HOME TEAM ACADEMY • 2014 ISSUE NO 5

HOME TEAM JOURNAL

BY PRACTITIONERS, FOR PRACTITIONERS

ORGANISATIONAL PREDICTORS OF STRESS AND RESILIENCE OF POLICE OFFICERS
Gabriel Ong

THE STAGES OF CHANGE IN THE REHABILITATION OF TERRORIST OPERATIVES
Counter-Terrorism Operations Division, Internal Security Department

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HOME TEAM JOURNAL

The Home Team Journal is a publication by the Home Team Academy in collaboration with the Ministry of Home Affairs of Singapore and its departments, which are collectively known as the Home Team. The journal publishes articles and reviews on issues relating to the Home Team and its core competencies. It aims to be a platform to share knowledge and new insights, stimulate critical thinking and discussion among the Home Team community, and reach out to our stakeholders and the global community of practitioners in national safety and security.

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RESEARCH • INSIGHT • TRAINING

FOREWORD AND EDITORIAL INTRODUCTION

I am delighted to pen this foreword for the first time since taking over as the Chief Executive of the Home Team Academy (HTA). The HTA will continue to push for greater depth of thinking on contemporary issues that concern the Home Team (HT), and for greater sharing within the HT community of leaders and practitioners. It is my firm belief that knowledge will enable our HT to progress to the next level of capability and sophistication. The Journal will also capture key policy developments and analysis of major incidents within the HT and share these so that useful lessons can be learnt across the HT community, and that these can serve as useful analogies for greater innovation and professionalism.

This issue – issue 5 – is teeming with rich content across a broad spectrum of areas, ranging from resilience, to the development of our passport, to operations, psychology and behavioural research, to law and order. This wide spectrum is reflective of the varied work the HT does – but which all goes towards creating a safe and secure Singapore.

Resilience – the capacity to 'bounce back' after a stressful situation – is a crucial attribute for HT officers in today's relentlessly fast-paced and complex operating landscape – as we police the frontlines, investigate serious crimes, respond to emergencies, manage aggressive offenders, and protect Singapore's borders from undesirable persons or illicit drugs. Stressors come in two forms: operational (for example exposure to physical risks, and the pressure to make quick crucial decisions), and organisational (for example supervisory support or the lack thereof, and limited resources). In our cover story, Dr Gabriel Ong posits that there is value in considering organisational interventions to bolster police officers' resilience, apart from interventions that target operational stressors. Using surveys of more than 11,000 Singapore Police Force officers, he finds out that support from one's immediate supervisor, peer cohesion and organisational trust are organisational factors that predicted individual resilience.

The HT is also rapidly evolving in its delivery of services to the public, with the increasing use of technology and constant benchmarking of what we do against the best practices of public agencies and the private sector. Mr Tan Kok Guan and Ms Kong Yong Sin's article charts out the development of the Singapore passport over the years and the Immigration & Checkpoints Authority (ICA)'s endeavour in using technology to improve both security and service standards. On a related note, the Internal Security Department (ISD) writes about the development of an automated façade modelling software that would enhance officers' planning for emergency response and major events.

Moving to operations, Mr Ling Young Ern's and Mr Anwar Abdullah's paper discusses the best practices and frameworks adopted that helped the Singapore Civil Defence Force (SCDF) fight the major Shell Pulau Bukom fire in 2011 in an operation that spanned eight days. The authors also share the challenges SCDF faced in managing this major incident.

Mr Timothy Leo provides a background on the Singapore Prison Service's usage and development of evidence-based practices to better manage offenders and rehabilitation programmes. He posits that evidence-based practices, coupled with strong management support, are able to facilitate quality rehabilitation services within the prisons.

There is also a greater use of psychology and behavioural sciences research to improve the quality of outcomes in policing, rehabilitation and leadership in not just the HT, but across the world. This is evident from the rich papers featured in this issue, selected from the second Asian Conference of Criminal and Operations Psychology (ACCOP) held last year in Singapore. Professor Ray Bull and Ms Laura Hunt's study found that a number of factors (including a considerable number on the rapists' reported speech) successfully differentiated genuine and false rape allegations. The results highlight the importance of interviewing (alleged) rape victims and obtaining detailed verbal accounts of the incident, especially what was said by the alleged perpetrator. However, when a traditional interview is not possible, Dr Lorraine Hope and Dr Fiona Gabbert propose an alternative investigative tool, developed based on the principles of Cognitive Technique Interview. Called the Self-Administered Interview (SAI©), it can be used to elicit comprehensive initial statements from witnesses who might not be able to articulate their thoughts. Dr David Matsumoto and Dr Hyisung C. Hwang explore the possibility of universal aggressive facial expressions across cultures by giving a preliminary report on the research done on South Korean and US law enforcement officers; predicting aggression with facial signs could be a foundational reference for officers who have to deal with aggressive members of public, inmates or suspects. Closer to home, ISD's article discusses behavioural changes that occur during the rehabilitation of persons detained for terrorist activity, using the Seven Stages of Change model. While these stages may not necessarily be in chronological order, they serve as a reference on what could occur in the course of effective rehabilitation. Mr Jeffery Chin, Dr Majeed Khader and Mr Jansen Ang's study examines the abilities and knowledge required for effective leadership during major incidents at the tactical level. Based on research of 1,425 emergency service personnel in Singapore, they validate two main qualities of leadership that are regarded as premium – operational knowledge and interpersonal abilities of major incident leaders.

Law and order issues set in Singapore's context are also examined in this issue. Mr Tai Wei Shyong and Ms Tang Gek Hsien's study of Singapore's homicide trends from 1955 to 2011 explores and offers tentative explanations about how and why the nature of homicide has changed over the years. Mr Tan Boon Gin discusses the challenges posed by money laundering in Singapore, particularly in the casinos, as well as the approaches the Commercial Affairs Department (CAD) adopts to mitigate such risks. Finally, Mr Timothy Leng reviews Henry Brownstein's *Contemporary Drug Policy*, which highlighted the merits of alternatives to a 'zero tolerance' drug control approach. Timothy argues that a country's drug control policies must take into account its unique context and circumstances. Singapore's approach has worked for it: as evidenced by the successes as well as the safety and security desired by its society.

Our regular readers may have noticed that there are new sections in the HT Journal contents page, such as 'Policies', 'Operations' and 'Research'. Moving forward, we hope to feature more papers relating to the HT that discuss the thinking behind our policies, the considerations we take into account in our operations, and relevant research that can better inform our officers so that they can be more effective in their daily work to make Singapore safe and secure.

