police officers' mental health post-recruitment, when they are exposed to stressful occupational challenges (Garbarino et al., 2013). Given the need for mental health interventions in English policing (Houdmont et al., 2020), interventions

Table III The multivariate logistic regression analysis results for the gender-stratified sample of police officers and staff in England

Characteristic	Unadjusted Model		Adjusted Model	
	Male	Female	Male	Female
Vigorous physical activity				
0	Reference	Reference	Reference	Reference
1	0.88 (0.74, 1.05) (NS)	0.83* (0.71, 0.96)	0.98 (0.80, 1.20) (NS)	0.82* (0.69, 0.98)
2	0.74* (0.63, 0.88)	0.70*** (0.60, 0.81)	0.85 (0.70, 1.04) (NS)	0.69*** (0.58, 0.82)
3	0.75* (0.63, 0.89)	0.61*** (0.52, 0.72)	0.82* (0.68, 1.00)	0.66*** (0.55, 0.80)
4	0.58*** (0.48, 0.71)	0.55*** (0.45, 0.66)	0.67** (0.53, 0.84)	0.54*** (0.43, 0.68)
5	0.57*** (0.46, 0.71)	0.74** (0.60, 0.91)	0.52*** (0.40, 0.68)	0.83 (0.65, 1.05) (NS)
6	0.69* (0.52, 0.91)	0.55** (0.39, 0.77)	0.84 (0.62, 1.16) (NS)	0.43*** (0.27, 0.67)
7	0.50*** (0.35, 0.71)	0.79 (0.59, 1.06) (NS)	0.50** (0.33, 0.75)	0.69* (0.48, 0.99)
Age				
≥17 to ≤40	Reference	Reference	Reference	Reference
>40 to ≤60	1.91*** (1.69, 2.16)	1.48*** (1.34, 1.64)	1.95*** (1.68, 2.26)	1.34*** (1.18, 1.52)
>60	1.82** (1.27, 2.62)	1.07 (0.73, 1.56) (NS)	1.79** (1.17, 2.76)	0.88 (0.57, 1.37) (NS)
Marital status				
Cohabiting	Reference	Reference	Reference	Reference
Divorced	2.44*** (1.92, 3.09)	2.20*** (1.82, 2.66)	1.89*** (1.44, 2.48)	1.96*** (1.55, 2.47)
Married	0.94 (0.80, 1.10) (NS)	1.13* (0.99, 1.30)	0.75** (0.63, 0.90)	1.06 (0.90, 1.24) (NS)
Other	0.97 (0.63, 1.49) (NS)	1.29 (0.98, 1.69) (NS)	0.90 (0.54, 1.50) (NS)	1.38* (1.00, 1.90)
Separated	2.45*** (1.86, 3.23)	1.77*** (1.34, 2.33)	2.13*** (1.56, 2.91)	1.66** (1.21, 2.27)
Single	0.98 (0.77, 1.25) (NS)	1.22* (1.04, 1.43)	0.99 (0.75 ,1.30) (NS)	1.19 (0.99 ,1.44) (NS)
Organizational position				
Inspector/Chief Inspector/ Superintendent or above	Reference	Reference	Reference	Reference
Other	1.03 (0.59, 1.78) (NS)	1.41 (0.88, 2.26) (NS)	1.06 (0.58, 1.91) (NS)	1.55 (0.93, 2.59) (NS)
Police constable/ sergeant	1.24* (0.99, 1.55)	1.32 (0.94, 1.86) (NS)	1.48** (1.16, 1.88)	1.48* (1.03, 2.14)
Police staff	1.64*** (1.28, 2.10)	1.59* (1.14, 2.23)	1.86*** (1.42, 2.43)	1.73** (1.20, 2.48)
Smoking				
Yes	1.54*** (1.29, 1.84)	1.58*** (1.37, 1.82)	1.33** (1.08, 1.64)	1.38*** (1.16, 1.64)
No	Reference	Reference	Reference	Reference
Alcohol consumption				
Daily or almost daily	Reference	Reference	Reference	Reference
Two or three times a week	0.60*** (0.50, 0.73)	0.61*** (0.50, 0.75)	0.60*** (0.49, 0.74)	0.69** (0.55, 0.86)
Four or five times a week	0.87 (0.70, 1.08) (NS)	0.65** (0.51, 0.83)	0.86 (0.68, 1.09) (NS)	0.67** (0.51, 0.87)
Two to four times a month	0.62*** (0.51, 0.75)	0.49*** (0.40, 0.60)	0.66*** (0.53, 0.82)	0.55*** (0.44, 0.70)
Monthly or less	0.57*** (0.45, 0.73)	0.61*** (0.49, 0.76)	0.68** (0.53, 0.88)	0.68** (0.53, 0.86)

*$p < 0.05$
**$p < 0.01$
***$p < 0.001$
(NS) = Non-significant; Adjusted model =model adjusted for Age, Marital Status, Organizational Position, Smoking and Alcohol Consumption (this model had the highest R^2 value compared with the other two adjusted models).

including mobile health technology (e.g., wearable activity monitors) may be an effective way to promote PA in workplace settings (Buckingham et al., 2019) and subsequently to improve mental health. Such technology has been shown to be acceptable and impactful for increasing PA in the police force, particularly for less active officers and staff (Buckingham et al., 2020). While an economic assessment was not possible in this study, increasing opportunities for PA and assessing the police force's mental health more rapidly may result in fewer sick days and injuries, reducing productivity loss (Fox et al., 2012).

Future research requires longitudinal studies investigating the association between depression and VPA using objective measures of PA that are independent of participants' recall ability, ethnicity, and socioeconomic status and may further the understanding of the duration or intensity of PA that is most beneficial for the police force (College of Policing, n.d.b). Examining the dose–response relationship between depression and VPA is recommended to fully understand how different factors (e.g., frequency and duration of VPA) affect depression; this will help to understand the U-shaped relationship observed in this study. As restrictive factors, including high workload, lack of training facilities and recommendation by superior officers to do exercise in one's spare time, discourage police officers from PA (Lagestad & Tillaar 2014), investigating the barriers to PA in the police work environment is also recommended. In conclusion, promoting PA in police officers and staff may prove to be a cost-effective way to prevent and treat depression by improving psychophysical well-being.

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CONFLICT OF INTEREST DISCLOSURES

Ethical approval was sought from the Research Ethics Committee (REC) of the University of Exeter Medical School, UK. The data from the Airwave Health Monitoring Study is not publicly available. For the purpose of this study, the team of the Airwave Health Monitoring Study at Imperial College London granted access to the dataset upon request by the authors. Only the authorized persons, e.g., RM, KM, and SB used the data for this study. The confidentiality forms provided by the Airwave Health Monitoring Study team at Imperial College London were signed by the authors. The data may be requested from: https://police-health.org.uk/. The authors declare that they have no competing interests.

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ORIGINAL RESEARCH

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TRUST

Comparing the lifestyles of victims: A routine activity theory assessment of repeat victimization in Canada

Zavin Nazaretian* and Chivon Fitch†

ABSTRACT

This paper simultaneously explores the relationship between social status, routine activity theory, and repeat victimization. This study compares the effects of lifestyle with key social status variables like gender, race, and sexuality, on varying degrees of victimization to answer the question: do routine activities or social status predict repeat victimization? This research is a secondary data analysis using two waves of the Canadian Victimization Survey from 2004 and 2009. Both a logistic regression and multinomial logistic regression are used to analyze the possible causes of repeat victimization. Overall, social status is influenced by lifestyle when predicting victimization; however, key social status variables predict high levels of victimization such as identifying as gay or lesbian or being an Aboriginal Canadian. The most powerful indicator of victimization was if a victim had been previously arrested themselves. The results of this study suggest that, while lifestyle is a strong predictor of victimization, minority groups are still at risk of being victimized at higher levels.

Key Words Social status; LGBT.

INTRODUCTION

The relationship between Routine Activity Theory (RAT), social status, and repeat victimization is complex. The three areas are rarely studied simultaneously; thus, little is known about the interaction of repeat victimization with social status (i.e., income, sex, age, completion of high school, race, Aboriginal Canadian status, sexuality, nativity, and an urban–rural identifier) and RAT. By studying repeat victimization, an examination of the causes of victimization can be explored across varying levels of severity and propensity. The majority of empirical tests on prior victimization use binary measures of victimization. In this paper, three levels of victimization will be studied: a binary measure of occurrence, a measure contrasting repeat and single victimization, and a measure of high repeat versus repeat victimization. The measures each paint a different picture of victimization and the implications of differing measurements warrant exploration. Both social status and routine activities will be examined to verify whether the previous weight given to RAT in studies can be maintained as victimization levels increase. One would assume that if RAT successfully explains singular victimization, then as levels of victimization increase, the variables associated with RAT would also become stronger predictors of victimization. If routine activities theory cannot account for repeat victimization, it could raise serious questions regarding the strength of the theory. Does RAT predict multiple victimizations or does one's social status predict multiple victimizations? The present study offers insight into this question to help clarify the relationship between RAT, social status, and repeat victimization.

This research will address the following three research questions. First, how is social status (i.e., race, socio-economic status, gender, and sexuality) related to the probability that an individual will suffer from repeat criminal victimization? Second, do lifestyle and opportunity differences (specified by RAT) explain social status differences in repeat victimization? Third, are social status characteristics moderated by the effects of routine activities on victimization?

Background

Repeat victimization refers to a pattern whereby the same person, household, or place is victimized more than once. Because of the prevalence of repeat victimization, a small proportion of victims represent a disproportionate amount of victimization (Pease, 1993; Perreault & Brennan, 2010;

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Nazaretian & Merolla, 2013). For example, in Canada, just 13.5% of victims represent 54% of all victimization (Gabor & Mata, 2004). Repeat victimization has been of particular interest to crime prevention researchers and criminal justice practitioners since the 1970s and has gained greater exposure in the 1980s as a result of the Kirkholt Burglary Prevention Project in the United Kingdom (Forrester et al., 1988). Kirkholt is a public housing community in England that suffered from rates of burglary far higher than the national average. The study focused on individuals who had already been victims of burglary, finding that repeat victimization was more probable than first-time victimization. The crime prevention project implemented crime reduction techniques based on reducing the opportunity for crime to occur in places it already had. This study demonstrated that cost-effective methods of crime prevention could be developed by focusing on those individuals, households, and places that are most likely to be repeatedly victimized (Forrester et al., 1988). As well as aiding in developing crime prevention efforts, research on repeat victimization has also helped researchers calculate more accurate rates of crime and has influenced the way measures of victimization have been constructed in surveys (Laycock, 2001; Nazaretian & Merolla, 2013; Lauritsen et al., 2012). Research on the rates of crime that include repeat victimization demonstrates victimization surveys underreport crime. Specifically, in Canada, they underreport violent crime more than property crime (Nazaretian & Merolla, 2013).

To date, the bulk of theory testing for repeat victimization involves repeat property crime (Farrell et al., 1995; Johnson et al., 1997; Tseloni et al., 2004; Johnson, 2008). More repeat victimization theory testing is needed for non-property-related victimization. Research indicates that repeat victimization is most prevalent for the most serious violent crimes such as sexual assault and assault (Farrell, Tseloni, & Pease, 2005; Pease, 1993). Previous research on the causes of repeat victimization uses opportunity theories focusing primarily on the environment in which a crime occurs as the most important influence on crime prevalence (Felson & Clarke, 1998; Tilley et al., 2002). Although criminologists target multiple aspects of the criminal environment, the most prominent theory used in studies of repeat victimization is RAT. Routine activities theory dictates that the most significant cause of crime is the opportunity for it to occur, defined by three factors. For a crime to occur there must be a lack of capable guardianship, a motivated offender, and a suitable target (Cohen & Felson, 1979). The last situational factor "a suitable target" has also been operationalized as including the lifestyle of the victims. For instance, individuals who are victimized repeatedly might frequent dangerous areas or otherwise engage in behaviours that increase their risk of criminal victimization. Miethe et al. (1987) explain that RAT incorporates lifestyle theory, but it is a more complete explanation of victimization because it considers both the lifestyle of the victim and the environment of victimization. The proportion of individuals who are repeatedly victimized is seen as evidence that criminal victimization is based on opportunities, because these individuals have specific attributes that make them a consistent target for criminal offenders (Tseloni et al., 2004; Farrell et al., 1995).

Much of the existing research on repeat victimization has focused on police presence in high crime areas, the physical characteristics of high crime areas, and how the mapping of crime patterns can be used to focus police efforts on "hot spots" where a large amount of crime occurs (Farrell & Sousa, 2001; Farrell et al., 1995; Menard & Huizinga, 2001; Polvi et al., 1990; Ratcliffe, 2002; Tseloni & Pease, 2003). The research focused on how to reduce repeat victimization often uses experimental methods that alter the opportunity for a crime to occur by manipulating the physical environment. This research has generally shown that when the opportunity to commit a crime is manipulated, a reduction results (Short et al., 2010). For example, numerous studies have examined parking locations that suffer from repeated car theft. The studies indicate that by increasing surveillance in the area, changing the physical characteristics of the hot spots (lighting) can lead to a reduction in car theft (Levy & Tartaro, 2009). Additionally, there is little evidence of displacement, or criminal offenders simply choosing new parking lots, because there was no significant increase in car theft in nearby areas (Johnson et al., 2012).

This example of repeat victimization research also showcases two related trends in the field. First, the research in this area tends to be limited to property crime; and second, there is little focus on the impact of social status on the opportunity for crime to occur. The present study will focus on both opportunity and social status to determine whether the same theoretical framework that is often used to explain victimization is useful for explaining repeat victimization. Additionally, this research includes an analysis of both property and violent crime, broadening the previously narrow focus used in other tests of RAT. Research shows that victims of assault and sexual assault are the subpopulations of victims who suffer the highest level of repeat victimization (Farrell et al., 2005). International patterns of repeat victimization indicate that the likelihood of being a repeat victim increases as the severity of the crime increases (Farrell et al., 2005). For instance, Pease (1993) argues that the pattern of repeat victims being subject to violent crimes is so pronounced that he suspects that murder victims would suffer from the highest level of repeat victimization prior to their murder. In general, violent crimes against individuals are more likely to be repeat crimes than are crimes against property (Pease, 1993). The literature on victimization fails to fully explain whether repeat victimization is simply the consequence of the same factors that put one at risk of victimization to begin with or whether it results from a more complex explanation. For example, Lauritsen and Quinet (1995) looked beyond opportunity-based theories of crime and examined the effects of the victim labeling process.

Social status is an important factor to consider when examining repeat victimization as many of the factors that contribute to the notion of social status have been linked to an increased risk of victimization: sex (Johnson & Sacco, 1995; Fox et al., 2009); race (Peterson & Krivo, 1999); age (Lauritsen et al., 1992; Sampson & Laub, 2003); income (Gannon & Mihorean, 2004; Daly, Wilson, & Vasdev, 2001); education (Lochner, & Moretti, 2004, Machin et al., 2011); sexuality (Herek, 1990); nativity (Reitz & Banerjee, 2007); Aboriginal status (Brzozowski et al., 2006). These variables (as discussed below) are missing in the majority of research on repeat victimization despite it having been demonstrated in previous studies that they predict both criminal offending and victimization.

This research is of importance to the Canadian population because Canada suffers from high rates of repeat victimization. For instance, in 2004, just 10% of Canadian crime victims represented 60% of all criminal incidents (Perreault & Brennan, 2009). In addition to the skewed amount of crime repeat victimization represents, this effect is exaggerated for the most serious crime types; just two percent of the Canadian population accounted for 60% of all violent crime victimizations (Perreault & Brennan, 2009). Given the degree to which repeat victimization plagues Canada, further research is needed to inform policymakers and practitioners interested in implementing crime prevention measures.

A review of the literature in this field will demonstrate two things. First, research that has examined opportunity theories of crime (versus social status) has not used repeat victimization as the dependent variable. Second, research on repeat victimization has not addressed the relationship between social status characteristics and multiple victimizations.

Opportunity Research Missing Repeat Victimization

While the research focused on repeat victimization has ignored social inequality in its explanation of crime, there is research in the opportunity theory literature that includes inequality. The majority of research in this area comes from lifestyle theory research, but social inequalities are also included in more formal tests of RAT (Cohen & Felson, 1979). Research in this area has examined the link between inequality and lifestyle. Cohen et al. (1981), in their earlier work, specifically explored the connection between social inequality and predatory victimization. While they found some connection between inequality and victimization, it suggested that path analysis would be a useful tool for explaining crime. For instance, the researchers found that people in their study were racially and economically segregated and that those who live in poor neighbourhoods were both more likely to be a poor minority and more likely to be victimized. However, when they controlled for lifestyle and proximity to poor urban areas, they found that income, race, and gender did not have direct effects on the risk of assault (Cohen et al., 1981). Using a tiered measure of victimization, unlike the Cohen study, may uncover the direct effect or the partial effect of inequality on victimization when controlling for lifestyle. While not directly looking for the effect of inequality on victimization (instead of controlling for it), other research on the topic has placed opportunity above inequality in explaining crime (Jensen & Brownfield, 1986; Miethe et al., 1987).

One important study on the connection between opportunity theories of crime and inequality is by Cao and Maume (1993). In their research, they found that lifestyle and urbanization were strong predictors of robbery. However, they also found that the influence of inequality on robbery was mediated by lifestyle. The findings suggest that urbanization and lifestyle are not causal elements of victimization but are mechanisms of the effects of social status. Their work prompts further research on the connection between said variables since these relationships are currently underexamined.

While inequality is not the missing variable in lifestyle theory victimization research, the previously discussed studies lack consideration of repeat victimization. The majority of the work cited is American and, until recently, the National Crime Victimization Survey (NCVS) did not have an easily accessible measure of repeat victimization because multiple victimization incidents were recorded as series of incidents without a record of the exact number of victimizations (Ybarra & Lohr, 2002). Research in the field of repeat victimization has been met with enough acknowledgment that the United States Census Bureau has been persuaded to change their data collection to better measure exact levels of repeat victimization (Lauritsen et al., 2012). Thus, prior research in this area could not use victimization as a variable with scale. This research not only expands on the work of previous repeat victimization research, but it also expands the research on RAT (target suitability/lifestyle) by adding the variable of multiple victimizations.