I wish you an engaging read. Do give us feedback so that we can take the journal to a higher level.

T. RAJA KUMAR
Chairman
Home Team Journal Editorial Board

ORGANISATIONAL PREDICTORS OF STRESS AND RESILIENCE OF POLICE OFFICERS:

A SINGAPORE PERSPECTIVE

By Gabriel Ong

Studies have shown policing to be a stressful occupation. Police officers are at risk of encountering psychological and physiological problems as a result of workplace stress. Research further suggests that organisational (i.e., job context) stressors have a greater impact on police officers' coping than operational (i.e., job content) stressors.

Adapted from Paton et al.'s (2008) Stress Shield Model, a study was conducted to identify specific organisational factors within the Singapore Police Force that contribute to individual police officer resilience. A total of 11,532 employees from the Singapore Police Force participated in an organisational climate survey to examine employee attitudes and beliefs about the organisation. Results from an analysis of the data revealed ten organisational factors, comprising six organisational predictors and four measures of individual resilience.

Based on the study findings, interventions may be developed that target the six organisational predictors of individual police officer resilience, which are:

- Career Development
- Rewards and Recognition
- Supervisory Support
- Peer Cohesion
- Confidence in Leadership
- Confidence in Operations

In addition, individual police officer resilience may be measured using the following identifiers:

- Empowerment
- Stress Coping
- Engagement and Passion
- Morale and Satisfaction

Recommendations are suggested based on the study findings. Limitations pertaining to study design and suggestions for future research are also discussed towards the end of this article.

POLICE OFFICER STRESS

What Makes Policing Stressful?

Work is stressful! In a study comparing workers in more than 400 occupations, Marchand, Demers and Durand (2005) arrived at the conclusion that occupational and organisational conditions contributed to the experience of psychological distress. Shane (2010) further found that individuals whose occupations involve an obligation for the health, safety or well-being of others were particularly vulnerable. Policing is one such occupation, and various studies have identified policing to be a particularly stressful occupation (Burke, 1993; Hart & Cotton, 2002; He, Zhao & Archbold, 2002; Violanti, Marshall & Howe, 1985).

"Various studies have identified policing to be a particularly stressful occupation."

What Types of Stressors do Police Officers Encounter?

Penalba, McGuire and Leite (2009) write that the stressors police officers face can generally be grouped into two categories: (a) operational factors, which are stressors related to the job content, and (b) organisational factors, which are stressors related to the job context.

In terms of operational factors, police officers have to respond to crime and emergency situations, and operational challenges that they

frequently encounter may include exposure to physical risk, witness to the murder of colleagues, and having to kill when necessary (Burke, 2000). In a survey of 371 Australian police officers, the most stressful operational stressors reported were 'witnessing the death of a partner', 'participating in an act of corruption', and 'shooting somebody in the line of duty' (Evans & Coman, 1993). When dealing with the general public, police officers are often the target of criticism and service complaints (Blau, 1994). Other operational stressors include many hours of inactivity suddenly shifting to overwhelming responsibility, as well as the pressure to make quick crucial decisions (Burke, 2000; Kroes & Gould, 1974; Kroes, Margolis & Hurrell, 1974).

In terms of organisational factors, police officers face work demands such as time pressure, public pressure, and limited resources, which contribute to work stress levels (Collins & Gibbs, 2003). In addition, Loo (2003) found departmental politics, lack of management support and recognition, as well as autocratic leadership styles to be sources of organisational stress. Other organisational stressors identified include a perceived lack of respect from members of the public, and a perceived lack of value of their role in society, low income, and stressful internal organisation (Burke, 2000; Kroes & Gould, 1974; Kroes et al., 1974). In the 1993 study on Australian police officers, 'failing police training course', 'failure on promotional examination', and 'unsatisfactory personnel evaluation' were identified as the most stressful job context events (Evans & Coman, 1993).

As a result of these challenges, police officers may experience a sense of helplessness and a lack of control in the work environment. This, in turn, is a major source of stress (Penalba et al., 2009). Several studies further suggest that organisational factors present as greater sources of stress significantly more so than operational factors. For instance, in a study examining sources of stress-related symptoms among 1,206 police officers, Kirkaldy and Cooper (1995) found that the highest ranked occupational stressors were specific to organisational factors rather than specific to policing. Similarly, Koortzen (1996) found that the top three stressors faced by the South African police force were the lack of supervisory and management skills, court verdicts that are seen as inappropriate by police officers, and emotional detachment from the family. In a study examining the impact of organisational stressors on police performance, Shane (2010) concluded that organisational structures, policies and practices – namely, bureaucracy, strained organisational capacity, internal affairs investigations, co-worker relations, training and resources, leadership and supervision – were the elements in a police agency that posed a greater source of stress.

To explain why organisational stressors are more strongly associated with perceived police stress than operational stressors, Gershon, Barocas, Canton, Li and Vlahov (2009) suggest that there is an expectation among police officers that they will likely encounter critical incidents in the line of duty. However, they do not expect to be treated unfairly by their department. When police officers perceive unfairness as a result of organisational policies or structures, they may end up feeling betrayed, confused and disappointed.

What are Some Common Symptoms of Police Officer Stress?

Exposure to routine occupational stresses or stressful work conditions have adverse effects on mental health (Liberman et al., 2002). As a result of the occupational stressors faced by police officers, a variety of symptoms and reactions can occur. These may include negative psychological states (e.g., frustration, depression, anxiety, anger), as well as psychosomatic and physical conditions (e.g., headaches, ulcers), which may exacerbate deteriorating work performance, leading to burnout, absenteeism and low morale (Burke, 2000). Other associated problems include substance abuse, adjustment disorders and personality disorders (Saathoff & Buckman, 1990). Police officers who encounter traumatic critical incidents at work may further be at risk of developing post-traumatic stress disorder

(Robinson, Sigman & Wilson, 1997; Mitchell & Everly, 1995). Some studies even suggest that police officers may also be at risk of suicide, but it is important to note that findings of heightened suicide risk have not found consistent support in the literature (e.g., Aamodt, 2008; Loo, 2003).

How do Police Officers Cope?

When faced with such job stressors, most police officers cope by adopting various coping and defence mechanisms. One prominent positive coping strategy in emergency service populations is positive reframing, in which police officers deal with the unpleasant aspects of their job by reminding themselves of their altruistic, helping role (Miller, 1995). However, Miller (2006) also noted that there is a prevalence of less effective strategies, such as repression, displacement and isolation of feelings.

"Police officers deal with the unpleasant aspects of their job by reminding themselves of their altruistic, helping role."

The challenge police officers face in coping effectively with stressors is compounded by their group culture. Police officers tend to project an image of stoicism, and refrain from showing emotional weakness to others (Burke, 2000), in the belief that any expression of psychosocial stress or of work-related difficulties would be perceived by others as an indication of personal weakness (Biggam, Power, MacDonald, Carcary and Moodie, 1997). As a result, they tend to be less willing to seek help in dealing with stress, experience difficulty in admitting psychological weaknesses, and feel a constant pressure to control their emotions and to appear efficient. Police officers may hence prefer not to disclose their feelings to others as a result.

From a systems perspective, the negative outcomes associated with poor police stress coping can also seriously undermine the organisational effectiveness of law enforcement agencies, leading to poor productivity, excessive turnover rates, difficulties in recruitment, high absenteeism, health care costs, as well as medico-legal compensation costs (Tang & Hammontree, 1992). Orrick (2002) estimated that it would cost a police department approximately US$59,000 to replace an officer with three years of experience with a new police recruit. Taken together, there is value in the provision of interventions to help police officers cope with work stress, so as to retain their services.

POLICE OFFICER RESILIENCE

What Can We Do to Enhance Police Officer Coping?

Various studies have investigated specific interventions to help police officers carry out their duties competently in the face of the stressors they experience. One of the most common interventions is the provision of training to teach police officers to recognise the warning signs of stress, and to know how to use individual coping strategies (Sewell, 1999). Other interventions that have been considered for dealing with stress among police officers include goal setting, time management, financial planning, physical fitness, meditation, progressive relaxation, biofeedback, social support, cognitive coping strategies (Ellison & Genz, 1983; Webb & Smith, 1980; Anderson, Swenson & Clay, 1995), stress debriefing (Addis & Stephens, 2008; Carlier, Lamberts, van Uchelen & Gersons, 1998), as well as critical incident stress management (Everly, Flannery & Mitchell, 2000).

Despite the variety of interventions available, the evidence is weak as to how effective such interventions are. Penalba et al. (2009) conducted a systematic review to assess the effectiveness of psychological interventions for law enforcement officers in preventing psychological disorders, and found only one study that reported significant results. Furthermore, the authors observed that all of the psychosocial interventions for law enforcement officers targeted job content stressors. None of the interventions looked at social and organisational support to help officers deal with job context stressors.

What is Resilience? Isn't it the same as Coping?

Despite the seemingly bleak findings from the review conducted by Penalba and her colleagues, recent interest in the topic of human resilience may yield new perspectives. In the last decade, many researchers have developed various approaches to study human resilience, and one consistent theme in resilience research is the notion that positive adaptation takes place in the face of adversity. This suggests two critical components of resilience. First, there must be exposure to significant threat or severe adversity, i.e., the risk component (Luthar & Zelazo, 2003). Second, positive adaptation is achieved despite major infringements on the developmental process, i.e., the positive adaptation component. In this respect, individuals and systems are not considered to be resilient if they have not faced and overcome significant adversity considered to impair normal development. More importantly, resilience is more than just coping with stress. Whereas stress coping suggests recovery, resilience suggests an element of 'bouncing back' and 'thriving' after a stressful situation.

"Resilience is more than just coping with stress. Whereas stress coping suggests recovery, resilience suggests an element of 'bouncing back' and 'thriving' after a stressful situation."

Why is Police Officer Resilience Important?

In the context of law enforcement, Paton et al. (2008) consider the assessment of police officer resilience to be particularly important, arguing that critical incidents such as those potentially faced by police officers are often unpredictable, are characterised by dynamic changes, and are diverse in nature (e.g., apprehending dangerous criminals, mass casualty incidents, crowd control situations, biohazard attacks). Such uncertainties make sense-making difficult, and challenge police officers' ability to derive meaning about their work and perceive the manageability of the situation. When a critical incident is viewed negatively, such that the officer perceives the situation to lack meaning (i.e., "how could this have happened?") and to be unmanageable, he or she is then said to experience a state of uncertainty and crisis, referred to as psychological disequilibrium (Smead, 1988).

Since the research points to organisational stressors rather than operational stressors as accounting for the major component of stress experienced by police officers, it implies that organisational stressors (e.g., bureaucratic structures, lack of support from co-workers, organisational processes that lack transparency) can equally cause disruptions to police officers' perceptions of the meaning of their work and sense of manageability, and create psychological disequilibrium just as well.

The conclusion therefore is that an effective police officer not only has to demonstrate a certain mental strength and temperament on the job (Miller, 2006), he or she also needs to demonstrate resilience (Klein, Nicholls & Thomalla, 2003) to deal with unexpected events that challenge perceived meaningfulness and manageability. This means that police officer resilience can be enhanced if occupational factors that broaden and normalise the range of experiences police officers may potentially encounter in their course of work are identified and developed, so that officers can render such situations to be comprehensible, meaningful and manageable when they are exposed to them (Fredrickson et al., 2003; Paton, 1994, 2006). Such occupational factors therefore have to be identified prior to unpredictable events occurring, so that appropriate interventions can be administered to equip police officers with an adaptive capacity before they experience such incidents.

How can Organisational Factors Influence Police Officer Resilience?

Paton et al. (2008) reported that resilience is usually investigated at the level of the individual, and argued that when identifying

the factors that predict police officer resilience, researchers should also consider the influence of team and organisational factors as well. This is because the way police officers make sense of and respond to occupational incidents is influenced by an organisational context (e.g., values, culture, norms) (Paton et al., 2008). This contextual space, developed over time through exchanges with colleagues and interactions with organisational procedures, guides what officers perceive their work roles, expectations and behaviours to be, and this in turn influences how they will respond to challenging experiences they encounter.

Various studies have demonstrated that organisational factors can have a positive effect on employee well-being and resilience. For instance, Paton, Smith, Violanti, and Eranen (2000) showed that organisational climate is a better predictor of post-traumatic stress than debriefing, social support, and dispositional factors (e.g., hardiness). Various researchers suggest that organisational factors, such as training, supervision, and peer support, reduce the individual differences (e.g., personal history, personal strengths and competencies) that each employee brings to an organisation (Alexander & Wells, 1991; Paton, 1994; Paton & Jackson, 2002), thus developing a shared framework among employees, and enhancing individual positive adaptability.