To date, one study does account for all three of the criteria: inequality, opportunity theory, and repeat victimization. Tseloni et al. (2004) study residential burglary across three nations: England and Wales, the United States, and the Netherlands. Their research uses a continuous variable instead of a dichotomous one for victimization. The study also tested for opportunity theories of crime while controlling for some variables measuring inequality. One difference in the cited work and this research is the choice of control variables. The race variables they used indicated only whether one was white or not white. In addition to the race variable being limited, the economic variable was not ideal. Instead of measuring the exact income or bracket of income for the participants, their employment status was used. This status indicated whether the participants were unemployed, employed part-time, or employed full-time (Tseloni et al., 2004). The researchers found that opportunity was a much stronger predictor than employment status when predicting repeat victimization. The purpose of the study was to test RAT and Lifestyle theory; thus, it was not designed to test the effect of inequality on victimization. This research builds on their work, using more measures for social status.

Repeat Victimization Research

The crime pattern referred to as repeat victimization has been documented as a global phenomenon. Every victimization survey, whether it is the Canadian Victimization Survey (CVS), British Crime Survey, NCVS (United States), or the International Crime Victimization Survey (ICVS), shows a pattern whereby a small proportion of victims represent a larger proportion of crime (Farrell & Bouloukos, 2001). The pattern of repeat victimization is sometimes used to support the notion that criminals capitalize on the same opportunities for those who have been victimized multiple times. The assertion is that the opportunity surrounding certain victims is so great that they are victimized time and time again. Thus, victimization can be attributed to their lifestyle, the environment they live in, or some combination of the two. People who are victimized time and time again are presented as appealing victims. While the connection between opportunity theories of crime and repeat victimization seems obvious, little has been done to explore the connection between social status and repeat victimization.

Repeat victimization literature can be broken down into three categories of research (methodological, prevention/policy, and theoretical). There is a plethora of research arguing that repeat victimization is an important methodical

concern for victimization surveys (Planty & Strom, 2007; Lauritsen et al., 2012). While this research proves repeat victimization should be addressed in the victimization survey methodology, it does not make any inferences about the theoretical connections between repeat victimization and social status or lifestyle factors. However, the literature in this field does emphasize the importance of repeat victimization for victimization research, as it demonstrates how a small number of individuals account for a large proportion of all victims of crime. For example, Planty and Strom (2007) show that if repeat victimization is included in the NCVS, crime rates increase by 62% in 2000 to as much as 174% in 1996. This difference in rates can lead to major differences in conclusions about the prevalence of crime in the United States. The authors point out that, in 1996, only 9,969,943 crimes were reported by the government using the NCVS; however, when repeat victimization is included, the number of crimes is closer to 25,546,326. Similar findings have been documented using data from Canada (Nazaretian & Merolla, 2013) and the United Kingdom (Farrell & Pease, 2007). Given the effect that repeat victimization can have on crime rates, it is important for scholars to understand the etiology of repeat victimization.

The increases in crime rates found when accounting for repeat victimization are not evenly distributed across all crime types. Instead, research on repeat victimization clearly demonstrates that the more serious crime types in society are more heavily influenced by repeat victimization (Farrell et al., 2005). The ICVS, which surveys 16 countries, demonstrates that violent crime is more prone to repeat victimization than property crime. Based on analysis of victimization across these 16 countries, 43% of victims of sexual assault and 39% of assault victims suffer from repeated victimization while only 15.7% of personal theft and 9.3% of car theft victims were repeat victims (Farrell et al., 2005).

While excelling in crime prevention and measurement strategies, the field of repeat victimization research has lacked theoretical development. Farrell et al. (1995) clearly outline how the effect of repeat victimization on crime prevention policy has "outpaced" the theoretical understanding. The lack of theoretical development of repeat victimization is surprising since it has such a strong influence on crime rates (Johnson et al., 1973; Zeigenhagen, 1976; Sparks et al., 1977; Hindelang et al., 1978; Feinberg, 1980; Reiss, 1980; Gottfredson, 1984; Farrell & Pease, 2007; Nazaretian & Merolla, 2013). The theoretical link between repeat victimization and opportunity theories has more often been assumed rather than tested because of the logical link between opportunity and repeat victimization.

Social status, just like RAT and opportunity theories of crime, has a long history of being linked to victimization. The connection between income and victimization proposed by Gannon and Mihorean (2004) and Daly et al. (2001) demonstrates that a decrease in income is associated with an increase in the likelihood that individuals will be the victims of violent crime. The effect of social status on victimization is not limited to financial inequality but is also established for racial and sexual minorities, as well as for immigrants (Peterson & Krivo, 1999; Herek, 1990; Reitz & Banerjee, 2007). Within Canada, governmental research by Perreault and Brennan (2009) demonstrated that Aboriginal people experience high rates of victimization and also have a low social status in the country. This link between the social status of Aboriginal people and victimization is also discussed by Dickson-Gilmore and La Prairie (2005), who identify challenges Aboriginal victims experience as unequal members of Canadian society.

Given the gaps in the research that have been described, this research is warranted. Specifically, this work will look at repeat victimization, RAT, and social status simultaneously to further develop the field's theoretical understanding of why repeat victimization occurs. Not only is it hypothesized that repeat victimization will be better explained by including social status and RAT in a singular analysis but, for the etiology of this crime pattern to be understood, social status cannot be ignored. The environmental context in which crime occurs is shaped by and linked to social status.

METHODS

Data and Sample

The data used in this research is taken from the CVS, which is similar to the NCVS and is conducted as part of Statistics Canada's General Social Survey every five years. Respondents selected for the CVS are asked about their experiences with both personal and property crime victimization experiences over the past year (Statistics Canada, 2009). However, one key difference between the CVS and the NCVS is that the CVS asks respondents for the details of up to 20 crimes per crime type. Because of this unique feature of the CVS, it is an ideal dataset to use to study the precursors of repeat victimization. For this research, the samples from the 2004 and 2009 survey periods are combined. These two survey years are identical in content (Perreault & Brennan, 2010). We combined the 2004 and 2009 sections to obtain an adequate number of individuals at all victimization levels examined. The target population of the survey is members of the Canadian population aged 15 and over who do not live in institutional settings. This population is thus almost identical to the target population of the larger General Social Survey (GSS). For the 2004 survey, 23,766 respondents were included in the sample. For the 2009 survey, 19,422 respondents were included in the sample. The total combined sample includes 43,188 individuals. The response rates are 75% for 2004 and 61.6% for 2009. All analyses are weighted using the Statistics Canada–provided weights that correct for a differential response.

Dependent Variable

The dependent variable for this study is victimization. Several specifications of this variable are included in the multivariate analyses presented below. In the CVS, the variable *total incidents* is the rawest measure of victimization. The original variable continuously measured the total number of times an individual in the sample reported being victimized, either for violent or property victimization. Thus, this measure represents the total number of crime incidents reported by the respondent in the survey (Statistics Canada, 2009). Responses to this variable range from 0 to 132 victimization incidents, and the mean number of victimizations for the total sample was 0.63 with a standard deviation of 3.11 (see Table I). The crimes included in this analysis are sexual assault, robbery, physical assault, breaking and entering, motor vehicle theft, theft of household property, vandalism and theft of personal

TABLE I Sex, Sexuality, and Racial Rates of Victimization

	Sample Size	Total Incidents	SD	Victimization	Repeat Victimization	High Repeat
Total sample	43,000	0.63	3.11	27.1	10.5	3.1
Male	21,297	0.65*	3.07	28.3*	10.9*	3.2*
Female	21,903	0.62*	3.16	26.0	10.2	2.9
LGBT	734	1.41*	5.19	44.2**	24.9*	10.8*
Heterosexual	42,466	0.62*	3.09	25.7*	10.2	3.0
White	35,467	0.62*	3.01	26.6	10.1	2.8
Visible minority	10,152	0.69	3.75	27.1	10.7	3.3
Aboriginal	820	1.01*	3.08	36.8*	17.9*	6.6

Source: Statistics Canada, GSS Victimization Survey Cycles 18 and 24
$N = 43{,}200$
$^{**}p < .01$
$^{*}p < .05$

property. Prior research has demonstrated that the pattern of repeat victimization is most prominent for those suffering from the most serious crimes, making the combination of these types of crime an acceptable choice (Farrell et al., 2005).

Any Victimization vs. No Victimization. The first dependent dichotomous variable used in this study was *any victimization*. For this variable, 0 represented no victimization and 1 represented all degrees of victimization. For the total sample, 27.1% of respondents indicated being victimized (Table I).

Repeat Victimization vs. One Victimization. The dependent variable, *repeat victimization*, was also dichotomous and, again, used in logistic regression models for the entire sample and five subsamples. The variable was coded as 0 or 1, with 0 representing one victimization and 1 representing anyone being victimized more than once in the given survey period. Constructing the variable this way made it possible to directly compare singular victims of crime with repeat victims; 38.8% of the victimized sample indicated that they had been the victim of more than one crime.

High Repeat Victimization vs. Repeat Victimization. *High repeat victimization* was the third and final dependent variable used in the logistic regression models. The variable is dichotomous, with 0 indicating the individual had been victimized twice within the survey period and 1 indicating that the individual had been victimized three or more times. This variable compared repeat victims of crime with those who suffered high levels of repeat victimization. The cutoff of three victimizations for high repeat status was chosen because the Canadian government currently caps all victimization counts at three for use in the calculation of official governmental statistics (Nazaretian & Merolla, 2013; Statistics Canada, 2009). Thus, if differences are found between these two categories of victims, the case can be made that Statistics Canada should reconsider the capping level. Of all repeat victims, 11.3% indicated that they had been victimized three or more times. Table I illustrates the different victimization rates and occurrences based on race, sex, and sexuality and indicates that LGBT and Aboriginal Canadians had the highest rates of victimization at 1.41 and 1.01 incidents, respectively, on average. Looking at the percent of victimization experienced by these different groups, again, LGBT and Aboriginal Canadians experience the highest rates of victimization, at 44.2% and 36.8%, respectively. In addition to experiencing high rates of victimization, these two groups also experience statistically significantly higher rates of repeat victimization and high repeat victimization: 24.9% of LGBT Canadians experienced repeat victimization and 10.8% experienced high repeat victimization, while 17.9% of Aboriginal Canadians experienced repeat revictimization and 6.6% experienced high repeat victimization (Table I).

Independent Variables

The independent variables in this research can be divided into two broad categories. The first category includes variables used to measure social status (see Table II). The variables in this category include income (categorical variable with 13 categories), age, sex (0 = Male, 1 = Female), completion of high school (0 = No, 1=Yes), race (0 = Minority, 1 = White), Aboriginal Canadian status (0 = No, 1 = Yes), sexuality (0 = Heterosexual, 1 = LGBT), nativity (0 = Canadian born, 1 = foreign born), and an urban-rural identifier (0 = Rural, 1 = Urban). Of particular interest in this research is the measurement of sexuality. Studying the lesbian, gay, bisexual, and transgender (LGBT) community sets this study apart from most studies; this research utilizes a nationally representative random sample of this population (Statistics Canada 2004; 2009). Included in our sample is the 1.7% of the population who self-identified as being LGBT during the survey years. Having access to such a sample in this capacity is uncommon; at present, Canada is one of few nations with a nationally representative victimization survey asking questions about sexuality.

The second category of variables is used to measure RAT. Marital status, previous arrest, crime prevention, evening activities, night work, night travel, and alcohol consumption are all used to measure one's *suitability as a target*. These variables can also be viewed as lifestyle variables (Table II). The link between lifestyle theories of victimization and RAT is well established and has been discussed in the work of Miethe et al. (1987). Composite variables were constructed to measure *capable guardianship* and *motivated offender*. The composite variable for *capable guardianship* was created by combining five questions that asked respondents about the presence and effectiveness of police in their community. The

TABLE II Variable information

	Mean/%	Standard Deviation
Dependent		
Victimization	27.1%	
Repeat victimization	10.5%	
High repeat victimization	3.1%	
Control / Social status		
Income	9.04	2.33
Age	44.53	18.18
Female (1=Yes)	50.7%	
High school (1=Yes)	73.5%	
White (1=Yes)	82.1%	
Aboriginal (1=Yes)	1.9%	
LGBT (1=Yes)	1.7%	
Nativity (1=Yes)	21.9%	
Urban	3.94	1.66
Routine activity and lifestyle		
Capable guardianship	2.56	0.39
Motivated offender	1.27	0.40
Married (1=Yes)	50.9%	
Previous arrest (1=Yes)	5.6%	
Crime prevention	35.5%	
Evening activities	25.09	35.06
Night work	8.69	16.73
Night travel	2.27	1.01
Alcohol consumption	3.31	1.74

Source: Statistics Canada, Crime Victimization Survey Cycles 18 and 24
N = 43,200

composite variable *motivated offender* was created by combining eight questions that asked respondents about the level of visible crime in their community. For example, one of the questions was "How much of a problem are: … people using or dealing drugs?" (Statistics Canada, 2009).

Analytic Strategy

Given that the primary focus of this study is to investigate the relationship of the independent variables to low and high levels of victimization, eliminating outliers from the sample to use an ordinary least squares (OLS) regression would have eliminated a central contribution of this study. Thus, victimization was investigated through four specifications of the victimization measure. Three dichotomous non-mutually exclusive specifications of victimization are used with the logistic regressions. Each victimization category included the higher rates of victimization within it. For example, the victimization category included all victims, while the repeat victimization category only included victims who had been victimized more than once. For the multinomial logistic regression, one mutually exclusive categorical specification was used (victimization = 1, repeat victimization = 2, high repeat victimization = 3+). Predictably, most Canadians reported little to no victimization, and a small number of individuals reported high levels of victimization, making the variable positively skewed and inappropriate for continuous variable linear modelling techniques (e.g., OLS or quantile regression). In addition to using a multinomial logistic regression, both a negative binomial and zero-inflated negative binomial model were considered. Given that the data focuses on victimization, we do not have a zero-inflated measure, making zero-inflated models less appropriate. Similarly, the data does not reflect overdispersion of the means, making negative binomial models unnecessary (Long & Long, 1997). After reviewing the structure of the data and considering the intent to compare groups of victims based on governmental techniques of capping victimization, a multinomial logistic model was selected to compare different groups of victims to non-victims. Comparing these groups is necessary due to the governmental analyses treating victims of crime as a single group by capping the dependent variable (Nazaretian & Merolla, 2013).

RESULTS

When examining variation in victimization across the entire sample, there were notable differences at all levels of victimization based on elements of social status and opportunity. The first analysis of the effects of social status and opportunity in relation to victimization is a multinomial logistic regression, with the reference category being no victimization. Table III describes the results from these models comparing the three levels of victimization to non-victims of crime. More important for this analysis than singular significant findings were patterns of significance across varying levels of victimizations ($p < .05$). Several variables are not only significant across the models but have increasing odds ratios, denoting that there is an increase in the variable associated with an increase in the chances of victimization. Of the social status variables, the variables that are significant and have a consistent directional effect across the model are age, Aboriginal status, LGBT, and nativity. As respondents' age increases, individuals are less likely to be the victims of crime. This effect is stronger as the level of victimization goes up. Respondents who identified as Aboriginal Canadians are 1.36 times more likely to be victims of one crime, 1.65 times more likely for two crimes and 1.7 times more likely to be the victims of three or more crimes, even when controlling for social status and lifestyle.

Although previous governmental studies identify Aboriginals as the most victimized minority, LGBT individuals are also a highly victimized group in this sample. Canadians identifying as LGBT are no more likely to be the victim of a singular crime incident; however, they are 1.5 times more likely to be the victims of two crimes and 2.4 times more likely to be victims of three or more crimes. Females and non-Canadian-born residents are less likely to be the victims of repeat crimes. Immigrants to Canada are slightly less likely to be the victims of singular crimes, 0.77 times for two crimes and 0.72 times less likely to be victimized three times or more. Women, who in past studies have been shown to experience more victimization than

TABLE III Multinomial-logistic regression reference group non-victims

	Victims	Repeat Victims	High Repeat Victims
	Exp (B)	Exp (B)	Exp (B)
Social status			
Income	1.054**	1.093**	1.054**
Female	.925**	.946	.840**
Age	.982**	.976**	.964**
High school	1.096**	.966	.783**
White	1.101*	1.098	1.022
Aboriginal	1.365**	1.648**	1.708**
LGBT	1.161	1.502**	2.393*
Nativity	.907**	.774**	.716**
Urban	1.081**	1.114**	1.087**
Routine activity and lifestyle			
Capable guardianship	.679**	.447**	.265**
Motivated offender	1.474**	2.043**	2.463**
Married	.966	.810**	.815**
Previous arrest	1.490**	1.828**	2.742**
Crime prevention	1.686**	2.563**	4.501**
Evening activities	1.001	1.002**	1.003**
Night work	1.002*	1.005**	1.005**
Night travel	1.039**	1.085**	1.045
Alcohol consumption	1.032**	1.019	1.071*

Source: Statistics Canada, GSS Victimization Survey Cycles 18 and 24
$N = 43{,}200$
$^{**}p < .01$
$^{*}p < .05$
Reference Category 0 = No Victimization

men (sexual victimization), are less likely than males to be victimized when examining both property and violent crime. Specifically, women are almost 0.92 times less likely to be victimized once and 0.84 times less likely to be victimized three or more times.

Beyond the social status characteristics of the victims, there are several opportunity variables that predict victimization. Individuals who experienced victimization are much more likely to indicate that there was a presence of motivated offenders in their community. Victims of one crime are 1.5 times more likely to indicate this, while victims of two crimes are 2 times more likely to cite potential offenders in their community as a problem. Individuals who experienced victimization three or more times are 2.4 times more likely to identify motivated offenders in their community than those who were not victimized (Table III). Unfortunately, the variable representing capable guardianship is not ideal because it is formulated based on the opinion of victims. It stands to reason that someone who has been victimized might see the presence of police in their community as ineffective.

The second strongest relationship from the multinomial logistic regression is the connection between victimization and previous arrests. Individuals who had been arrested in the past are much more likely to be victimized than those who had not been previously arrested. Those who had been victimized once are 1.5 times more likely to have been previously arrested. Those who had been victimized twice are 1.8 times more likely to have been previously arrested. And, finally, those who had been victimized three or more times are 2.7 times more likely to have been arrested than non-victims of crime (Table III).

The final significant variable in the model, which is consistent across all levels of victimization, is the composite variable of crime prevention. Individuals who had been victimized once are 1.7 times more likely to engage in crime prevention strategies than non-victims. Those who were victimized twice are 2.6 times more likely and those who were victimized three or more times are 4.5 times more likely to engage in crime prevention. Initially, the use of the crime prevention variable was assumed to measure some sort of opportunity-reducing techniques by individuals, which would then have a negative relationship with victimization. However, based on the strength of the relationship and the direction of the effect, crime prevention strategies are most likely to be initiated *after* victimization.

In Table IV, the control/social status variables are first run independently of the opportunity variables (RAT and lifestyle; Model 1), then these variables are added to demonstrate the mediating effect of opportunity on social status (Model 2). Based on Baron and Kenny's (1986) approach to establishing mediation, we determined that social status and lifestyle characteristics were both predictive of victimization. While almost all of the variables predict victimization in both models for single victimization in Table III, when comparing the social status variables in models 1 and 2, the mediated effect on social status of including opportunity is evident. For example, the effect of education (high school) is completely mediated, and for both of the minority groups in the model, there is a diminished effect (Baron & Kenny, 1986). When opportunity is added to the model, the effect of being LGBT and having Aboriginal status is reduced, but not completely eliminated.

This same effect is evident when comparing single victims with repeat victims in Table IV: when opportunity is added to the model, the effect of being LGBT on victimization is decreased. In the case of Aboriginal people, the effect is completely eliminated. While the effects of social status are reduced by opportunity for some categories, when looking at LGBT status, for example, opportunity specifically decreases the likelihood of LGBT victimization from 92% to 42%. Thus, even when controlling for opportunity variables, the LGBT community is still 43% more likely to experience repeat victimization than the general population.

In the last column of Table IV, fewer variables predict victimization differences between repeat and high repeat victims; however, for those variables that are significant, opportunity mediates the effect of social status. The effects of income, Aboriginal status, and nativity are completely mediated by opportunity. A reduction in the effect of social status is shown for LGBT status and completion of high school. The effect becomes more pronounced for age. Even when accounting for opportunity, then, LGBT status still makes respondents almost 1.7 times more likely to be a high repeat victim than a repeat victim of crime.

TABLE IV Logistic regression nationally representative sample

	Victimization N = 43,200				Repeat Victimization N = 11,707				High Repeat Victimization N = 4,536			
	Model 1		Model 2		Model 1		Model 2		Model 1		Model 2	
	Exp(B)		Exp(B)		Exp(B)		Exp(B)		Exp(B)		Exp(B)	
Social status												
Income	1.043	**	1.063	**	1.000		1.027	**	.967	*	.991	
Female	.942	*	.925	**	1.036		1.028		.969		.932	
Age	.971	*	.979	**	.982	**	.992	**	.976	**	.984	**
High school	1.117	**	1.017		.883	**	.832	**	.825	**	.753	**
White	1.072		1.090	*	.931		.978		.879		.940	
Aboriginal	1.726	**	1.472	**	1.391	*	1.248		1.407	*	1.202	
LGBT	1.861	**	1.401	**	1.921	**	1.428	**	2.410	**	1.694	**
Nativity	.763	**	.856	**	.778	**	.876	*	.755	*	.888	
Urban			1.090	**			1.034	*			1.008	
Routine activity and lifestyle												
Capable guardianship			.544	**			.569	**			.465	**
Motivated offender			1.730	**			1.579	**			1.554	**
Married			.910	**			.852	**			.911	
Previous arrest			1.684	**			1.403	**			1.740	**
Crime prevention			2.052	**			1.755	**			2.309	**
Evening activities			1.001	**			1.006	**			1.007	**
Night work			1.003	**			1.002				1.001	
Night travel			1.051	**			1.031				.993	
Alcohol consumption			1.031	**			1.001				1.042	*

Source: Statistics Canada, GSS Victimization Survey Cycles 18 and 24
**p* < .01
**p* < .05

DISCUSSION

As suspected in the case of the models that compare no victimization with single victimization, the majority of the variables were significant. Not only was this due to the large sample size, but this effect is also because they were selected based on their prior significance in previous research and theoretical tests. Of particular interest in this research is the question of whether these variables remain significant predictors of victimization at varying levels of victimization and whether they remain directionally significant.

As victimization became more severe, fewer variables remained significant and even fewer variables remained significant while operating in the same direction. The three social status variables that remained significant across the majority of the models are the completion of high school, age, and LGBT status. Additionally, the effects of lifestyle mediated all three of these variables (Table III). There are also five lifestyle/opportunity variables that remained significant in all of the models: previous arrest, crime prevention, the number of evening activities, capable guardianship, and a motivated offender. For many of the opportunity variables, issues arose concerning dependent versus independent variable confusion. For example, the number of crime prevention strategies one engaged in increased as victimization increased. This indicates that engaging in crime prevention strategies is a result of more frequent victimization, and, in a sense, is ineffective. Other variables where causality was muddled include capable guardianship and motivated offender. It is unclear whether these variables are truly accurate responses by respondents or whether victims' views have been changed by being victimized. For example, did the respondent's view of the police diminish because she or he had been repeatedly victimized, or was a respondent who was repeatedly victimized able to accurately report the quality of policing in their neighbourhood? In future iterations of this research, this could be controlled by comparing victims and non-victims who reside in the same areas for their opinion on policing/capable guardianship.

The most powerful indicator of whether someone would be victimized is having been previously arrested. This vari-

able could be considered the ultimate lifestyle variable and further strengthens the literature on the victim–offender overlap. While the lifestyle/opportunity variables did not consistently predict victimization through all of the models, they did cause mediation in all of the logistic regressions. So, although these variables did not solely explain victimization, they did rule out certain social status variables. Furthermore, a mediating effect was also noted in the social status variables that remained significant, indicating that victimization is explained by both social status and opportunity simultaneously versus reciprocal causation.

Some of the most compelling findings of this research are the social status variables that remained highly significant in the majority of the models. For example, the predictive power of being gay or lesbian is highly significant in all of the models and not entirely explained away by lifestyle differences. While being Aboriginal was not significant in every model, it was still a strong predictor of victimization, which is in line with Canadian research on victimization (Brzozowski et al., 2006). Further research is needed to understand why certain groups are repeatedly targeted for victimization in Canada, devoid of lifestyle differences that would make them more suitable targets. Future research on this topic should include research with specific subsamples, such as the LGBT or Aboriginal population, to identify the within-group causes/predictors of singular versus repeat victimization.

CONCLUSION

While our research is a step towards gaining a better understanding of how lifestyle and social status characteristics affect victimization, our study has limitations. First, we are using secondary data provided by the Canadian Victimization Survey. The data is not explicitly designed with the variables of interest in this study in mind. More precise measures could be created to determine with more specificity whether our findings can be replicated. Second, the restricted nature of the data makes it impossible to conduct post hoc analyses: once the researcher left the facility, it was not feasible to return to the data repository to re-run or revisit analyses of interest. If the sample sizes differed between results within 20 respondents, results could not be exported. Finally, the sample size of the data varies from one data collection period to the next. While we expanded our sample size by combining two waves of data, it would be preferable to use waves with higher response rates, if possible. Although the current study and data are not without limitations, they do offer insight into an underexamined and important topic. Further, the results of our study may provide insight into policies and practices that may reduce the risk of victimization and revictimization for vulnerable populations living in Canada. Taken in combination with other studies on this topic, we are hopeful that policymakers can use these findings to address risk factors and design policy for the at-risk populations identified in this study. Victimization in Canada is not evenly distributed and our crime prevention strategies need to be reflective of this in both scope and funding.

CONFLICT OF INTEREST DISCLOSURES

The authors have no conflicts of interest to declare.

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REVIEW

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TRUST

Law enforcement agencies' approach to de-escalation: Incorporating a social services perspective

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This article is related directly to the 6th International Law Enforcement & Public Health (LEPH) Virtual Conference in March 2021.

ABSTRACT

In this critical review and social innovation narrative, we analyze the literature regarding Canadian law enforcement agencies' approach to de-escalation and crisis intervention. Using an interdisciplinary approach, we consider how the skills and values of social work can be used to inform and train officers on essential skills such as de-escalation and conflict resolution. We look at the systemic barriers to bringing about change within Canadian police forces as the current culture continues to be influenced by colonization and law enforcement continues to value and endorse use of force over de-escalation. While services can benefit by applying an interdisciplinary lens when training officers, the factors that impede this union and collaboration are discussed and explored as police services are given immense discretion in how they train and respond to mental health crises. In conclusion, we examine the government's role in perpetuating these issues.

INTRODUCTION

Crisis intervention, defined as supporting individuals and families in times of extreme duress, is an essential service provided by many professional bodies. Police officers are among those who respond. Mental health calls make up a large percentage of the calls for service to which law enforcement officers respond. In these circumstances, first responders are the first point of contact in de-escalating members of the public in crisis and restoring order. This literature review aims to contribute to guidelines for officers' response to mental health by identifying the best and most promising practices used in other disciplines that may benefit police officers in de-escalating mental health calls. The literature review has been conducted with the following questions in mind: What are the theories that inform both social services and law enforcement practices? What are the skills used by social workers and affiliated mental health professionals in de-escalating mental health crises? Can these skills be used by law enforcement officers and their approach in de-escalation? How might citizens' perception of officers hinder the application of these skills? Finally, we will discuss the research questions that have yet to be answered.

Social Services Theoretical Framework and Skills

The reviewed literature is rooted in social services and humanities disciplines and includes scholarly articles from psychiatric nursing, social work, and psychology. The theories within these disciplines create frameworks from which skills are derived and subsequently applied. A common theory discussed in the literature is symbolic interaction.

The theory of symbolic interaction states that interactions are dependent on both parties' perceptions of the world around them and explores how prior beliefs inform subsequent meanings (Berring et al., 2016). According to Berring et al. (2016), symbolic interactionism has three main premises: 1) Humans act towards events depending on the meaning they have for them; 2) People have different meanings; and 3) Meanings can change. In any interaction, there is the person who relays the information and the person who decodes the message. Research has shown that conflict and aggression emerge when there is distrust, which generally occurs when a person's interpretation of an action is incompatible with their expectation (Berring et al., 2016; Richter et al., 2006, p. 127). For example, a person who views police as helpful but then finds their actions intimidating and coercive will begin

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to distrust the police and simultaneously believe they are in danger. According to Richter et al. (2006), apart from patients with specific personality disorders, human beings are usually not voluntarily aggressive; aggression and violence are triggered by the subjective notion that one must defend oneself against intimidating or unjust behaviours. Breaking this "paranoid" thinking is the key task in non-violent conflict resolution (Richter et al., 2006).

Drawing from the literature, the skills most commonly practised and encouraged by social workers and allied professionals are self-awareness, self-reflection, and emotional regulation. Within social services, the emphasis is placed on the practitioner to analyze, recognize, and respond to the situation.

Skills in Social Services

Self-awareness is a powerful tool in achieving de-escalation, as it encourages the practitioner to consider how they present themselves and whether they are displaying coercive tactics or an abuse of power; both coercion and power have been linked to aggressive outbursts from patients (Berring et al., 2016). Patients who feel powerless develop feelings of fear and resentment due to a lack of respect (Berring et al., 2016, p. 500; Richter et al., 2006, p. 127; Nordstrom et al., 2012, p. 4). Self-awareness encourages the practitioner to consider the verbal and non-verbal cues being displayed and how the patient might perceive these actions, while simultaneously considering the patient's past experiences that might also influence their interpretation. Practitioners who were most effective in de-escalation created a safe space by showing mutual respect, displaying empathetic gestures, and relinquishing power (Berring et al., 2016, p. 505; Duperouzel, 2008, p. 303; Richter et al., 2006, p. 125; Nordstrom et al., 2012, p. 5).

Self-reflection is another skill and is helpful in achieving self-awareness as it allows the practitioner to consider their behaviours and beliefs following the interaction, and the ways in which they contributed to the patient's response (Berring et al. 2016, p. 505; Duperouzel, 2008, p. 303; Richter et al., 2006, p. 128). For example, (psychiatric) patients are concerned with short-term goals, and when this "need" is threatened and their sense of security is in jeopardy, it acts as a trigger for violent outbursts (Richter et al., 2006, p. 127). In reflecting on why a homeless individual appears overly protective of their possessions and thus uncooperative, one may consider that the individual has lost their belongings and the items are the last of their possessions. Self-reflection encourages the practitioner to consider how they presented themselves and the daily struggles of the person.

Another skill commonly used in social work is emotional regulation. Practitioners remain aware of their emotional responses towards individuals, and control and adjust their reactions. Practitioners are capable of acknowledging that some actions are outside of the person's control, and, in doing so they are less likely to become defensive, judgemental, and antagonizing (Duperouzel, 2008, p. 306; Richter et al., 2006, p. 128; Nordstrom, 2006, p. 6). According to Duperouzel (2008), practitioners will put on a "facade," appearing calm among chaos. Emotional regulation is about maintaining composure even when challenged.

Mental health professionals approach de-escalation by emphasizing and mastering these skills. Law enforcements' response to mental health would benefit by applying an interdisciplinary research approach. It is important to consider the theoretical frameworks that influence law and security when attempting to merge social services with enforcement.

Policing Theoretical Framework

In contrast to social services approaches, policing, law, and security apply de-escalation from an enforcement model. Policing differs from social services and humanities in that officers are permitted to use "lawful force" to regain control. In several ways, warranted force is the essence of policing and is used as a tactic to restore public order (Fielding, 2002). The issue with "use of force," is that it is subjective in nature, as the application of force is discretionary and often contingent on officer perception and tolerance (Fielding, 2002). Force can be prematurely used depending on an officer's temperament, thus creating issues around excessive force and what constitutes legitimate force (Fielding, 2002).

Furthermore, the enforcement model tells officers that citizens must respect police by their mere presence, power, and authority. When their power is challenged, which is especially likely in mental health crises, it creates an issue for the responding officer, who has been conditioned to believe that their verbal commands should not be challenged. This conflicting narrative creates a struggle for officers when they fail to gain the compliance that was expected. In order to regain control, officers use the skills they have been taught, which no doubt stem from an enforcement and "use of force" model and involve forceful tactics, including electronic control devices (taser), batons, oleoresin capsicum (OC) spray, combative strikes, and firearms.

Expectations theory is also worth discussing in relation to policing as there is a hierarchy within law enforcement agencies. Expectations theory states that within organizations, members assume or are appointed certain roles, resulting in a hierarchy among staff. For various reasons, specific individuals are implicitly deemed as more valuable and are offered more responsible roles while other employees adhere to submissive directives (Correll & Ridgeway, 2003). According to Correll & Ridgeway (2003), one of the ways in which members are "selected" to carry out specific tasks is through "status characteristics." Status characteristics are social constructs presumed to anticipate the quality of a member's future work. For example, a status characteristic can be the assumption that men are better at technological tasks than women; men, therefore, would automatically assume supervisory roles within technological companies while women assume junior positions (Correll & Ridgeway, 2003). In relation to law enforcement, the emphasis on using force to regain control and compliance has resulted in law enforcement placing more value on men as they are seen as "masculine" and "intimidating"; this has meant, historically, that they were hired as officers, and, in the present time, that they have assumed more dominant/senior positions in the force.

Both theories are important to consider when looking at the culture of policing. Law enforcement values "legitimate force" over de-escalation skills, and those who hold supervisory positions further endorse and value "use of force." Forces are quick to invest money into weaponized supplies and slow to invest in crisis and negotiation training. While some services incorporate Crisis Intervention Training (CIT)

that educates and encourages officers to use de-escalation and communication skills, this approach needs to be encouraged and practised unanimously across Canadian police forces. Currently, each service has discretion in the number of hours they dedicate to crisis intervention and de-escalation training.

De-escalation Skills Taught in Policing

The research record is inadequate in identifying promising skills taught and used by police officers to de-escalate mental health calls. The research is outdated and insufficient to draw any conclusions, mostly evaluating the success of de-escalation by focusing on reduced arrest rates, community referrals, and reduced on-scene time. Officers certainly benefit by either working with mental health professionals or being trained from a social services perspective, such as CIT, as arrest rates are lowered, times on scene responding are reduced, and community resources are more likely to be referred to persons in crisis (Oliva et al., 2010; Watson et al., 2008; Coleman & Cotton 2010; Wortley et al., 2006). However, these outcomes do not equate to effective de-escalation skills in which force was not used by an officer, and more research is needed in this area to draw conclusions.

Tying Them Together

Law enforcement has the potential to improve responses to mental health by incorporating social service research and skills when training officers. It is important that officers be equipped with essential skills to de-escalate mental health crises. Patients in crisis prefer when mental health professionals accompany police, reporting that they have a more positive interaction where coercive and forceful tactics are less likely to be used (Kisely et al., 2010; Lamanna et al., 2015; Kirst et al., 2015; Canada et al., 2019; Nicholson & Marcoux, 2018). Furthermore, it has been concluded that almost half of all police-involved fatalities occurring in Canada, since 2000, involved a person who was under mental duress; another 48% of the interactions involved comorbid circumstances where the person was mentally distressed and/or under the influence of a substance (Nicholson & Marcoux, 2018).