The Stress Shield Model

Paton et al. (2008) suggested that one way to assess police officer resilience is to identify and examine the effects of organisational factors on resilience. In so doing, police organisations can actively build officer well-being and resilience through organisational interventions (e.g., selection, training, resources, supervision, etc.) that increase positive organisational experiences and optimise adaptive capacity.

"Police organisations can actively build officer well-being and resilience through organisational interventions (e.g., selection, training, resources, supervision, etc.) that increase positive organisational experiences and optimise adaptive capacity."

To this end, Paton et al. proposed the Stress Shield Model of police officer resilience as a framework for proactively developing and sustaining police officer resilience (see Figure 1 for the full Stress Shield Model). Developed specifically for police officers, the Stress Shield Model is a multi-level model of resilience that integrates individual, team and organisational factors. Drawing upon literature research, the model proposes that team and organisational factors have a positive association with perceived empowerment, which

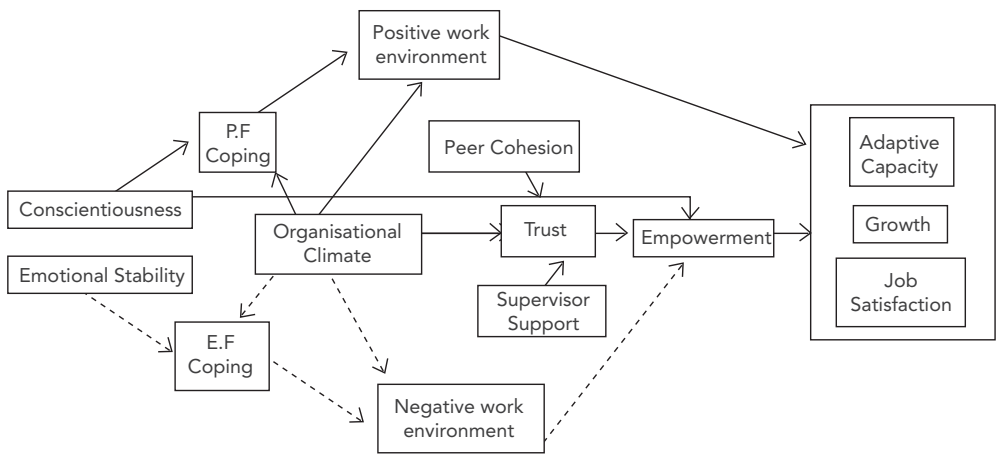

Figure 1. Paton et al.'s (2008) Stress Shield Model of police officer resilience. Solid lines indicate positive influences on adaptive capacity and growth. Dashed lines indicate pathways with a negative influence on empowerment.

in turn has a positive association with officer resilience, insofar as resilience is conceived of comprising adaptive capacity, growth and job satisfaction.

STUDY AIMS AND HYPOTHESES

Why did we conduct this study?

The aim of the current study is to examine the Stress Shield Model on individual resilience in the context of the Singapore Police Force. Building on the framework of the Stress Shield Model, the current study intends to investigate and identify the organisational (team-level and organisation-level) factors associated with individual resilience, with the purpose of describing the relationship between these factors and quantifying the strength of associations among the factors in a structural model that represents the results obtained. Once these relationships are better understood, possible areas for systemic interventions to enhance individual police officer resilience can be targeted, so as to better support and mitigate police officer stress.

In addition, the current study examines the Stress Shield Model as applied to a different cultural context. The vast majority of research on organisational factors and individual police officer resilience has been conducted on North American, European and Australian populations. An extensive literature review by the author has not found any study that has been conducted on the Stress Shield Model in an Asian context. To this end, the current study aims to develop a model of individual police officer resilience based on the Stress Shield Model that is applicable to a Singaporean population.

Hypotheses: What did we expect to find?

From the literature reviewed, team-level variables such as peer cohesion and supervisor support have been shown to share positive associations with organisational trust. In terms of organisation-level variables, organisational climate has been shown to be positively associated with organisational trust. Greater individual employee resilience has been observed alongside higher positive ratings of organisational trust. In addition, empowerment appears to be the underlying process explaining the relationship between organisational trust and individual resilience. Taken together, the hypotheses considered in the current study were as follows:

a. Peer cohesion will be positively correlated with organisational trust
b. Supervisor support will be positively correlated with organisational trust
c. Organisational climate will be positively correlated with organisational trust
d. Organisational trust will be positively correlated with individual resilience
e. Empowerment will mediate the relationship between organisational trust and individual resilience

Figure 2 shows a structural model depicting the hypothesised relationships between organisational climate, peer support, supervisor support, organisational trust, empowerment and individual resilience.

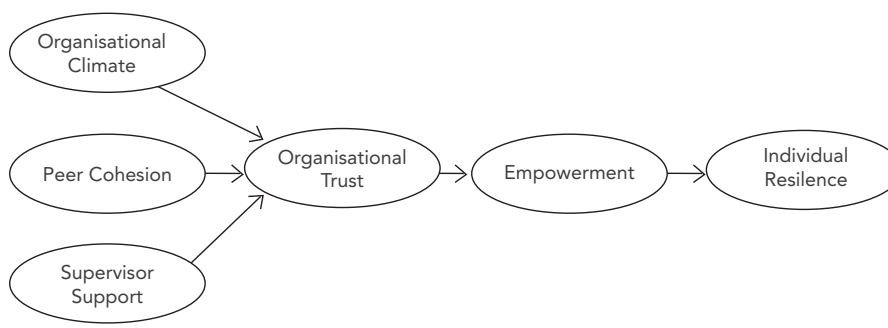

Figure 2. Hypothesised structural model of organisational climate, peer support, supervisor support, organisational trust and empowerment on individual resilience.

METHOD

Participants

Participants comprised the employees from the Singapore Police Force (SPF). These included police officers and staff in all schemes of service, including uniformed commissioned officers (Senior Officers), uniformed non-commissioned officers (Junior Officers), enlisted personnel serving their National Service obligations with the police force, as well as non-uniformed management executives and support staff. In all, approximately 11,000 SPF employees participated in the study.

Measure

To measure the various organisational dimensions, the SPF Organisational Health Survey (OHS) was used. Developed by Khader et al. (2007), the OHS is designed to seek employee inputs for the continuous improvement and organisational development of the SPF. Serving as an organisational barometer, the OHS is conducted once every 18 months, and all SPF employees are required to take part in the OHS.