When incorporating non-combative skills, how does one effectively incorporate social work strategies into the educational policies that govern law enforcement? How will officers accept this multidisciplinary approach in responding to mental illness? Research has found education to be an effective tool in changing behaviours and beliefs. Educational seminars, discussions, and scenario-based training that incorporate social services skills and encourage officers to self-reflect, be self-aware, and practise emotional regulation will undoubtedly help them de-escalate and diffuse a person in crisis. Interdisciplinary research can also help explain the behaviours of a person in crisis. For example, shouting often occurs when a person feels their opinion is not heard and is not necessarily indicative of challenging someone. Therefore it is important to acknowledge what a person is saying. Social work also applies an intersectional lens in relation to mental distress, incorporating and considering the social determinants of health and how this impacts a citizen's well-being and mental health.

It is not enough to simply educate officers who work on the frontline about mental health, de-escalation, and conflict resolution. As previously discussed, the culture and hierarchy within policing need to be considered. The current culture of policing preserves the status quo by recruiting, training, and socializing officers in a very traditional manner, orienting them towards an enforcement model. Research has shown that, in order to effectively implement change, upper management, administrators, sergeants, and staff sergeants need to adopt an optimistic attitude towards change (Novak et al., 2003). As discussed by Novak et al. (2003), those who create the policy are not responsible for implementing the policy, as frontline officers have the opportunity to choose how they will react to organizational policies and decide whether to comply, ignore, or even sabotage them (Novak et al., 2003, p. 7). Unity among upper management is of paramount importance in adopting and embracing new strategies that are then introduced to fellow officers (Novak et al., 2003, p. 7). Subordinate officers look to their sergeants, staff sergeants, inspectors, and the chief for praise and honorariums. Thus their support, in a non-militant style of policing, is needed for "junior" (lower-ranking) officers to adopt and use these skills (Novak et al., 2003, p. 7).

Other Factors and De-Escalation

When understanding policing and de-escalation, there are other variables that influence the interaction and the outcome, such as gender, race, and educational background. Research has shown that women police officers are less likely to use force and tend rather to rely on communication and de-escalation techniques; they are subject to fewer allegations of excessive force (Rabe-Hemp & Schuck, 2007; Schuck & Rabe-Hemp, 2007). Yet, research has shown no difference in assaultive behaviours towards female officers compared with male officers, except when responding to calls involving domestic violence, where female officers are assaulted more than their male coworkers (Rabe-Hemp & Schuck, 2007; Schuck & Rabe-Hemp, 2007). Despite this, female officers consciously avoid using force even when it may be warranted. According to Schuck & Rabe-Hemp (2007), female officers are more likely to engage in "unpredictable policing," that is, using communication and de-escalation, in situations where one might have predicted the use of force. Conversely, male officers were more likely to practise "overpredicted policing," in which force was used pre-emptively (Schuck & Rabe-Hemp, 2007). Force is not always necessary in gaining compliance—women often effectively achieve this while relying on de-escalation and conflict resolution.

Another factor discussed within the research was race and whether it plays a role in how citizens perceive police. In one study, officer race, ethnicity, age, and physical size were found to be insignificant in how citizens perceive officers and did not influence the frequency with which force was used against the officer or by an officer (Weitzer, 2000). Most research has shown that it is the demographics of the neighborhood rather than the individual's race that has an impact on how officers are perceived (Weitzer, 2000). Low socioeconomic neighborhoods are more likely to have a negative perception of police, seeing them as more coercive and aggressive, regardless of race, and higher socioeconomic neighborhoods view police more favourably (Weitzer, 2000). The research focused on perception and not necessarily force used.

Supportive actions, including de-escalation and communication, are significantly influenced by an officer's educational

background. Officers with post-secondary education are more likely to engage in supportive actions, such as communication, than those without post-secondary education (Weitzer, 2000). Furthermore, officers who have shown a vested interest in mental health, either through educational endeavours, voluntary actions, or knowing someone with mental health concerns, are more likely to engage in de-escalation and conflict resolution.

What is Missing in the Research?

The research fails to consider the reasons why "use of force" continues to be accepted and prioritized by law enforcement agencies. Currently, law enforcement dedicates most of its time training recruits/officers on efficient use of their weapons, such as firearms, electronic control devices (taser), batons, and oleoresin capsicum (OC) spray. Officers receive full-day, in-class, hands-on training that is dedicated to effective tactical techniques. Yet, the same level of training is not mandated nor encouraged for non-combative, conflict resolution, and de-escalation training. The current research does not adequately explore why agencies continue to practise from an enforcement model rather than a community approach, especially given the shift in officers' duties as they continue to take on a more direct role in mental health calls. Throughout an officer's career, they are far more likely to be required to use communication and de-escalation than force, yet law enforcement continues to train using an enforcement model.

Further, while consolidating the research, it was unclear whether researchers examined and considered how the designation of a mental health professional influenced the citizen's perception and thus the interaction. Were citizens more compliant when mental health professionals accompanied police due to the fact that they knew they were speaking to an "expert" versus an officer? Since mental health professionals self-identify, did this act almost as a placebo effect? Was it actually the professional skills of the mental health professional or was it a combination of those skills and their professional designation? This was not adequately discussed in the research and can shed light on how citizens' perceptions influence the outcome of a mental health crisis. If officers hold multiple designations (for example, if they are a registered social worker while also being a police constable), should this be revealed to citizens as it may facilitate the interaction during mental health calls?

The research does not explore the various factors that influence de-escalation, such as gender, race, and education, and how law enforcement agencies plan to mitigate and address these issues. If female and educated officers are more likely to engage in de-escalation and conflict resolution, are educated and female officers more likely to be recruited into units that specifically respond to mental health crises? What are the skills and responses that make these officers more effective in de-escalating mental health crises?

CONCLUSION

Having discussed de-escalation and how it is taught and applied within law enforcement, specifically in relation to mental health calls, we have shown that there needs to be an amendment. Law enforcement agencies would benefit from applying an interdisciplinary approach to training officers. By incorporating the skills used by mental health professionals, officers may learn self-awareness, self-reflection, and emotional regulation, skills that are promising in de-escalating mental health crises.

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CONFLICT OF INTEREST DISCLOSURES

The author has no conflicts of interest to declare.

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Improving police transparency in Canada

Lance Valcour*

ABSTRACT

The path to improved police transparency in Canada includes the use of advanced technology with capabilities such as artificial intelligence, machine learning, "cloud" enabled services, and an ever-increasing number of data collection and management tools. However, these innovations need to be closely linked with a national—not federal—stakeholder review of current legal, legislative, and privacy frameworks. This article provides readers with a high-level overview of the issue of police transparency in Canada. It then outlines a number of key challenges and opportunities for improving this transparency. It concludes with a call to action for key Canadian stakeholders to work collaboratively to improve police transparency in Canada.

Key Words Accountability; privacy; stakeholder engagement; information management; strategic planning.

INTRODUCTION

The path to improved police transparency in Canada includes the use of advanced technology with capabilities such as artificial intelligence, machine learning, "cloud" enabled services, and an ever-increasing number of data collection and management tools. However, these innovations need to be closely linked with a national—not federal—stakeholder review of current legal, legislative, and privacy frameworks. It is critical that these tools support concepts such as "privacy by design" while, at the same time, leading to enhancing Canadian law enforcement's ability to legally and ethically capture, manage and share critical information with the communities it serves in a timely fashion.

At an ever-increasing pace, police services in Canada are turning to leading-edge technologies to support their missions. Rarely does a day go by that there's not another announcement in the media about some exciting new technology being deployed by a law enforcement agency somewhere in the country. Some of the key adjectives used in these press releases include effective, efficient, and transformational. Recently, we have also seen police leaders espousing how their newest purchase will help improve trust, accountability, and transparency. Detractors will often respond negatively, saying that technology may not, at least on its own, provide the results often being touted.

While one of the hottest topics today is the use of body-worn cameras (BWC), there are numerous other "sensors" or surveillance tools that have been in use for years, even decades. These include in-car video, closed-circuit television (CCTV) cameras and, more recently, remotely piloted aircraft systems, otherwise known as drones.

There are numerous research papers on the topic of how these tools may, or may not, improve trust and accountability. However, very few, especially on the subject of BWC, come from a Canadian perspective. How surveillance tools, when appropriately governed through thoughtful policy, might support police transparency, is still nascent, at least in the Canadian context. A number of Canadian researchers, including Dr. Alana Saulnier and Dr. Greg Brown, are leading the way in exploring these topics.

THE CASE FOR LEVERAGING ADVANCED TECHNOLOGY

As an example of a Canadian agency using advanced technology, Calgary Police Service (CPS) provides a strong case that body cameras can improve trust and accountability. For example, a CTV Calgary news article states: "CPS confirms, through the officer's body camera, that an unfortunate comment was made by the officer towards the driver during a traffic stop at a parking lot" (Le, 2020). Here, a community member complained about the actions of a CPS member's behaviour during a traffic stop on August 25, 2020. Three days later (possibly earlier directly with the complainant), Calgary Police released a statement confirming that the officer's comment was "unfortunate" based on a review of BWC video.

Prior to Calgary's commencement of a BWC program in 2018, this type of situation was often very difficult to resolve

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as there are typically no independent witnesses to corroborate either side's story. The CPS had in-car video prior to 2019, so they may in fact well have been able to hear the recording and resolve the case (Calgary Police Service, 2021). However, what happens less frequently is the actual release of video (or audio) recordings demanded by the public due to various policy and privacy rules. A copy of the CPS's recently released study titled "2020 Body Worn Camera Evaluation Report" was released in March 2021 and is available online (Budd, 2021).

Counterpoint: Privacy and Legal Landscape

In Saulnier (forthcoming), the authors note the following:

> While it is important that BWC footage remain secure, it is also important that police be able to demonstrate transparency through footage disclosure—this is a fundamental desire underlying public calls for police use of BWCs. Disclosure of video to persons featured in that video (while protecting the identities of other persons featured in that video) is a requirement linked to Section 12 (*access to personal information*) of the *Privacy Act*. This section legislates individual rights to access information collected from them by government institutions (though the *Act* also contains exemptions when disclosure would interfere with a law enforcement investigation). In the interest of supporting this right, it is important for a BWC policy to clearly articulate the disclosure request process as well as any exemptions that may be allowable. However, this is a complex issue, a central concern being that disclosing video to one person featured in a video can compromise the privacy of other persons… Police disclosing BWC video to media presents a further challenge whereby police either disclose video and fail to protect individual privacy and/or fail to secure evidence associated with an investigation or do not disclose video and fail to demonstrate transparency with the general public. Many international guidelines advocate for public and media access to BWC footage (through appropriately channeled requests) (e.g., ACLU 2020; College of Policing 2014; LCCHR 2017), and it may be in the best interest of police-community relations for Canadian police to establish procedures for releasing BWC video to media disclosure requests.

The public release of police videos, whether from BWC, in-car cameras, drones, or any other police information management systems is strictly limited by various legal precedents and/or privacy regulations in Canada. There are good reasons for these restrictions, which are based on well-established Canadian legal and cultural values.

Unlike our American counterparts, where in some jurisdictions the police are mandated to release almost all police videos to the public, Canadian police leaders are often prohibited from doing so. This inability, not to be confused with unwillingness, becomes exacerbated in cases where external investigative bodies are called in to investigate police services in serious cases. For example, in Ontario, when the Special Investigations Unit (SIU) "invokes" their mandate, the law requires that the police service cease speaking about the incident in question and prohibits any release of information, including BWC videos that might have pertinent information.

However, recent changes in Ontario now permit the SIU director, under very specific circumstances, to release some information. The *Special Investigations Unit Act* (2019) states the following:

> The SIU Director may issue public statements respecting an ongoing investigation or preliminary inquiries under this Act, if,
>
> a) the statement is aimed at preserving public confidence; and
> b) the benefit of preserving public confidence clearly outweighs any detriment to the integrity of the investigation or inquiries.
>
> The Complaints Director may issue public statements respecting an ongoing investigation under this Part, if,
>
> a) the statement is aimed at preserving public confidence; and
> b) the benefit of preserving public confidence clearly outweighs any detriment to the integrity of the investigation.

Most provinces have similar external investigative bodies and regulations, without the updated release of information section in Ontario. A number of provinces and territories that do not currently have these in place are in the process of either creating them or looking to neighbouring jurisdictions to provide these oversight services.

Furthermore, police services, including the Royal Canadian Mounted Police, have additional, and very important, privacy frameworks that severely limit their ability to release information to anyone other than the person or persons directly involved in the case—and even then, there are restrictions in place.

For example, the Privacy Act of Canada (R.S.C., 1985) states:

> Personal information under the control of a government institution cannot be disclosed without your consent except in specific circumstances, such as:
>
> - for the original purpose for which the information was collected or a use consistent with that purpose
> - where the disclosure is authorized in federal legislation
> - to comply with subpoenas, warrants or orders of a court or another body with authority to compel information
> - where disclosure would clearly benefit the individual
> - where the public interest in disclosure outweighs any invasion of privacy

Finally, we have the critically important, and constitutionally protected, right to a fair trial. The *Canadian Charter of Rights and Freedoms* states:

> 11. Any person charged with an offence has the right
>
> (*a*) to be informed without unreasonable delay of the specific offence;

(*b*) to be tried within a reasonable time;
(*c*) not to be compelled to be a witness in proceedings against that person in respect of the offence;
(*d*) to be presumed innocent until proven guilty according to law in a fair and public hearing by an independent and impartial tribunal

Therefore, in cases where an accused is, or may be, before the courts, the police have a duty to ensure that no information is released that might in any way negatively impact their ability to have a fair trial.

This is, at least in part, why Crown Prosecutors, as agents of the Attorney General and officers of the court, are typically responsible for releasing information both to the accused's legal representative and, in rare cases, to the public during trials—normally via the media. It should be noted that in some sensitive trials, such as sexual assaults, disclosure of specific evidence is prohibited.

In a recently published BWC book (Brown, 2020), Dr. Greg Brown, from Osgoode Hall Law School (York University), states that:

> accountability and visibility/transparency, as they relate to front-line police work throughout Western societies (including the United States and Canada), have intersected, and effectively comingled, to such a degree that they are now, for all intents and purposes, conflated in their everyday understandings and operationalization across both policing and the public sphere. In other words, today it is widely understood that the visibility of police actions in the field constitutes, and is now relied on as, the principal mechanism to ensure police accountability.

Moving Forward—The Path to Improved Police Transparency

Over the past few years, and increasingly since the tragic death of George Floyd in Minneapolis, there have been more calls for Canadian police to wear body cameras. Prime Minister Justin Trudeau has added his voice, and government support, for body cameras being worn by Canadian police officers.

A Reuters news article (Ljunggren, 2020) quotes the Prime Minster as saying:

> One of the things we (the Prime Minister and RCMP Commissioner Lucki) discussed was the adoption of body cameras. I'm committing to raising this with the provinces this week so we can move forward as quickly as possible," Trudeau told a daily briefing. "Body cameras (are) a significant step towards transparency.

There is little doubt that current and future technologies provide an unprecedented ability for agencies to share digital evidence with their partners including groups like Crown Prosecutors, external investigative bodies (such as the SIU in Ontario), and the communities they serve. As outlined above, however, there are a number of legal, privacy, and policy barriers that are currently in place in most provinces that limit a police agency's ability to be fully transparent. These barriers are, for the most part, outside a Police Chief's ability to change on their own.

However, in the same way that most community safety leaders are committed to finding better ways to respond to mental health calls (again in part via the use of advanced technology such as livestreaming), there has never been a better, or more important, time for thoughtful and visionary leaders to join forces and blaze a trail to increased police transparency in Canada.

Call to Action

As a life member of the Canadian Association of Chiefs of Police and long-time information management advocate in Canada and around the world, I believe it is time for key stakeholders to work collaboratively to improve police transparency in Canada. These stakeholders include, but are not limited to, various Chiefs of Police Associations, Police Governing Bodies, Police Associations, governments at all levels, Privacy Commissioners, Crown Prosecutors, the Defence Bar, external investigative agencies (like SIU), academic researchers, and, most critically, community leaders, to join forces and work together on this issue.

At a high level, this would require a detailed analysis of current barriers to transparency and then working jointly on updating relevant policies, privacy legislation and provincial/federal acts to reduce these barriers and produce truly enhanced transparency in the Canadian policing and justice landscape (Figure 1). There are many forms that such a process could take as well as many planning models to follow. One such successful model used by Public Safety Canada and the Canadian Association of Chiefs of Police outlines the following steps with key stakeholders:

1. Conduct a thorough current state analysis
2. Develop a vision of the ideal future state—with no restrictions based on potential barriers like cost
3. Outline the case for change including high-level goals and metrics to measure success
4. Identify all potential barriers to achieving these goals including a detailed risk analysis and, finally,

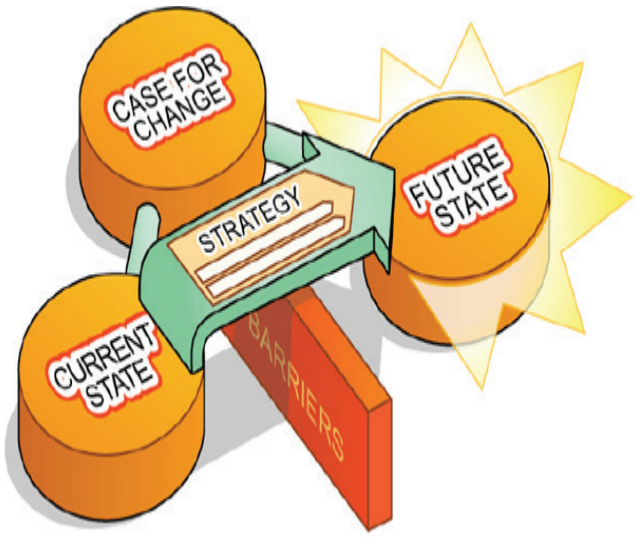

FIGURE 1 Strategic planning model previously leveraged in Canada.

5. Leverage all the information gathered and reach a mutual understanding/agreement of the goals, including developing a strategy and action plan with clear timelines and accountability statements designed to achieve the strategy's vision.

CONCLUSION

Between COVID-19 and the extraordinary calls for change in Canadian policing, there has never been a more critical time in our history to truly work together with a common vision. Improving police transparency in Canada requires more than just press releases. It requires both vision and leadership on behalf of a wide range of stakeholders. I stand ready to work with any interested stakeholders to do my part to continue my decades-long mission of improving community safety practitioners' ability to get the right information to the right people (including the public) at the right time.

CONFLICT OF INTEREST DISCLOSURES

The author has no conflicts of interest to declare.

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ORIGINAL RESEARCH

Journal of
COMMUNITY SAFETY & WELL-BEING

STRENGTHS

The effect of the COVID-19 pandemic on domestic violence and child abuse

Sandra M. Bucerius,* Brad W. R. Roberts,* and Daniel J. Jones†

This article is related directly to the 6th International Law Enforcement & Public Health (LEPH) Virtual Conference in March 2021.

ABSTRACT

In response to the COVID-19 pandemic, many governments around the world have implemented lockdown or mass quarantine measures. While the purpose of these measures is to prevent the spread of the virus, they have had important social consequences. To determine the effect that pandemic-related isolation and quarantine measures have had on domestic violence and child abuse, we analyzed Canadian police calls for service data from 2015 to 2020. Our findings indicate that calls for service related to both domestic violence and child abuse have significantly increased during the pandemic. In light of these findings, we make recommendations for both government officials responsible for pandemic management and policing organizations on how to prevent increases in domestic violence and child abuse during future lockdowns.

Key Words Policing, quarantine, lockdown, abuse, children, violence.

INTRODUCTION

On 30 January 2020, the World Health Organization (WHO) declared the coronavirus disease 2019 (COVID-19) a Public Health Emergency of International Concern. Shortly thereafter, on 12 March 2020, the WHO declared COVID-19 a pandemic, and it rapidly became the largest global health emergency of the twenty-first century. In an attempt to stop the spread of the virus by preventing its human-to-human transmission, many governments around the world implemented (and *still* implement at the time of writing) "lockdown" or "mass quarantine" measures, which aim to limit the movement of people and prevent face-to-face interactions (Davies et al., 2020; Lau et al., 2020). Depending on the national, and sometimes local, context, some of these measures include work-from-home advisories, compulsory "shelter-in-place" orders, the closure of schools and non-essential services, as well as restrictions on social gatherings, travel, and border crossings (Wilder-Smith & Freedman, 2020).

While such measures have shown to be effective in slowing the spread of the virus, preventing deaths, and alleviating stress on the healthcare system (Lau et al., 2020), they have other far-reaching consequences. On one hand, air quality has improved during the pandemic as a result of a reduction in greenhouse gas emissions (Zambrano-Monserrate et al., 2020), due, in part, to significantly reduced air and road traffic in 2020. In particular, road traffic reduced by half globally in April 2020, while the number of air travel passengers reduced by 63% in April 2020 in comparison with April 2019 (United Nations, 2020). On the other hand, previous studies have shown that mass quarantine measures and lockdowns both contribute to low life satisfaction, emotional isolation, and fear of infection (Cava et al., 2005; DiGiovanni et al., 2004; Reynolds et al., 2008; Zhang et al., 2020). The social and economic costs of social and physical distancing and lockdowns are particularly brutal for the most vulnerable members of society. These individuals are typically engaged in employment where they are less likely to be able to work from home and experience higher rates of unemployment due to the closure of non-essential services (International Labour Organization, 2020). Furthermore, some essential services for vulnerable populations (e.g., homeless shelters) have been forced to close to mitigate the spread of the virus (Perri et al., 2020). When focusing on youth, research on the effect of quarantine measures and isolation on children has shown a higher likelihood of developing acute stress disorder, adjustment disorder, and grief, with 30% of quarantined or isolated children meeting clinical criteria for post-traumatic stress disorder (Sprang & Silman, 2013). Nationwide school closures could also negatively impact the health and

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well-being of children, since evidence suggests that children are less physically active, have significantly longer screen time, irregular sleep patterns, and less favourable diets when not participating in school (Brazendale et al., 2017).

The various societal costs of the pandemic will need to be carefully studied over time and across different research disciplines to understand its impact on public health, life satisfaction, mental health, the psychological as well as social development of children, and educational outcomes. The role of criminologists will be to study the effect of the pandemic on crime rates. Historically, criminologists have observed an increase in violence and drug use during times of recession and economic crisis (Carpenter, 2017; Dávalos et al., 2011; Hollingsworth et al., 2017; Schneider et al., 2016), as well as an increase in domestic violence following disasters (see, for example, Rahman, 2013, and Gearhart et al., 2018). In this light, we hypothesize that the COVID-19 pandemic and its associated government-mandated lockdowns have had a similar effect on such crime rates. By analyzing Canadian data, our article will provide some initial insights into the effect of the COVID-19 pandemic on both domestic violence and child abuse. The research question we will address is the following: What effect do quarantine measures and isolation have on the calls for service to police organizations pertaining to domestic violence and child abuse? We make specific recommendations for policing organizations that follow from our findings.

CONTEXT

Domestic Violence and Child Abuse

A number of scholars have historically examined the impact of pandemics, disasters, and other major crises on domestic violence. For example, Decker et al. (2013) examined how the HIV pandemic influenced the abuse of women, whereas Wilson et al. (1998), Gearhart et al. (2018), and Parkinson (2019) examined the increase of domestic violence following disasters. Several scholars have commented on the effect of social isolation during the COVID-19 pandemic on domestic violence around the world (van Gelder et al., 2020). In particular, there has been a 40%–50% increase in domestic violence in Brazil (Graham-Harrison et al., 2020); there was a 20%–30% increase in calls to domestic violence helplines in Cyprus and Spain in the several days following implementation of their government-mandated isolation measures; there has been a surge in calls to the National Domestic Violence Hotline in the United States since the beginning of the pandemic (Thomas, 2020); and there was a 25% increase in calls related to domestic violence in the United Kingdom within just one week of implementation of their lockdown measures (BBC, 2020). Scholars have additionally begun examining contextual differences in the rise of domestic violence. For example, Boserup et al. (2020) demonstrated significant differences in domestic violence increases between different states in the United States, with a range between 10% and 27% in March 2020 in comparison with March 2019. Just recently, a meta-analysis by Piquero et al. (2021) found that, across the 18 included studies, officially reported domestic violence increased by an average of 7.9% during the COVID-19 pandemic internationally, with a slightly higher average (8.1%) increase across studies performed in the United States.

In contrast to research on the effect of pandemics or other disasters on domestic violence, there has been comparatively less empirical research examining the relation between such events and child abuse. However, it is well established that stress can cause cognitive, emotional, and physical fatigue, all of which can strain relationships between children and their parents (Deater-Deckard, 2004). The consequences of this often include harsher parenting (Beckerman et al., 2014) and child abuse (Rodriguez-Jenkins & Marcenko, 2014). Stress is, therefore, an important factor to consider when examining the consequences of the COVID-19 pandemic. Lockdowns, the closure of schools and non-essential services, physical distancing measures, and the indefinite loss of employment have resulted in many individuals and families experiencing stressful economic situations as well as heightened mental health concerns (e.g., Marazziti et al., 2020; Brown et al., 2020).

Research Location

COVID-19 was first detected in Alberta, Canada, in January 2020 and was traced to out-of-country travel. By 5 March 2020, the province was experiencing exponential growth in transmission of the virus, and by 15 March 2020, all schools across the province were closed. On 16 March 2020, Edmonton, Alberta, where our research takes place, closed all city-run facilities (e.g., libraries, gyms, and hockey arenas), cancelled all international flights to and from the city, and allowed only essential services to remain open. Edmonton is the capital of Alberta and the most populous northern city in the world, with close to one million residents within city limits and approximately 400,000 additional residents in neighboring communities. The city has a police service (Edmonton Police Service (EPS)) with approximately 2,500 members, 1,800 of whom are sworn police officers. In the initial phases of the lockdown (i.e., following 15 March 2020), the EPS experienced a decrease in the frequency of calls for service. This decrease could largely be explained by the fact that many individuals were working from home, resulting in a decrease in the frequency of residential break and enters and fewer traffic accidents. Shortly after 15 March 2020, however, commercial break and enters began to increase (with non-essential services being closed, the reporting of such break and enters was delayed). The other types of crime for which the EPS received increased calls for service include domestic violence and child abuse.

METHODS

We entered into a research agreement with the EPS, and they provided us with Edmonton calls-for-service data for two types of crime, domestic violence and child abuse, between the years 2015 and 2020. The dataset contained only calls for service that resulted in a charge in one of the two described categories. In other words, calls for service that did not result in a charge, or resulted in a charge for a different type of crime, were not included in the dataset. Using these data, we tabulated the number of occurrences of domestic violence and child abuse in each yearly quarter from the beginning of 2015 to the end of 2020. We also calculated the average number of occurrences for 2015 through 2019, and, for each type of crime, the percent change in occurrences from the 2015–2019 average to 2020 for each quarter.

RESULTS

In Figure 1, the total number of domestic violence (Figure 1A) and child abuse (Figure 1B) occurrences are shown from the beginning of 2015 to the end of 2020. A visual inspection suggests that the number of domestic violence and child abuse occurrences were both greater in 2020 than in the previous years shown.

In Table I, the average number of domestic violence and child abuse occurrences between 2015 and 2019 are shown for each yearly quarter. The number of occurrences in 2020, as well as the percent change from the 2015–2019 average to this year, are also shown. For both types of crime and all yearly quarters, there was a significant increase in occurrences from 2015–2019 to 2020 (e.g., there was a 54% increase in child abuse in 2020 compared with 2015–2019 for the third yearly quarter). These results confirm the visual inspection of Figure 1.

DISCUSSION

The potential long-term consequences of COVID-19 on public health are currently not well understood. However, while a focus on the impact of the disease on public health is important, attention must also be paid to the wider societal costs of the pandemic and its associated lockdowns. Our findings draw attention to the consequences on two types of crime during a state-ordered lockdown: domestic violence and child abuse. Calls for service for both types of crime have significantly increased during the pandemic. These findings have implications for future lockdowns and, in particular, raise the question of how policing organizations can potentially address anticipated lockdown-related issues *before* they arise. In light of our findings, we make recommendations for both government officials responsible for pandemic management and policing organizations:

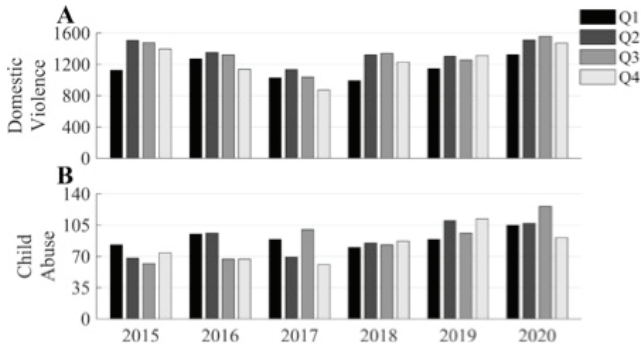

FIGURE 1 Domestic violence (A) and child abuse (B) occurrences in Edmonton, AB, CA between the years 2015 and 2020. Shown are the total number of occurrences in the first (Q1), second (Q2), third (Q3), and fourth (Q4) yearly quarters from the beginning of 2015 to the end of 2020.

TABLE 1 Average number of domestic violence and child abuse occurrences in Edmonton, AB, CA between the years 2015 and 2019 as well as the percent change in occurrences from the 2015–2019 average to 2020.

	Domestic Violence			Child Abuse		
Quarter	2015-2019 Average	2020	Change	2015-2019 Average	2020	Change
1	1,111	1,325	19%	87	105	20%
2	1,324	1,511	14%	86	107	25%
3	1,286	1,559	21%	82	126	54%
4	1,190	1,472	24%	80	91	13%

- As our findings indicate, domestic violence and child abuse both increase during lockdowns. With this knowledge, policing organizations should be prepared to pivot during times of lockdown, moving resources to their units responsible for domestic violence and child abuse.
- Our data shed light on the unintended consequences of school closures, especially pertaining to children in elementary school (i.e., kindergarten to sixth grade). In addition to its educational role, school often serves as a safe place for children, sometimes the *only* safe place they have. With this in mind, the closure of schools may have two detrimental effects on child abuse: (1) children lose their safe space and access to adults they may be able to trust (including a school resource officer that they may have a trusting relationship with); and (2) perpetrators in the home have continued access to their victims, while also not needing to fear that the children in their care will report their victimization to teachers, school social workers, school resource officers, school friends, or friends' parents. To prevent child abuse, school closures should therefore always be a last resort. If schools must close, we recommend that schools and teachers develop best practices to identify students who are at an increased risk of child abuse during school closure and develop protocols for how to routinely check in with such students and their families. This could potentially be realized in collaboration with school resource officers.
- More broadly, the empirical evidence of significant increases in both domestic violence and child abuse further highlights the need for trauma awareness for first responders, in general, and police officers, specifically (Jones 2020). The longitudinal impact of domestic violence and child abuse as they relate to Adverse Childhood Experiences (ACEs) is well documented (Merrick et al., 2017; Messina & Grella, 2016; Finkelhor et al., 2015). Consequently, trauma awareness and trauma-informed programming, as well as educating police officers and justice workers about the impact of domestic violence and childhood abuse, are critical. Such training is particularly important during disasters and pandemics, as police officers must respond to increased calls for service for crimes related to domestic violence and child abuse.
- During economic downturns, funds for prevention of, and social intervention in, social issues are often reduced. Since the economy of Alberta has been devastated by the pandemic, we are therefore concerned that programs to prevent domestic violence and child abuse will be among those that receive less funding. Given the long-term impact of domestic violence and child abuse, we urge the government to reconsider such potential funding

cuts. Without the described programs, the police will likely deal with an increase in cases related to domestic violence and child abuse.

- There needs to be increased media attention on domestic violence and child abuse, especially during times of state-mandated lockdowns, when regular safe spaces may not be available for victims. Victims need to know who they can call and reach out to when being victimized, and the public needs to understand warning signs that may urge them to call the police. This could be accomplished via media campaigns involving police officials.
- In many jurisdictions, victim-centered services closed their operations, preventing victims of domestic violence or child abuse from physically meeting with victim service workers. Future research should investigate whether this has affected the use of these services. If the use of such services has decreased, police organizations need to determine how to safely administer physical programming during future lockdowns.
- There is promising research on how focused deterrence can reduce domestic violence (Sechrist & Weil, 2018). Policing organizations could benefit from investigating evidence-based practices on focused deterrence and consulting with experts on how focused deterrence could be implemented during future lockdowns.

While our data show an increase in calls for service in Edmonton for both domestic violence and child abuse during the pandemic, further research is needed to determine whether our results apply to other populations. Since Edmonton is a blue-collar city in a province that is predominately dependent on the petroleum industry—which has experienced a downward trend during the pandemic—it is possible that our findings are influenced by the fact that many Albertan families have experienced elevated stress during the pandemic caused by severe economic struggles. As discussed, previous research has shown that stress plays an important factor in relationships and well-being and could be an indirect cause of the observed increase in domestic violence and child abuse. It is possible that calls for service related to domestic violence and child abuse did not increase to the same extent in areas that were not negatively affected economically to the same extent as Alberta.

Our findings raise awareness of the societal costs of government-initiated lockdowns and pandemic management while also providing recommendations for police organizations.

CONFLICT OF INTEREST DISCLOSURES

The author has no conflicts of interest to declare.

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COMMUNITY SAFETY & WELL-BEING

Promising indications in the journey of the Mental Health Pathway collaboration between police and health in Scotland

Claire E. Coleman*

This article is related directly to the 6th International Law Enforcement & Public Health (LEPH) Virtual Conference in March 2021.

ABSTRACT

Mental Health Pathway is a pioneering collaborative project in Scotland between police and health professionals seeking to get the first point of contact right for the public in relation to their mental health. Six months after the launch of the first stage, we take a reflective look over what has taken place and look to the future plans.

Mental Health Pathway (MHP) is a new collaborative project between NHS24, Ambulance (SAS – Scottish Ambulance Service), and Police Scotland, its key objective being to better support the public in Scotland in relation to mental health – *Right Care, Right Time*.

Prior to the Pathway, the police and ambulance service traditionally took a person in mental health crisis to an Accident & Emergency department for assessment. This approach has been found to be both embarrassing for the person in crisis and frustrating for the officers as they knew this was the wrong journey for the person (Figure 1). This photograph from October 2018, courtesy of BBC News (https://www.bbc.co.uk/news/uk-scotland-47141260) shows the extent of a typical night at a Scottish hospital, where its car park is filled with police vehicles. Within a rural setting, the officers may have had to travel excessive distance and/or use ferries to leave Islands to enable the person to receive support.

FIGURE 1 Larbert Hospital car park October 2018

Figure 2 shows the Pathway timeline from conception in 2017 to August 2020, charting its various achievements and milestones. One of the first objectives of the group was to truly understand the roles and responsibilities of the police and ambulance services. Additionally, when opportunities presented, they engaged in joint learning, including live listening in exercises and attending training together, which consolidated the small group.

In 2019, NHS24 launched their Mental Health Hub (MHH) for any person within Scotland, regardless of age, to be able to access mental health support by telephone. Initially it was open just four nights a week; however, due to its success and demand, the service rapidly increased to 24/7.

When contacting the Hub, the first person a member of the public speaks to is a Psychological Wellbeing Practitioner (PWP). This non-clinician role is unique to the Hub, with practitioners who have excellent life skills and are specifically trained to support people in distress. Most people who phone the Hub are supported by a PWP to safe self-care. The Hub is also staffed by Mental Health Nurse Practitioners and Mental Health Senior Charge Nurses. If needed, they will supervise the call to a safe outcome.