The OHS examines organisational health in the SPF along five major domains, namely Operational Health (examining areas such as those pertaining to confidence in leadership, confidence in operations), Social Health (e.g., satisfaction with peers, satisfaction with supervisors), Environmental Health (e.g., safety at work, environmental issues), Physical Health (e.g., fitness and health), and Psychological Health (e.g., psychological well-being, stress coping issues). Over time, emerging climate dimensions have been added to the OHS to reflect the changing organisational and operating contexts of the SPF. The OHS that was used for the current study was the seventh edition, conducted in 2010.

The current edition of the OHS comprises 140 items, measuring officers' perceptions on 20 climate dimensions, covering a wide spectrum of organisational issues. However, for the current study, we excluded two of the dimensions ("Supplementary Questions for Frontline Ground Officers" and "Supplementary Questions for Leaders"), as the items from these dimensions were not completed by all participants. Participants responded to the remaining 120 items of the OHS by indicating the extent of their agreement with the items using a 5-point Likert scale.

Tan, Khader, Kuck, Ang and Jayagowry (2009) examined the internal consistency of the sixth edition of the OHS (conducted in 2007). The OHS as a whole was found to have a Cronbach's alpha value of .98, suggesting that the items in the OHS were internally consistent and hence reliable. The internal consistency for the OHS dimensions showed mixed reliability, with Cronbach's alpha values ranging from .92 to .56.

Procedure

The current study used archival OHS data that was collected in 2010. For the current study, the data set was audited to detect and remove any anomalies and to examine normality assumptions. With such large sample sizes, tests of skewness and kurtosis are likely to be significant, and Field (2005) has recommended they not be applied. Thus, even though the data set presented apparent departures from normality, transformations were not considered necessary because of the large sample size.

RESULTS

Data Management

In total, 11,532 police officers took part in the 2010 OHS. Participants were required to answer all items in the OHS. Items in which participants did not indicate their response clearly were treated as missing values.

5.2 Factor Analysis

SPSS version 20 and AMOS version 20 were the statistical software used in the data analysis for the current study.

First, the data set was randomly split in half. One half was used to conduct an exploratory factor analysis (EFA) to uncover the underlying structure

of the relatively large set of variables. This was done to try to establish the factor structure of the OHS by identifying the number of organisational climate dimensions that influence the OHS and determining the strength of the relationship between each dimension and the OHS.

In terms of assumption testing, the Kaiser-Meyer-Olkin measure of sampling adequacy was .988, and Bartlett's test of sphericity was significant ($\chi 2$ (5253) = 107,013.64, $p < .05$), indicating that the data set permitted a factor analysis to be conducted.

Given the large sample size involved in the current study, a maximum likelihood extraction was used. In determining the number of factors to be retained, various tests for factor retention were considered: the K1 method (Kaiser, 1960), the scree criterion (Cattell, 1966) and Horn's (1965) parallel analysis. Results indicated that 12 factors, which explained approximately 59% of the total variance, could be retained.

An oblique rotation was utilised as it was assumed that the factors were likely to be related to each other. Given the large number of items in the OHS, items were dropped if they failed to meet a minimum criterion of having a primary factor loading of at least .4. A total of 72 items were eliminated in this way. In addition, one item was further eliminated as it cross-loaded at higher than .4 on two factors. This resulted in a 47-item, 12-factor solution to the OHS. Three of the factors were subsequently dropped as they each had fewer than three items loading on them, and this further trimmed the factor structure into a 44-item, nine-factor solution.

Based on the solution obtained through the EFA, the nine factors were labeled as follows: Factor 1 'Confidence in Leadership' (comprising 3 items), Factor 2 'Supervisory Support' (6 items), Factor 3 'Peer Cohesion' (6 items), Factor 4 'Stress Coping and Empowerment' (6 items), Factor 5 'Confidence in Operations' (7 items), Factor 6 'Engagement and Passion' (5 items), Factor 7 'Career Development' (3 items), Factor 8 'Morale and Satisfaction' (5 items), and Factor 9 'Rewards and Recognition' (3 items).

Structural Equation Modelling

The second half of the data set was used for a confirmatory factor analysis (CFA) and structural equation modelling (SEM). These were conducted so as to confirm the factor structure (i.e., to see if the identified factor model fits the data), as well as to specify the relationships between the factors identified, in order that substantive conclusions about the OHS factor structure could be developed, and a significant model of organisational factors that predicts individual police officer resilience could be established.

As missing values accounted for 0.03% of the data set, maximum likelihood estimation was used to find expected values based on maximum likelihood parameter estimation. The CFA revealed three items, comprising one item each from the 'Supervisory Support', 'Peer Cohesion' and 'Confidence in Operations' factors, with low inter-item correlations. Analyses revealed that item-total correlations were improved when these items were deleted. These three items were thus removed from further analyses. The CFA further suggested that 'Stress Coping and Empowerment' factor comprised two separate factors. This resulted in a 41-item, ten-factor solution for the OHS.

The SEM was next conducted, and a preliminary factor model was specified based on the Stress Shield Model of police officer resilience (see Figure 3). All residual variances were assumed to be uncorrelated and all exogenous variables were assumed to be correlated. Based on this specification, the order condition was determined, and the model was appropriately identified (Schumacker & Lomax, 2004). To estimate the parameters in the model, maximum likelihood method was used.

The preliminary measurement model that was tested did not fit the data ($\chi 2(760) = 14{,}579.11$, $p < .001$, NFI = .906, IFI = .910, TLI = .903, CFI = .910, RMR = .080, RMSEA = .056), and the Bollen-Stine p value was < 0.01. Inspection of model diagnostics suggested that the assumption of uncorrelated residuals was a considerable source of poor model fit. Correlating the

residuals is justifiable theoretically as it is possible to specify variables external to the model that may serve as common causes of the constructs (e.g., adaptive capacity, organisational culture, global satisfaction with organisation, common method variance). The residual variances were therefore allowed to correlate, and the model was modified by re-examining the modification indices. An examination of the standardised residual covariances further revealed large values in the residual matrix. In particular, the observed covariance matrix and the model-implied covariance matrix presented large values between 'Stress Coping' and 'Empowerment' factors, suggesting possible misspecification of the model. To resolve this, the 'Empowerment' factor was re-designated as a separate endogenous variable alongside the 'Stress Coping', 'Engagement and Passion' and 'Morale and Satisfaction' factors. This suggests that 'Empowerment' was measured as an outcome rather than as a process (Zimmerman, 1995). Organisational trust was thus conceived to have a direct effect on all four outcomes variables without any mediating variable.