In addition, the staff can also offer other services, such as the National Distress Brief Intervention Service, where local health partners can support the person for a few days. Some people are directed to a primary care out-of-hours service,

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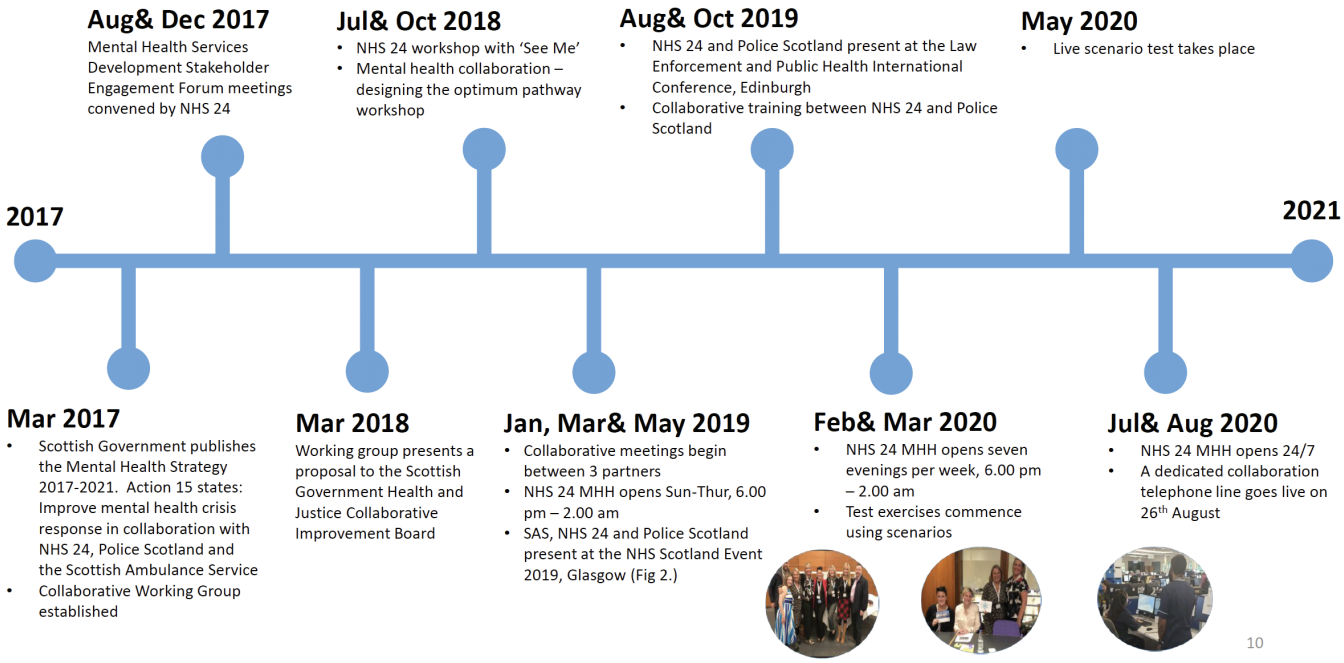

FIGURE 2 MHP Timeline

and very few people are referred to a local accident and emergency department, or emergency services. The most common reasons for contacting the Hub include suicide, anxiety, low mood, psychosis, and self-harm.

Over the summer of 2020, over 600 Police Service Centre Advisors (civilian role and initial point of contact with Police Scotland either by telephone or email) completed a bespoke learning program designed in collaboration with NHS24 and Edinburgh Napier University. One concern for the police side of the collaboration was officers and staff letting go of the incident and passing the responsibility to another service. To achieve buy-in, the project team provided an extensive engagement and learning program, which received 97% positive feedback. This program allowed them to effectively assess public contact for mental health and distress, and if it fit the Mental Health Hub referral criteria, they would complete the referral with the consent of the member of the public.

The MHH referral criteria are as follows:

Any **public contact** where it appears that an ADULT (any person aged 16 years or older) would benefit from Mental Health support and where there is NO:

- IMMEDIATE threat to life
- reason for police involvement, beyond an apparent need for health/mental wellbeing support.

In short, through this referral system, a member of the public speaks with a PWP within 10 minutes, no officers are deployed, and the support remains with the Mental Health Hub team.

Since the launch at the end of August 2020, MHH referrals have grown in strength and maturity to over 1,300 referrals, with staff describing this introduction as providing them the opportunity to "listen to the callers and assess their needs more efficiently, knowing that we now have an appropriate resolution for them."

In December 2020, the ability to make such referrals was rolled out to the rest of the Police Scotland Contact, Communications and Command division, which includes Police Control rooms. The last stage of the MHH referrals will be introducing the ability to make referrals to the rest of Police Scotland, from the uniformed officer in Dumfries, to the Station Assistant in Benbecula, to the Detective noting a historical abuse statement in Edinburgh.

Six months after the launch of the referrals, a joint evaluation is currently taking place between NHS24 and Police Scotland, which will be published in spring 2021. Early indications have shown that there is a fair split between genders, 53% male and 47% female, in people who use the Hub. Ages range from 16 to 89 years (although the Hub is available for any age, Police Scotland only refer 16 years and above), with the most prevalent age range being 50 to 59 years, at 19% (Figure 3).

Of interest, 32% of referrals are made during core opening times (0900 to 1700 hrs) for General Practitioners and local mental health support services, and the most popular time is 23:00 to 23:59 hrs, with 12% of referrals. Saturdays are busiest (17%), followed closely by Sunday and Tuesday (15%), and the least busy is Monday with 11% (Figure 4).

It was also established that people contacted the police looking for mental health support after their own dealings with the police due to criminality, which includes both victims and accused. From April 2020, all persons being released from police custody will be provided with written information regarding the Hub. It is hoped that with the national rollout across the rest of Police Scotland, this service will better support victims when sign-posting can be conducted during all police dealings.

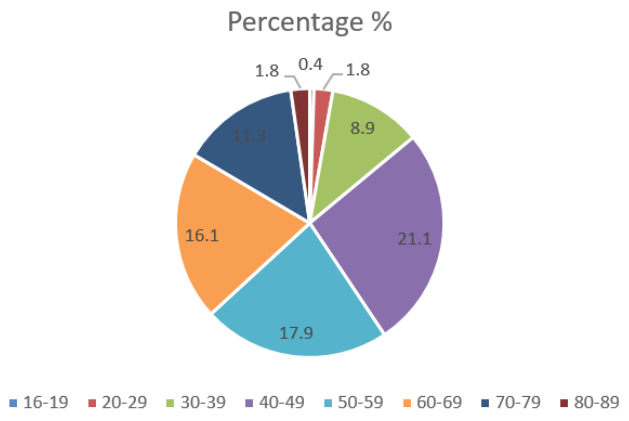

FIGURE 3 Ages of people referred to the Hub

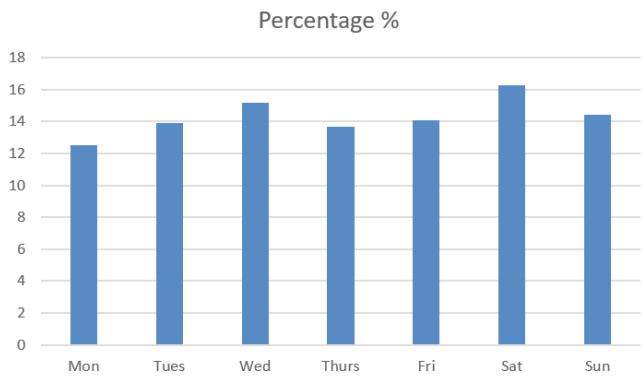

FIGURE 4 Percentages of referrals to the Hub by day of the week

The most popular reason identified for referring to the Hub is feelings of low mood and depression, with 49% and 17%, respectively, stating they had suicidal feelings but could keep themselves safe long enough for Hub contact. What is key out of all the findings is that 93% of referrals resulted in a non-emergency intervention combining the following:

- self-care, such as mindfulness, identifying coping strategies or grounding techniques
- General Practitioner (GP) post-contact
- Distress Brief Intervention (24-hr post-follow-up support)

As Police Scotland moves to phase 2, the introduction of Mental Health Nurse Practitioners into Police Control rooms, in the summer 2021, the Pathway members have been in conversation with their colleagues in England and Wales, where there are many examples of such work, and in some case for over eight years, such as at the Leicestershire Constabulary. This has allowed for sharing of information and identification of best practices.

Those who have benefitted the most from the Pathway have been the officers and staff within Police Scotland, who all speak highly of the collaboration and have fully embraced it. Early indications point to the potential for greater benefits for the health care system and general safety and well-being of persons affected by mental health conditions.

If you wish to find out more about the Mental Health Pathway, please contact claire.coleman@scotland.pnn.police.uk

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CONFLICT OF INTEREST DISCLOSURES

The author has no conflicts of interest to declare.

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ORIGINAL RESEARCH

Journal of
COMMUNITY SAFETY & WELL-BEING

JUSTICE

Observational study of visual testing efficacy in detecting cannabis usage

Phillip Olla,* Mustafa Abumeeiz,* Lauren Elliott*, Rachel Foote,* Mialynn Lee-Daigle,* Stephen Bartol*, and Laszlo Erdodi†

ABSTRACT

Drug recognition and examination programs are widely used to detect drug impairment in motor vehicle operators. Visual tests are a key assessment in the detection of cannabis-related impairment. Participants were recruited via social media from the medical cannabis community in Southwestern Ontario, Canada. Twenty-two participants completed the full observational trial design. The majority (n = 13 or 59.1%) were male, with a mean age of 36 years (SD = 9.4; range: 24–59). Participants underwent the following protocol: 1) First round of testing (vital signs, bio sample collection, visual tests, subjective data, neurocognitive testing) (*Baseline* phase); 2) Consumption of cannabis via inhalation; 3) Second round of testing 30 minutes following consumption (*THC* phase); 4) Additional rounds of testing at 90, 150, and 210 minutes following consumption (*Recovery* phase). Visual assessment data and vital signs did not follow typical patterns associated with acute cannabis intoxication. With blood THC levels more than double the Canadian legal limit (5 ng/mL), visual testing results were not diagnostic for cannabis impairment, as participants maintained normal pupil sizes and normal ocular convergence patterns. Visual testing is a key component in standardized examinations used for detecting cannabis-related impairment in Canadian drivers; however, our data indicate that visual testing may not be an effective diagnostic tool for the specific population of medical cannabis users.

Key Words Medical cannabis; impaired driving; drug recognition expert.

INTRODUCTION

Cannabis is the most widely used illicit drug worldwide (Hamilton et al., 2017; Health Canada, 2017). While commonly used for medicinal purposes (for example, it is prescribed by doctors in Canada as per the *Cannabis Act*) or recreationally in a decriminalized context, there has been recent broader legalization of cannabis for recreational use in Canada and in several American states, such as Montana, Arizona, and New Jersey (Cox, 2018; Health Canada, 2020; National Conference of State Legislatures, 2021). Given the trend towards the legal allowance of cannabis use, the health and safety risks of the substance, especially implications for impaired driving, are a primary concern.

A study by Hartman et al. (2016) finds cannabis to be the most common illicit drug identified in cases of driving under the influence. Cannabis is known to induce cognitive and psychomotor changes that result in impaired driving and, as such, has been linked to acute harm outcomes including increased risk of a motor vehicle accident (Busardò et al., 2017; Fischer et al., 2018; Hartman et al., 2016). Psychophysical and visual examinations have been previously shown to produce reliable indicators of cannabis intoxication in impaired driving cases (Hartman et al., 2016), but less is known about the effectiveness of standard impairment testing in the specific population of medical cannabis users.

Review of Drug Impairment Examinations

The Drug Evaluation and Classification (DEC) program is one of the most widely used procedures for assessing drug impairment in drivers and provides a systematic means for law enforcement to find the cause of impairment in drivers suspected of being under the influence of drugs (Porath-Waller et al., 2009; Richman, 2017). The DEC program contains a 12-step protocol for law enforcement; police officers can become accredited by the International Association of Chiefs of Police, through the RCMP, as Drug Recognition Experts (DRE) who use the DEC (see Figure 1; Royal Canadian Mounted Police, 2018a). Previous research has found DEC examinations to be up to 95% accurate in correctly identifying

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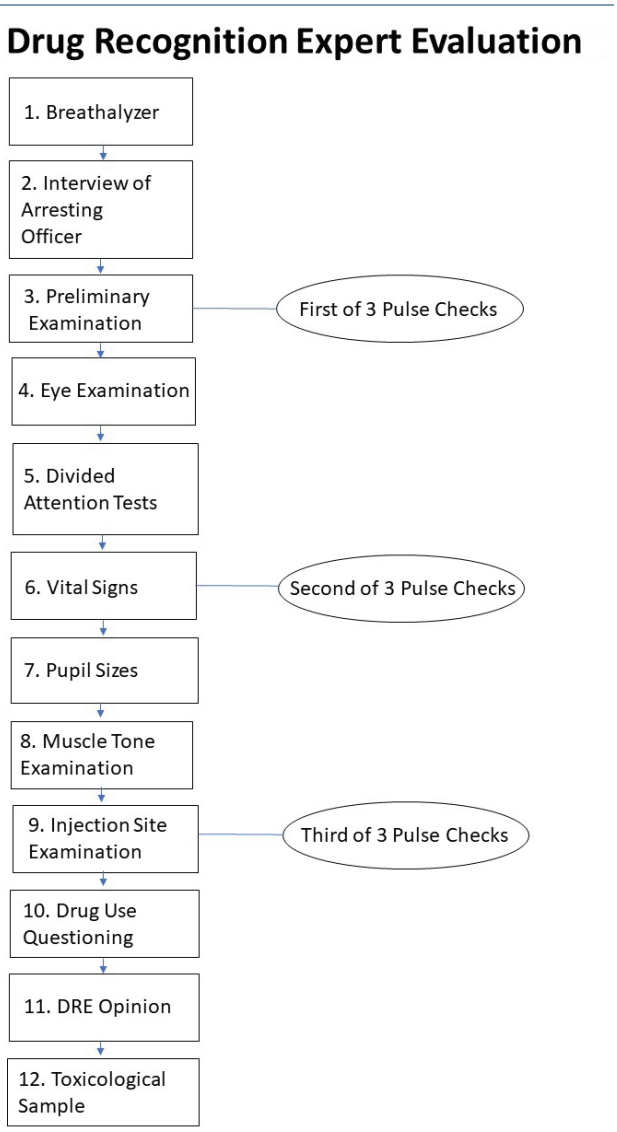

FIGURE 1 12-step drug recognition expert evaluation flow chart (produced with information from Royal Canadian Mountain Police, 2018). DRE = drug recognition expert.

drug impairment in Canada (Beirness et al., 2009; Porath-Waller & Beirness, 2010; Smith et al., 2002).

Standardized field sobriety tests (SFSTs) are widely used by law enforcement officers to detect drug and alcohol impairment in drivers and are included in the DEC. These tests are brief psychophysical tests done roadside (including limited visual exam and walk-and-turn test) that screen for impairment (Government of Canada, 2018). If the driver's blood alcohol content is inconsistent with the arresting officer's observation of impairment via the SFST, the rest of the DEC evaluation can be used to ascertain the nature of the involved substance. This evaluation is completed by DREs in a controlled environment, often at a police department. The DEC includes components such as a pupil examination and an eye examination as well as breath alcohol testing, psychophysical coordination testing, vital sign measurement, muscle tone examination, interviews with the offender and arresting officer, and toxicological examination (Hartman et al., 2016; Porath-Waller et al., 2009; Royal Canadian Mounted Police, 2018a). Based on the combined results of these tests, examiners classify the offending substance into one or multiple of seven categories, one of which is cannabis (International Drug Evaluation and Classification Program, n.d.; Richman, 2017).

Using Visual Assessments to Detect Impairment

An important aspect of SFSTs and the DEC is visual testing. While visual testing in SFSTs is only comprised of horizontal and vertical gaze-evoked nystagmus (sustained jerking when eyes are deviated to the side; Royal Canadian Mounted Police, 2018a), during the DEC, pupil size changes (pupil size and reaction to varied lighting conditions) and potential lack of convergence (inability to sustain inward turning of eyes) are also examined. In combination with the other parameters of the DEC, visual testing can be used to profile various forms of substance impairment including ethanol, cocaine, and cannabis impairment. Research has identified that during visual testing, ethanol produces horizontal gaze nystagmus, does not cause lack of convergence, and does not cause pupil dilation (Heishman et al., 1996; Romano et al., 2017). In combination with errors in the walk-and-turn test, miscounting in and failure to complete the one-leg-stand test, abnormal muscle tone, and increased pulse readings, ethanol impairment can be identified through the DEC (Heishman et al., 1996). Similarly, cocaine produces pupil dilation, does not cause lack of convergence, and does not cause horizontal gaze nystagmus (Heishman et al., 1996; National Institute on Drug Abuse, 2020). In combination with errors in the walk-and-turn test, decreased errors on the one-leg-stand test, abnormal muscle tone, and increased pulse readings, cocaine impairment can also be identified through the DEC (Heishman et al., 1996).

Using Visual Assessments to Detect Cannabis Impairment

Previous researchers have established the association of acute cannabis intoxication with pupil dilation (Bramness et al., 2010; Heishman et al., 1996) and lack of convergence (Hartman et al., 2016; Heishman et al., 1996; Yeakel & Logan, 2013). Additionally, cannabis impairment is associated with normal results for gaze-evoked nystagmus (Hartman et al., 2016; Heishman et al., 1996; Kibby & Halcomb, 2013; Porath-Waller & Beirness, 2010; Yeakel & Logan, 2013). This visual assessment, in combination with other DEC measures such as errors on the walk-and-turn test, abnormal muscle tone, decreased errors on the finger-to-nose test, and increased pulse readings (Heishman et al., 1996), provides a profile indicative of individuals under the influence of cannabis. While these are the established expected visual findings for cannabis impairment in the general population, potential differences in visual assessment findings between medical cannabis users and less frequent or recreational users has yet to be investigated.