Upon re-specification, the model achieved improved fit ($\chi 2(724) = 5{,}217.64$, $p < .001$, NFI = .966, IFI = .971, TLI = .967, CFI = .971, RMR = .033, RMSEA = .033). The Bollen-Stine *p* value was < .01. Figure 4 shows the final model, with accompanying standardised parameters presented. All parameters were statistically significant at $p < 0.01$.

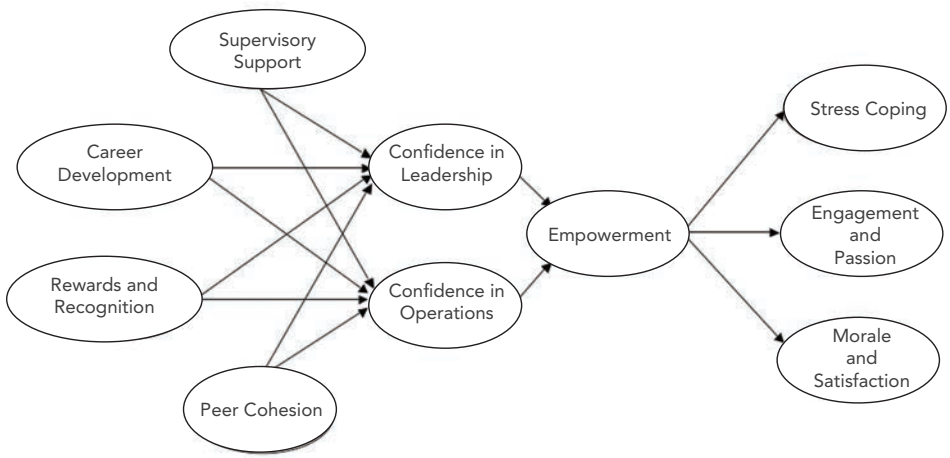

Figure 3. Preliminary model specification based on the Stress Shield Model.

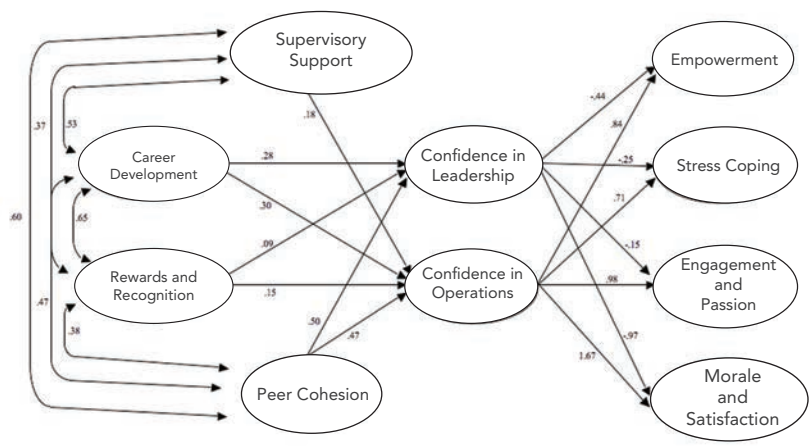

Figure 4. Final solution showing the effect of organisational factors on individual resilience.

DISCUSSION

As the literature review makes clear, policing is a particularly stressful occupation, and police officers are at risk of psychological and physiological problems as a result of the operational and organisational stressors encountered in the course of work. Studies further suggest that organisational factors, rather than operational factors, play a larger role in contributing to the stress encountered by police officers, as police officers are more likely to anticipate stressful situations in the line of duty than organisational hassles (Gershon et al., 2009), although interventions for police officers appear largely to address job content stressors instead of job context stressors (Penalba et al., 2009). To this end, Paton et al. (2008) proposed the Stress Shield Model, which identified individual, team and organisational factors that influence police officer resilience.

The current study investigated the Stress Shield Model, with the aim of identifying organisational factors that predict individual police officer resilience in the Singapore Police Force context. Using factor analysis and SEM techniques, the current study found that the SPF Organisational Health Survey comprised 10 main dimensions. Applying Paton et al.'s (2008) Stress Shield Model as a theoretical framework, organisational factors were found to consist of career development, rewards and recognition, supervisory support, peer support and organisational trust. In addition, police officer resilience was found to consist of stress coping, empowerment, engagement and passion, and morale and satisfaction.

Key Study Findings

The findings from this study have been distilled and are broadly presented below, as it is beyond the scope of this article to discuss each key finding in depth.

The current study found that various organisational dimensions create trust, perceived fairness, and sense of autonomy, bringing about beneficial individual outcomes of improved stress coping, increased sense of empowerment, heightened engagement and passion at work, as well as greater morale and job satisfaction. In particular, career development, rewards and recognition, supervisory support, peer cohesion and organisational trust were found to be the organisational factors that predicted individual resilience.

Additionally, the current study suggested that organisational justice was an overarching factor that linked several organisational predictors of individual resilience. When employees felt that they were treated fairly at the workplace, there was greater trust in the organisation, which further enhanced individual resilience.

"Organisational justice was an overarching factor that linked several organisational predictors of individual resilience. When employees felt that they were treated fairly at the workplace, there was greater trust in the organisation, which further enhanced individual resilience."

The current study also suggested that police organisational structure influenced individual perceptions of organisational trust. When police officers perceived supervisory support at the workplace, they were more confident in the operational capability of the organisation. However, due to the hierarchical nature of the police organisation, police officers who perceived supervisory support did not always report higher levels of confidence in the leadership of the organisation. Furthermore, when police officers had their immediate leaders as their referent of trust, they also exhibited higher levels of resilience. Conversely, when their organisational leaders were the referent of trust, police officers did not report higher levels of resilience.

Lastly, the current study found that empowerment may be used as a proxy measure for resilience. Taken together, these findings from the current study contributed to the development of a Singaporean model adapted

from Paton et al.'s (2008) Stress Shield Model by postulating organisational factors (i.e., organisational justice, organisational structure) and resilience measures (i.e., empowerment) not previously explored.