Examining Medical Cannabis Users

Medical cannabis users may differ from recreational users in the frequency and chronicity of their cannabis use. Medical cannabis patients could be more likely to partake in daily and

chronic use due to their medical needs (Hill, 2015). Through this frequent use, individuals can develop a physiological tolerance to the acute effects of the drug (Colizzi & Bhattacharyya, 2018; Desrosiers et al., 2015; Theunissen et al., 2012). If medicinal cannabis users display less significant signs of impairment due to tolerance, it is possible that standard examinations for the presence of impairment may provide inaccurate results. Medical users may also have cannabinoids lingering in their system due to frequent use and due to various ingestion methods. The RCMP can test either oral fluid, urine, or blood (Royal Canadian Mounted Police, 2018b). THC can be detectable in blood at greater than the legal limit (2 ng/mL) for up to a week in frequent cannabis users (Peng et al., 2020), which would modulate both their baseline results and their results following subsequent dosages of cannabis. This brings into question whether the eye and pupil examination portions of the DEC, and the rest of the protocol, for that matter, are suitable for use with medical cannabis users. This research seeks to investigate the effectiveness of visual testing in the detection of cannabis impairment for medical cannabis patients. In particular, it will focus on aspects of eye examinations that are not present in SFSTs and which are important in identifying cannabis impairment specifically (lack of convergence and pupil dilation).

Ethics Approval and Consent to Participate

This project was approved by the University Research Ethics Board, and ethical guidelines regulating research involving human participants were followed throughout the study. All data collection, storage, and processing were done with the approval of relevant institutional authorities regulating research involving human participants, in compliance with the 1964 Helsinki Declaration and its subsequent amendments or comparable ethical standards. Study participants gave informed consent at every phase of the trial. The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

METHODS

The aim of this observational study was to investigate the neurocognitive and psychophysiological effects of acute cannabis intoxication in a sample of medical cannabis users. Participants were recruited via social media from the medical cannabis community in Southwestern Ontario, Canada. Three hundred people expressed interest in participating in the study, of which 30 completed a medical interview via a telemedicine service to verify eligibility. Twenty-three participants reported to the study, but one withdrew early due to adverse effects following cannabis consumption. Thus, a total of 22 participants completed the full study design.

The majority of participants (n = 13 or 59.1%) were male. Mean age was 36.0 years (SD = 9.4; range: 24–59). The mean level of education was 13.7 years, 12 years being a high school degree (SD = 1.7; range: 10–16). To be included in the study, participants were required to be 24 years of age or older and native English speakers, in possession of a medical marijuana license for treatment of a chronic health condition, medically stable, and have peripheral veins suitable for repeated venipuncture. Exclusion criteria were pregnancy and allergy to any cannabinoid or marijuana smoke. The most common reason for participants' medical marijuana prescription was a psychiatric disorder (n = 15 or 68.2%), followed by musculoskeletal (n = 4 or 18.2%), (auto)immune (n = 2 or 9.1%) and respiratory (n = 1 or 4.5%) illnesses. Pain management was identified as one of the reasons for which medical marijuana was prescribed in 54% of the sample (n = 12). Average self-reported cannabis consumption was 3.2 grams/day (SD = 1.5, range: 1–14) and mean body-mass index was 29.78 (SD = 9.5; range: 17.77–51.62). More details about individual participants can be found in Table I.

Procedure

Participants were observed over six hours on a single day from 8:30 a.m. to 3:00 p.m. Height and weight, vital signs (blood pressure, heart rate, temperature), urine samples, and breath samples were collected by registered nurses, and blood samples (plasma THC levels) were collected by phlebotomists. A medical doctor was available for the duration of the study. Neurocognitive tests were administered by research assistants with extensive training in test administration and scoring who had previous experience administering these measures in research and clinical settings. The research assistants were supervised by a licensed clinical neuropsychologist. These measures, as well as pupil size, ocular convergence, and subjective data were taken at 30, 90, 150, and 210 minutes following cannabis consumption. Participants' breath was collected using an exhaled breath collection device called ExaBreath produced by SensAbues AB of Sweden. Samples were analyzed using Liquid Chromatography-Tandem Mass Spectrometry at the Hospital for Sick Children, Toronto, Canada. Subjective data included data regarding emotional state and physical symptoms. These included subjective ratings of cannabis "high," feelings of relaxation, happiness, slow reaction, confusion, concentration, energy, depression, anxiety, dizziness, nausea, hunger, pain, and more. Following the baseline measurements, one gram of *Cannabis sativa* (20% THC) was consumed by participants via vapes, cannabis cigarettes (joints), and dabs for 10 minutes, followed by subjective level of intoxication reporting on a visual analogue scale. It is important to note that participants were medical cannabis users and had therefore consumed their medical dosages before the study and presented with elevated blood THC levels. Dosage amounts were specific to each participant.

Plasma THC Measurement

Plasma THC levels were measured at baseline (pre-consumption) and at 30, 90, 150, and 210 minutes post-consumption. Plasma THC measurements were performed by the Analytical Facility for Bioactive Molecules at the Hospital for Sick Children. The measured plasma THC values were then converted to their blood THC equivalents for legal limit comparison, using a plasma-to-blood conversion model commonly employed in the literature (Desrosiers et al., 2014; Huestis et al., 2005).

Visual Testing

Eye movement and pupil size were observed pre-consumption and at 30, 90, 150, and 210 minutes post-consumption. Visual assessments were completed by a police officer trained in DEC

TABLE I Research participants' medical cannabis usage profile and eye convergence data prior to consumption

Participant	BMI	Age	Usage per Day (g)	Gender	Medical Condition	Lack of Convergence
1	28.14	32	3	Male	Back pain	N
2	29.18	42	2	Female	Back pain	N
3	31.31	30	3.5	Male	Chronic pain	N
4	19.67	44	1	Female	Degenerative disc disorder	N
5	26.57	33	2	Female	Anxiety	N
6	22.36	37	2.5	Female	Depression	Y[a]
7	44.26	36	5	Male	Anxiety	N
8	N/A	25	1	Male	Anxiety	N
9	46.68	26	2	Female	Immune	N
10	34.26	35	2	Female	Knee pain	Y
11	22.83	37	3	Male	Anxiety	Y[a]
12	17.77	27	2	Male	Arthritis	N
13	19.59	33	2	Male	Scoliosis	N
14	20.90	34	2	Male	Osteoarthritis	N
15	34.08	39	1.25	Male	Lower back pain	N
16	22.54	31	3	Female	Osteoarthritis	N
17	35.62	58	1.5	Female	Anxiety	N
18	30.64	59	14	Male	Spinal dysraphism	Y[a]
19	29.10	32	9	Male	Anxiety	N
20	27.70	39	3.5	Female	Sleep apnea	N
21	18.73	24	3	Male	Back pain	Y[b]
22	51.62	30	1.5	Male	Back pain	N
23	41.53	41	3	Male	Chronic pain	N

[a] = participants with abnormalities in visual assessment (e.g., eyes drifting to one side, focused to left or right); [b] = participant with a known medical condition affecting the eyes.
N/A = data unavailable.

examinations (the police officer being a DRE), thus reflecting the field standard for the detection of drug impairment. Pupil assessment involved measurement of each pupil diameter and reactivity to light in normal room lighting conditions. Ocular convergence tests assess participants' ability to converge their eyes towards a target (Richman, 2017). In this test, the target (a pen) is positioned approximately 12 inches in front of the participant's face, and the participant is instructed to follow the target movement with the eyes only. The target is moved in two large circles and the eyes are watched to ensure proper tracking. After the circles are completed the pen is positioned back to the center and moved toward the bridge of the nose while the eyes are observed for sustained convergence (inward turning of the eyes) for at least two seconds in duration.

RESULTS

Due to the length of the study procedure, many participants opted to not participate in subsequent measurement periods. The amount of data collected therefore significantly decreased as consumption periods progressed. There were 22 participants for measurement at baseline, 30 minutes post-consumption, and 90 minutes post-consumption. This dropped as low as 13 at 150 minutes post-consumption and 6 at 210 minutes post-consumption for certain measures (such as pupil dilation and convergence). This means a full comparison can be made across the first 3 points of measurement, and the last 2 comparisons should be interpreted with those limitations in mind. At baseline, we found that out of 21 participants, 4 had a blood level below 2 ng/mL, 3 had 2–5 ng/mL, 6 had 5–10 ng/mL, and 8 exceeded 10 ng/mL (double the legal limit) (see Figure 2 and Table II). At 30 minutes post-consumption, all participants' blood THC concentrations were greater than 10 ng/mL, blood THC levels well over the current Canadian legal limit of 5 ng/mL. This physiological indication of acute intoxication aligned with an average self-report of subjective "high" of 5.07 on a scale of zero to ten, compared with an average baseline subjective high of 1.33. Participants' THC levels remained elevated for more than 90 minutes post-consumption, with 18 of 22 participants maintaining THC levels over 5 ng/mL.

Participants' pupil diameters were measured at intervals throughout the study. Reference pupil sizes for non-impaired

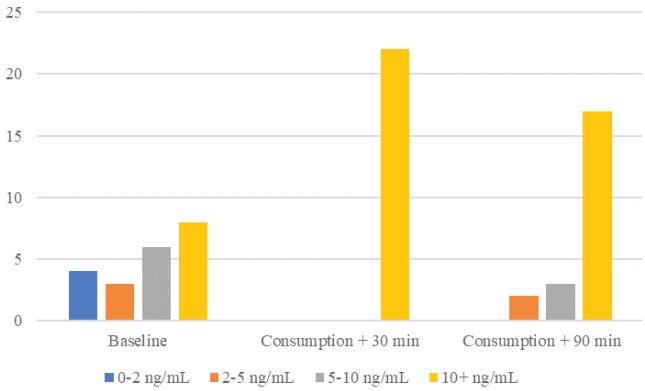

FIGURE 2 Trial blood THC levels in comparison with Canadian *per se* blood THC limits.

TABLE II Blood THC (ng/mL) across consumption periods.

Subject Number	Baseline	Consumption + 30 minutes	Consumption + 90 minutes	Consumption + 150 minutes
1	15.28	29.35	32.70	19.90
2	1.33	15.21	5.43	4.57
3	1.11	42.61	14.54	9.85
4	6.70	11.86	3.44	2.04
5	5.33	33.37	15.28	8.11
6	6.70	N/A	N/A	N/A
7	23.25	90.45	56.28	21.57
8	13.07	39.93	21.24	17.35
9	4.90	19.90	13.60	7.84
10	7.30	49.85	24.46	14.34
11	26.60	48.78	44.42	22.24
12	0.48	39.80	12.19	5.21
13	30.28	67.00	35.78	19.36
14	7.17	19.36	9.05	6.08
15	N/A	N/A	N/A	N/A
16	5.13	48.84	20.23	11.73
17	1.82	13.67	4.64	3.18
18	22.04	39.87	12.46	11.19
19	13.20	37.32	23.92	20.84
20	4.70	60.17	17.49	8.98
21	19.30	79.06	31.96	22.58
22	N/A	N/A	N/A	N/A
23	2.70	21.71	7.84	5.74

N/A = data unavailable.
Note: participant 15 dropped out of the study.

individuals in room light range from 2.5 mm to 5.0 mm, with an average of 4.0 mm (Drug Recognition Expert Course, 2015; Hartman et al., 2016). In the present study, participants' average pupil sizes ranged from 4 mm to 4.55 mm for the right eye and 4 mm to 4.35 mm for the left at different measurement points (pre-controlled consumption and post-consumption) (see Table III and Figure 3). There was no spike in pupil size associated with blood THC levels. Throughout the study, pupil sizes remained within what is considered a normal range for non-impaired individuals, and thus were not indicative of impairment from cannabis (Bramness et al., 2010; Heishman et al., 1996).

Eye convergence tests were coded as either "convergence" or "lack of convergence." It is important to note that the majority of participants who opted out of the procedure for the last two measurements were those whose eyes demonstrated

TABLE III Participants' pupil sizes for both left and right eye (mm) across the first three measurement periods

Subject Number	Baseline L/R (mm)	Consumption +30 minutes L/R (mm)	Consumption +90 minutes L/R (mm)	Consumption +150 minutes L/R (mm)
1	4.2/5.9	3/3	3/3	N/A
2	4/4	4/4	4/4	N/A
3	5.3/5.3	5/5	5/5	5.3/5
4	4/4	4/4	4/4	N/A
5	4/4	3/3	3/3	3/3
6	4.3/4.3	4/4.2	4/4.2	4/4.2
7	6.4/6.4	5/5	5.3/5.3	5.3/5.3
8	5.3/5.3	5/5	5.3/5.3	5.3/5.3
9	4.2/4.2	4/4	4/4	4/4
10	4.2/4.2	4.2/4.2	4.2/4.2	4.2/4.2
11	3/4	3/3	3/3	3/3
12	4.2/4.2	3/3	3/3	3/3
13	5.3/5.3	5.3/5.3	5.3/5.3	N/A
14	4.2/4.2	4.2/4	4/4	N/A
15	4.2/4.2	N/A	N/A	N/A
16	4/5	4/5	4/4	4/4
17	4/4.3	4/4	4.2/4	4/4
18	5.4/6.5	4/5	5/4	4/5
19	5.3/5.3	5.3/5.3	5.3/5.3	N/A
20	2/2	2/2	2/2	N/A
21	5.3/5.3	5/5	5/5	5/5
22	4/4	4.2/4.2	4/4	N/A
23	3/3	3/3	3/3	N/A
Average	4.35/4.55	4/4.1	4.1/4	4.2/4.2

N/A = data unavailable.
Note: participant 15 dropped out of the study.

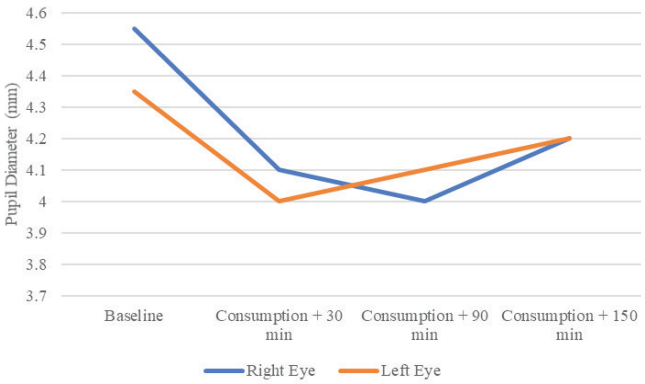

FIGURE 3 Mean pupil sizes for left and right eyes, measured at baseline and at intervals post-cannabis consumption.

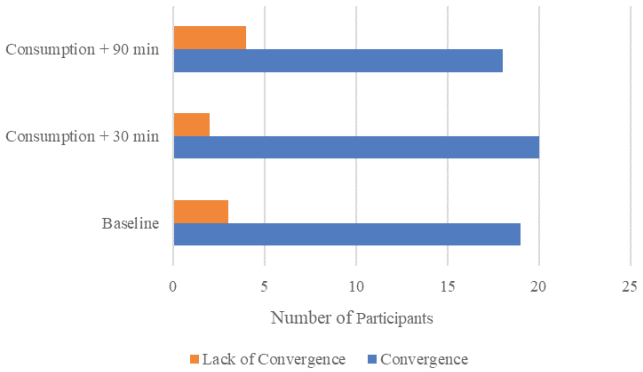

FIGURE 4 Convergence vs lack of convergence at multiple time points in the trial.

normal convergence. Regardless, the majority of participants displayed convergence at each measurement point in the trial, a finding inconsistent with typical signs of cannabis impairment (see Figure 4; Hartman et al., 2016; Heishman et al., 1996; Yeakel & Logan, 2013). Prior to procedural consumption, 19 of 22 participants displayed convergence. At 30 and 90 minutes post-consumption, 20 and 18 participants displayed convergence, respectively. The results for convergence testing show peculiar variance (see Table IV). Participants 10 and 11 showed convergence patterns expected for acute cannabis intoxication (initial normal convergence, with lack of convergence developing after consumption). However, participants 18 and 21 were unsuccessful in convergence at pre-controlled consumption, and were then able to converge the eyes 30 minutes post-consumption. At the same time, participant 6 displayed lack of convergence at every testing point. During each point of testing, the participants were well above the legal limit for blood THC levels. Overall, participants displayed normal convergence of the eyes at pre-controlled consumption and post-consumption, while simultaneously having blood THC levels significantly higher than the legal limit.

During the examination, vital signs were also observed pre-consumption and at 30, 90, 150, and 210 minutes post-consumption. The general trend in our findings is a 12.6% increase in heart rate 30 minutes following cannabis consumption, with a gradual decrease returning to baseline by 90 minutes for many and by 150 minutes for most (see Figure 5). Paradoxically, however, some participants showed the opposite trend: an initially elevated heart rate with a decrease following cannabis consumption, and a gradual increase in the following hours post-consumption (see Table V, participants 5, 8, 13, and 21). While certain gaps and obscure trends made it difficult to interpret subjective data outside basic measurements such as perceived "high," anxiety proved to be a somewhat consistent measure. Measures of anxiety may serve to reflect changes in heart rate; as per Table VI, on average, there was an increase in subjective anxiety that aligned with the spike in heart rate. Average subjective reports of anxiety rose from 2.46 at baseline to 3.05 by 90 minutes post-consumption, while average heart rate rose from 84 beats per minute (bpm) at baseline to 100 at 30 minutes post-consumption and 99 bpm at 90 minutes post-consumption (see Tables V and VI). Both these measures fell by 150 minutes

TABLE IV Trends for convergence or lack of convergence in participants

Subject Number	Baseline	Consumption + 30 minutes	Consumption + 90 minutes
1	Convergence	Convergence	Convergence
2	Convergence	Convergence	Convergence
3	Convergence	Convergence	Convergence
4	Convergence	Convergence	Convergence
5	Convergence	Convergence	Convergence
6	No convergence	No convergence	No convergence
7	Convergence	Convergence	Convergence
8	Convergence	Convergence	Convergence
9	Convergence	Convergence	Convergence
10	Convergence	Convergence	No convergence
11	Convergence	No convergence	No convergence
12	Convergence	Convergence	Convergence
13	Convergence	Convergence	Convergence
14	Convergence	Convergence	Convergence
15	Convergence	N/A	N/A
16	Convergence	Convergence	Convergence
17	Convergence	Convergence	Convergence
18	No convergence	Convergence	No convergence
19	Convergence	Convergence	Convergence
20	Convergence	Convergence	Convergence
21	No convergence	Convergence	Convergence
22	Convergence	Convergence	Convergence
23	Convergence	Convergence	Convergence
Percent of Participants with Convergence	87	91	82

N/A = data unavailable.
Note: participant 15 dropped out of the study.