Recommendations

Organisational stressors present as having a greater influence on police officer stress than operational demands. Therefore, instead of interventions that target operational stressors, there is value in considering organisational interventions to bolster police officer resilience. The advantage of administering organisational interventions is that they address organisational concerns at two different levels. At the individual officer level, organisational interventions assist to develop employee empowerment, job satisfaction and resilience. At the systemic level, organisational interventions assist to address and mitigate problems structurally rather than symptomatically. As argued by Fredslund and Strandgaard (2004), in order to improve occupational health, it is valuable to examine interventions at the organisational level, since interventions are not implemented in a vacuum, but in specific organisational contexts.

A. Highlight the Perception of Fairness in Resource Allocation

One, raising perceptions of fairness in the allocation of resources and rewards is important in building organisational trust. This means that there needs to be a level of transparency in procedures and protocols with regards to areas such as human resource management. Matters pertaining to staff development, remuneration, advancement opportunities and training opportunities have to be communicated to SPF employees in a way that is clear, transparent and coherent, so that employees can see for themselves how such resources are allotted in a fair and consistent manner.

B. Encourage Exemplary Supervisory Support Behaviours

Two, encouraging supervisory support is a crucial instrument in building police officers' confidence in operational capability. Systemically, the supervisor-supervisee relationship can be formalised, in order to recognise the level of accountability held by both parties in a supervisory exchange. Further, the task of supervision needs to be delineated explicitly, so that there is a clear expectation of the purpose, roles, structure, processes and outcomes of supervision. Other possible interventions could be to introduce training programmes to enhance supervisory and supervision skills in employees placed in immediate leadership roles, as well as the recognition of supervisors who demonstrate effective supervisory behaviours, so as to reinforce a support culture in the organisation. Supervisors may further be encouraged to participate in or initiate team-bonding activities; these activities not only act as opportunities to build supervisory trust through increased interaction, they also serve to strengthen communal coping (Lyons et al., 1998) by building more cohesive teams.

C. Empower Police Officer to Build Sense of Autonomy

Three, interventions to enhance police officer resilience need to involve empowering officers to raise their sense of autonomy and control. That is, SPF employees need to be clear on the boundaries of empowerment, so that they can feel comfortable and confident about the decisions they make, and not be fearful of potential repercussions (Conger & Kanungo, 1988). In particular, the high demand, low control nature of policing (Shane, 2010) suggests that the enhancement of empowerment in law enforcement settings may be especially relevant. In this respect, organisational leaders can enhance empowerment by improving employee access to information (Kanter, 1986). By making more information more easily available to the people at more levels through various

"Employees need to be clear on the boundaries of empowerment, so that they can feel comfortable and confident about the decisions they make, and not be fearful of potential repercussions."

communication channels, leaders then provide immediate, direct communication in real time to give people the information they need to act, access to resources, and develop a working culture that emphasises the value of its human capital (Spreitzer, 1995). Additionally, organisations seeking to build employee resilience need to adopt practices that assist to enhance employees' sense of manageability of work tasks and meaningfulness of work roles. This could involve organisational interventions such as: (1) avoiding role conflict and ambiguity by developing clear job descriptions, (2) reducing physical and psychological symptoms by ergonomically redesigning physical work environments, and (3) increasing employee participation by involving them in decisions affecting them.

"The current study suggests that strategies to strengthen the resilience of SPF employees should include interventions to increase perceived organisational support by raising levels of supervisory support and peer cohesion, as well as interventions to heighten organisational justice by enhancing the perceived fairness of remuneration packages and career development pathways."

D. Consider Using Empowerment to Measure Officer Resilience

Four, to evaluate the effectiveness of organisational interventions on individual police officer resilience, the current study further proposes that there is a strong potential that empowerment may serve as a proxy measure for individual police officer resilience. This is particularly so, given that when empowered individuals perceive that they can act autonomously in ways that will help them maintain control in challenging situations, they may feel that such situations are more manageable, comprehensible and meaningful.

In summary, the current study suggests that strategies to strengthen the resilience of SPF employees should include interventions to increase perceived organisational support by raising levels of supervisory support and peer cohesion, as well as interventions to heighten organisational justice by enhancing the perceived fairness of remuneration packages and career development pathways. In addition, interventions to raise the perceived sense of control and autonomy at work would help to improve levels of organisational trust and empowerment. Nevertheless, the current study recognises that large organisations such as law enforcement agencies have myriad complex issues, and any recommendations proposed need to take into consideration the systemic idiosyncrasies, local cultures and operational complexities that each police division or precinct encounters. Instead of adopting a one-size-fits-all approach, interventions have to be adapted and customised to local contexts and demands.

Limitations and Future Directions for Research

The current study is not without limitations. To address this, the following suggestions are proposed for future research consideration.

A. Use Objective Measures to Measure Organisational Constructs

Adams and Wiswell (2007) wrote that organisational constructs such as organisational culture, climate or trust cannot be measured directly. Instead, researchers rely on the perceptions of individuals within the organisation, who will have different views of situations and contexts based on their personal experiences.

The current study thus suffers from this limitation as a result of the use of a survey method to obtain participant attitudes and perceptions. Future studies in organisational-related dimensions might consider incorporating the use of objective measures (Hellriegel & Slocum, 1974) when measuring constructs such as organisational climate, empowerment or trust. That is, job- and organisational-

level interventions should be evaluated using organisationally relevant objective outcome measures in addition to employee subjective reports. Such outcomes include health care costs, absenteeism records, turnover, staff performance and productivity, organisational effectiveness, accidents and injuries, as well as disciplinary records. Notably, the current study utilised a single omnibus organisational health survey to measure all of the organisational factors and outcomes of resilience. Not only does this exclusive use of self-report measures affect study findings (Campbell, 1982), this limitation may further contribute to possible common method variance, in which any variance in the observed scores obtained may be partially attributable to a methods effect, such as that of using the same method of data collection (Meade, Watson & Kroustalis, 2007).

B. Consider Longitudinal Study Designs to Determine Causality

Further, the cross-sectional design of the current study limits the extrapolation of findings to show causality. Such cross-sectional study designs do not permit analysis of causation, as the determinants and outcome measures were captured at the same time frame. As such, there would be value to consider the use of longitudinal designs in future studies, as this would strengthen the veracity of the findings and interventions.