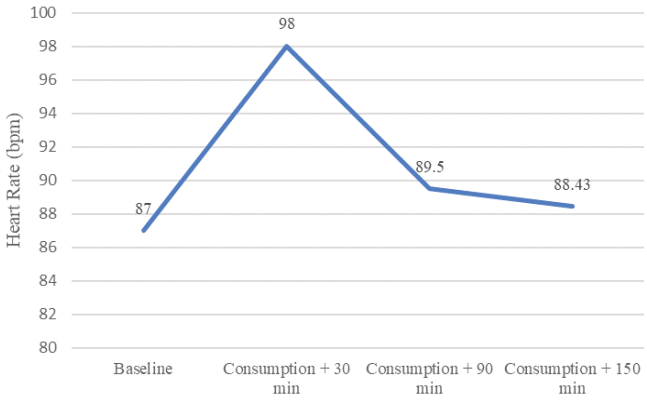

FIGURE 5 Average heart rate of participants throughout the trial.

post-consumption, to 1.50 for anxiety and 77 bpm for heart rate. While this pattern did not hold true for all participants (for example, participants 2 and 6; see Table V and VI), the general trend remains apparent.

DISCUSSION

This study examined the effect of cannabis on a sample of medical cannabis patients (defined in Methods). Given participants' status as medical cannabis patients, they largely presented with elevated blood THC levels at the beginning of the study. Contrary to previous research on the detection of cannabis impairment, visual assessment data did not follow typical patterns associated with acute cannabis ingestion. During the peak THC ingestion phase, 100% of study participants had blood THC levels over the legal limit but maintained normal visual testing results. According to the DEC and other literature, the expected finding in the context of cannabis intoxication is possible pupil dilation (change greater than 4.0 mm; may be present or absent) and the inability of the eyes to converge (Bramness et al., 2010; Hartman et al., 2016; Richman, 2017; Yeakel & Logan, 2013). However, in this study, there were no observed changes to pupil size, and minimal changes to convergence during the first two post-consumption measurements. Findings also demonstrated inconclusive results for participants' heart rate post-consumption. In the field, these differences in visual

TABLE V Heart rate before and after consumption of one gram of Cannabis sativa (20% THC)

Subject Number	Baseline blood THC (ng/mL)	Pre-controlled Consumption (bpm)	Consumption + 30 min (bpm)	Consumption + 90 min (bpm)	Consumption + 150 min (bpm)
1	15.28	94	105	108	94
2	1.33	89	113	93	98
3	1.11	101	120	103	107
4	6.70	77	93	72	78
5	5.33	67	64	62	69
6	6.70	104	93	94	77
7	23.25	113	114	105	94
8	13.07	86	76	76	82
9	4.90	76	103	101	77
10	7.30	74	105	92	74
11	26.60	80	85	76	71
12	0.48	87	151	125	120
13	30.28	89	84	78	85
14	7.17	79	74	72	72
15	N/A	N/A	N/A	N/A	157
16	5.13	82	114	85	98
17	1.82	86	108	100	95
18	22.04	72	90	103	92
19	13.20	87	89	79	76
20	4.70	69	70	70	67
21	19.30	92	61	64	70
22	Data unavailable	126	144	112	104
23	2.70	84	100	99	77

bpm = beats per minute, N/A = data unavailable.
Note: participant 15 dropped out of the study.

TABLE VI Subjective reports of anxiety on a scale of 1 to 10 across three time periods

Subject Number	Pre-consumption	90 minutes post-consumption	150 minutes post-consumption
1	N/A	0	0.5
2	6	3.5	N/A
3	N/A	6	N/A
4	N/A	0.5	0.5
5	5	4	1
6	0	8	6
7	0	0	0
8	6	3	0
9	N/A	0	0
10	N/A	5	5
11	0	0	0
12	0	0	0
13	N/A	3	0
14	10	0	4
15	N/A	N/A	N/A
16	N/A	5	1
17	0	10	1
18	N/A	7	1
19	N/A	1	0
20	0	0	6
21	1	2	1
22	4	8	3
23	0	1	0
Average	2.46	3.05	1.50

N/A = data unavailable.
Note: participant 15 dropped out of the study.

test results and vital sign inconsistencies may complicate the ability of law enforcement officers to accurately detect cannabis-related impairment in this population.

Lack of Convergence

The fourth step of a 12-step DEC examination tests the ability of the eyes to converge, which is not present in SFSTs and is typically impaired in the context of cannabis intoxication. Five participants were unable to converge their eyes at one or more points during the trial, three of whom demonstrated this inability at the experimental baseline measurement (prior to in-experiment consumption of cannabis). Of note is that each of the participants who was unable to converge their eyes had an observed ocular abnormality such as involuntary nystagmus or eyes drifting to the right or left. This may have affected their performance on these visual tests. Furthermore, it is known that approximately 7% of the general population displays an inability to properly converge their eyes at the experimental baseline (Richman, 2017). Overall, the majority of participants maintained the ability to converge their eyes at the experimental baseline, through the acute phase of cannabis ingestion, and through the recovery period. For the few participants whose eyes did not converge, there were known medical factors potentially influencing their visual testing results.

Of additional note is the reduced compliance with visual testing protocols later in the study, which limited data collection for convergence after the 90-minute mark. As per the study protocol, research participants were required to consent to each round of testing. After the initial rounds of testing, some participants who had no impairments in convergence declined to continue with further convergence testing. This resulted in incompleteness of the dataset for these later points in the trial. However, from the perspective of cannabis intoxication, it is unlikely that the ability to converge would be affected beyond 90 minutes post-consumption when it was not affected during the acute phase (30 minutes post-consumption). From the data collected, it remains clear that this sample of medical cannabis users did not produce visual testing results typically indicative of cannabis impairment on DEC examinations.

Heart Rate Measurement

During a DEC examination, the arresting officer measures the driver's heart rate three separate times during the evaluation. Typically, the aim is to identify an increase in heart rate. In this study, the physiological effects of participants' various medical conditions, in combination with the modulating effects of cannabis, may be confounding factors in the interpretation of heart rate measurements. It should be reiterated that subjective anxiety reports (see Table VI) reflect the increases in heart rate post-consumption (30 minutes to 90 minutes, and 90 minutes to 150 minutes), which may provide an explanation for this phenomenon. Since arresting officers will not have baseline (pre-cannabis consumption) heart rate measurements for their suspects, their findings at the roadside may only amount to minor decreasing or increasing trends over the three pulse checks. Furthermore, multiple factors will conceivably influence the heart rate of an impaired driving suspect: beyond the true physiological effects of the impairing substance, there will be sympathetic nervous arousal associated with interaction with law enforcement. Overall, the inconsistency in findings makes it challenging to extract valuable conclusions applicable to the context of roadside examination. However, a 12.6% increase 30 minutes post-consumption was recorded, followed by a return to baseline. This spike may reflect what was expected of the DEC examination following cannabis ingestion (Heishman et al., 1996). The speed of the recovery may also be influenced by the tolerance effects demonstrated by medical users (Bosker et al., 2012; Colizzi & Bhattacharyya, 2018). Further research in this area would be useful, as there are many factors which may influence vitals when consumption of cannabis occurs.

Tolerance to the Effects of Cannabis

As medical cannabis patients, participants in this study were frequent users of cannabis, with variable prescribed dosages (see Table I). Participants' generally elevated baseline THC measurements are indicators of recent or chronic use of cannabis. Participants' average subjective feeling of intoxication

30 minutes after consumption was only 5.07 out of 10, which is some indication of a level of tolerance. While subjective reports may contain inconsistencies, they prove useful in establishing general trends. Additionally, medical cannabis users may be more able to describe experienced effects. Previous research has shown that medical cannabis users can develop a tolerance to cannabis and subsequently experience reduced acute effects compared with recreational users or otherwise non-daily users (Bosker et al., 2012; Colizzi & Bhattacharyya, 2018). In this study, the overall normal visual testing results may be related to participants' tolerance to cannabis. However, other researchers have found few differences in cannabis-related neurocognitive impairment among frequent versus infrequent cannabis users, so the connection remains unclear (Ramaekers et al., 2016). Furthermore, as was mentioned, most participants had above a 0 baseline of blood THC, with a large portion having above the legal limit. This pre-existing THC might have affected subsequent results, both at baseline and post-consumption. Ideally, participants would have come in without THC in the blood, but as they were a population of medical cannabis users, that would have required days of abstinence from their medication, which would have been unethical.

Medical Cannabis and Driving

In Canada, there are currently two levels of cannabis-related impairment. The greatest punishment incurred goes to those found driving with a THC level of 5 ng or more, resulting in a fine and/or variable prison term, while driving with a blood THC level between 2 and 5 ng is a less serious offence (Government of Canada, 2019). Due to the chronic and frequent nature of their cannabis use, medical cannabis patients could have elevated levels of blood THC. As shown in this study, these patients may not display the expected indicators of impairment. Visual testing is a core component of DEC assessments, and typically produces results that may indicate cannabis use. Our data highlight that even when over the legal THC limit, medical cannabis patients are likely to maintain normal pupil sizes, retain the ability to converge the eyes, and may not have expected heart rate patterns following consumption. This brings into question how policy should change given this information. If the potential tolerance effects of medical users and pre-existing THC in their blood may confound results, the DEC should re-evaluate its methods. One option would be use different methods for a driver with a medical cannabis card, but this would not reach frequent recreational users of cannabis who may demonstrate a similar profile to medical users. Tests that accurately and consistently measure impairment regardless of potential tolerance and pre-existing cannabis metabolites should be implemented.

Limitations and Future Research

This study involved a relatively small sample size of 22 participants. The feasibility of a larger cohort was affected by the logistical complexity of the study design. As discussed above, there was reduced compliance with the visual testing protocols later in the trial, which resulted in incompleteness of the dataset at these points. Additionally, overall difficulties with recruitment at the time limited the potential size and diversity of the participant pool. Had the study been performed more recently, after the legalization of recreational cannabis in Canada, the medical cannabis participant pool could have increased. Furthermore, recreational cannabis users could have been included in the study design, more controllable methods of cannabis ingestion could have been implemented (such as edibles), and groups with little to no cannabis experience could have been included to deepen potential interpretations about tolerance, DEC testing, and visual testing. Future research could explore the link between tolerance, impairment, and visual testing more rigorously by including these additions to improve the potential conclusions drawn. While research has been done on the DEC protocol and other drugs, similar questions related to frequent usage and driving should be asked for these drugs (Heishman et al., 1996; National Institute on Drug Abuse, 2020). All of this research should feed back into the readjustment of DEC policy so that reports of impaired driving can be more accurate, and justice dispersed equitably and according to the best available research.

CONCLUSION

Visual assessments are important for detecting cannabis impairment during DEC examinations. However, the present data suggest that visual test results are not diagnostic for cannabis impairment in medical cannabis users, despite significantly elevated levels of blood THC. This may present a problem for law enforcement officers in their goal of accurately detecting cannabis-related impairment in this population. The DEC examination has been in use for over 30 years. However, with current trends toward the broad legalization of cannabis, it is timely and necessary to conduct further research in this area and establish appropriate testing for impairment with safety considerations. This research should be communicated with organizations conducting DEC training to establish effective standardization of the test.

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CONFLICT OF INTEREST DISCLOSURES

The authors have no conflicts of interest to declare.

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SOCIAL INNOVATION NARRATIVES

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Canadian Police Knowledge Network: The power of technology, standards, and collaboration

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This article is related directly to the 6th International Law Enforcement & Public Health (LEPH) Virtual Conference in March 2021.

ABSTRACT

The Canadian Police Knowledge Network (CPKN) is a not-for-profit organization that delivers high-quality technology-enhanced professional development for Canadian police. Through collaboration, technology, and standards CPKN has established a credible model that offers a reliable, cost-effective solution to meet the increasingly diverse and complex needs of contemporary policing. This article examines CPKN's evolution from an online learning service provider to a nationally recognized leader in police learning and professionalization. It specifically explores the role of ongoing collaboration within the Canadian police community, through CPKN, to develop nationally relevant training and to modernize the competency-based management framework to establish more nationally consistent competency standards.

INTRODUCTION

The Canadian Police Knowledge Network (CPKN) is a not-for-profit organization that develops and delivers high-quality technology-enhanced learning for Canada's police and public safety community. That's the simple version. In reality, we have evolved far beyond our role as an online learning repository. Today, the network is supporting contemporary policing by advancing learning and professionalization through an elaborate blend of collaboration, technology, and standards.

A Pioneer in Technology-Enhanced Learning for Police

Back in 2004 when a small group of like-minded police training leaders from the National Research Council Canada and Holland College's Justice Knowledge Network came together to form CPKN, it might be said that we were ahead of our time. While there was an identified need for online learning in Canada's policing sector, we quickly learned that achieving a nationally relevant—and accepted—model would be no small feat.

Canada's public safety sector is an exceptionally diverse and layered entity of national, provincial, municipal, and First Nations police services, training institutions, and other public safety organizations. At CPKN we learned early on that "one size does not fit all"—policing priorities, challenges, and resources vary from province to province and community to community. Easing agencies out of a largely siloed approach to training was a marathon of effort, and we had to find that middle ground to produce learning content and technical infrastructure that was relevant to the greatest number of police and law enforcement agencies. Establishing a credible model that offered a reliable, cost-effective solution came down to a one-at-a-time approach: one conversation, one partnership, one course, one police service, one customer.

The success of CPKN did not come overnight, but over the last 16 years we have established ourselves as an integral piece of Canada's police training model. Far from the meagre catalogue of four courses we started with, CPKN now offers more than 180 courses to more than 100,000 learners across the country. Our in-house design and development team has honed a time- and cost-effective process to produce engaging, high-quality courses. Our custom-built learning management system is a robust and flexible structure that enables more than 350 police and public safety agencies across the country to access and manage their individual online learning curriculums.

Our success has not been an independent effort. We have relied on the time, support, experience, and expertise of

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our Board of Directors, National Advisory Committee, and numerous partners to keep CPKN aligned with the needs and realities of the sector. The commitment of these police leaders and training professionals gave CPKN the clout it needed to establish an extensive network of organizations that are working together to drive excellence in policing professional development.

But a network needs to network. CPKN's annual Stanhope Conference is a national forum for sharing knowledge and best practices for police training. It plays a critical role in keeping the network connected and in reaching consensus on which topics should be the focus of CPKN's energy and resources. The Network Webinar Series is a more recent initiative that provides a platform for policing professionals and visionary thinkers to discuss priority issues—such as systemic racism and transformational leadership—through the lens of professional development. These events not only facilitate open dialogue and idea sharing across the sector but collectively move us towards excellence in professional development for all Canadian police.

Better Together: Collaborative Approaches to Training Development

From the beginning, knowledge-sharing has been a core part of the CPKN model. Through the guidance of our National Advisory Committee, which identifies key topics and emerging issues, CPKN seeks out partners and experts to respond to a constantly expanding range of training requirements. In some cases, an existing course from a police service or training institution may be adapted and shared with the wider police audience. In other cases, courses are developed from scratch, using a collaborative approach that ensures the final product not only has expert content but also aligns with universal learning needs. Moreover, through other projects, such as the *Community Engagement Inventory*, which surveyed the sector on training related to community interactions, police trust, and legitimacy, we work to better understand the scope, niches, and gaps in the training available to the community.

These activities serve the community well. Recent initiatives to produce training on topics such as the cannabis legislation, autism spectrum disorder, methamphetamine and the precursor control regulation, and mental health self-awareness are key examples of how collaboration is producing benefits for police services across the country. It increases access to expertise—regardless of service size or location—on issues of common concern across the sector. It lessens the financial load on individual police services, reducing the number of in-house courses that need to be produced and maintained. (In fact, CPKN courses are developed and maintained at no cost to police services.) When CPKN levels the field on essential learning, individual services are able to invest their efforts in producing supplementary resources to support local operations.

Enhanced Professionalization: Competency-Based Management in Policing

There is also significant collaboration taking place around the issue of competency-based management (CBM) in policing. This has been a topic of discussion among policing leaders for nearly two decades. While there has been incremental progress during that time—particularly in the form of the Police Sector Council's Competency-based Management Framework—CBM is a complex issue, and meaningful progress towards implementation is often beyond the capacity of police services. That said, amid continually evolving demands on police, calls for police reform and de-funding, allegations of systemic racism, and the inevitable economic consequences of COVID-19, there is renewed agreement that CBM is essential to enhancing the productivity, transparency, accountability, and fiscal efficiency of policing in Canada.

At CPKN we are working with key partners—including the Canadian Association of Chiefs of Police, the Canadian Police Association, the Canadian Association of Police Governance, and the Canadian Police College—on a national campaign for greater integration of competency-based practice and nationally consistent policing standards. We are working on two fronts: 1) to gain the support we need to fund the work, including modernization of the existing Framework, and 2) to collectively engage the community to identify role-based competencies in key areas such as leadership. It is a massive undertaking but one we feel will form the foundation of sustainable policing well into the future.

CONCLUSION

CPKN is a unique entity. We have evolved from—for all intents and purposes—a common online learning service provider to a nationally recognized leader in police learning and professionalization. But we are still learning, still growing, and still finding new ways to support the Canadian police community.

There are many challenges at hand and ahead for policing in Canada and abroad, but the model that CPKN has created will ensure that Canadian police agencies do not have to go it alone. Through CPKN, the sector has harnessed the power of technology, standards, and collaboration to tremendous effect. And come what may, we can be sure that that will anchor all of us in the years to come.

CONFLICT OF INTEREST DISCLOSURES

The author has no conflicts of interest to declare.

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