C. Take into Account Organisational Context

The current study further found organisational context to influence organisational behaviours. The effect of organisational context has also been reported in the literature. For instance, Lewicki and colleagues (1998) demonstrated that an individual's behaviour and readiness to trust another in his or her organisation may reflect contextual influences, in that an individual's decision of whether to trust his peers, supervisors and management may be influenced by the salience and recency of interpersonal experiences. Furthermore, organisational trust can also be influenced by the prevailing culture of the organisation (Schein, 1996). Likewise, Zimmerman (1995) argued that because empowerment theory proposes that empowerment takes on different meanings in different contexts, it is important to conceptualise empowerment specific to a workplace context to differentiate its meaning from other contexts.

Hence, in terms of the extension of research in this area, future researchers should recognise the peculiarity and complexity of police organisational structures. Subsequent studies that examine organisational factors to predict police officer resilience should be conducted using police officer samples, or equivalent populations (e.g., military groups, correctional officers, auxiliary law enforcement services). Findings from studies that use participants from dissimilar organisational contexts (e.g., student populations, business settings) may lack the contextual fidelity, limiting the applicability of results to law enforcement settings.

D. Areas for Further Research

Lastly, in light of current study findings that empowerment is a potential proxy measure for police officer resilience, future research could look into examining the role of empowerment as an outcome variable, particularly in understanding the effect of power distance cultures at the workplace. In addition, the current study proposes that there is value and a need to conduct more research in devising organisational interventions to improve the management of occupational stress, given the proposition that organisational factors have the potential to influence individual resilience. However, instead of a surface approach to intervention that looks solely at officer stress and coping, the current study further proposes that any organisational intervention to enhance employee resilience should be devised, implemented and evaluated as to whether such interventions intentionally raise perceived fairness, increase peer support and improve sense of autonomy at the workplace.

CONCLUSION

Using these findings, the current study makes the argument that organisational interventions to raise positive emotions and outcomes at the workplace go beyond strategies to maintain an organisation's growth, function and service delivery, but that such organisational processes have the added benefit of strengthening the individual resilience of their police officers, particularly given their exposure and vulnerability to stressful organisational and operational demands.

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EDITOR'S NOTES

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UNDERSTANDING AND MITIGATING MONEY LAUNDERING AND TERRORISM FINANCING RISKS IN CASINOS

By Tan Boon Gin

INTRODUCTION

Money laundering and terrorism financing are borderless crimes that threaten the stability of every country. Simply put, money laundering is the process where 'dirty money' or proceeds from criminal activities become 'clean money' or legitimate funds. Money laundering conceals the criminal origin of funds. It also gives the criminal a legitimate or rather, an apparently legitimate reason for possessing illegitimate wealth. There are three widely recognised stages in the money laundering process in order of occurrence, namely:

- Placement,
- Layering, and
- Integration.

Placement is the introduction of criminal proceeds into the economy or the financial system. Layering is the conversion of criminal proceeds into another form and the creation of layers of financial transactions to disguise the audit trail and the source and ownership of the tainted funds.

The final stage of the money laundering process is Integration, which is the re-introduction of laundered proceeds back into the economy to create the perception of legitimacy.

MONEY LAUNDERING IS NOT A VICTIMLESS CRIME

There might have been a time when money laundering was regarded as a poor cousin of the traditional economic crimes. However, times have changed, and money laundering is big business now. The United Nations Office on Drugs and Crime estimated that in 2009, criminal proceeds of USD 1.6 trillion were being laundered. Money laundering can also no longer be dismissed as a benign offence and a victimless crime. The crimes from which the money originates often have direct identifiable victims. Successful money laundering makes it harder for these victims to recover their monies. The criminal does not mind losing a small portion of his proceeds if it means legitimising the rest. Hence, he may be willing to buy assets at a cost significantly above their actual value. Over time, this could result in the unnecessary inflation in the price of assets, making the economy and the genuine consumer, also victims of money laundering.

"Money laundering can also no longer be dismissed as a benign offence and a victimless crime. The crimes from which the money originates often have direct identifiable victims."

CASINOS AS AN IDEAL LOCALE FOR MONEY LAUNDERING

The Financial Action Task Force (or FATF) is an inter-government organisation that spearheads the global fight against money laundering, terrorism financing and related criminal activity. A report by FATF and the Asia Pacific Group on Money Laundering (Financial Action Task Force and Asia Pacific Group on Money Laundering, 2009) noted significant global casino activity that is cash intensive, competitive in its growth and vulnerable to criminal exploitation. This report concluded that the operating environment of casinos makes them particularly susceptible to money laundering.

Casinos are attractive to money launderers for three reasons. Firstly, casinos perform a wide

range of financial transactions that are similar to those offered by financial institutions: for example, cash deposits, inter-patron account funds transfers, currency exchange, cheque encashment and credit facilities. This is coupled with the fact that most casinos operate on a '24/7' basis, which means greater convenience and accessibility.

Next, casinos often experience high human traffic and undertake voluminous transactions daily. Criminals may think that their attempts at money laundering stand a higher chance of going undetected in the midst of all the activity that is taking place around them in the casino.

Thirdly, casinos offer anonymity. One does not need to be a member or participate in any form of the loyalty programmes being offered in order to game in the casinos.

These are just some of the operational conditions in a casino environment which render casinos more vulnerable to criminal exploitation. In fact, casinos are unique in that they can offer a 'one-stop centre' for money laundering as all the three stages of placement, layering and integration can be carried out under one roof.

MONEY LAUNDERING METHODS AND TECHNIQUES

There are three common methods of money laundering in the casinos, namely:

- Use of Casino Value Instruments,
- Structuring and Refining, and
- Use of Casino Accounts

Use of Casino Value Instruments

Casinos use a variety of value instruments to facilitate gaming by their customers and one of the most commonly used instruments are casino chips.

Casino value instruments are often used in the placement and layering stages of the money laundering process. Placement takes place when the tainted funds are used to purchase casino chips. The funds are then layered, for example, through engaging in a few hands of play at the gaming tables and thereafter, redeeming the unused casino chips for a casino cheque from the casino operator.

Another common technique employed by money launderers is even money betting by two or more patrons at a gaming table. This technique involves at least two patrons placing opposite bets with the same or almost similar betting amount in the same game. The losses of one player would become the winnings of the other player, and criminal proceeds would then be disguised as casino winnings.

Another instrument is the Ticket-In-Ticket-Out or 'TITO' tickets or vouchers which are dispensed by Electronic Gaming Machines (EGMs) or Electronic Table Games (ETGs). A money launderer may load the gaming machines with illicit monies on the pretext of gaming, and subsequently withdraw the money after minimal play in the form of a TITO ticket. The TITO ticket can then be exchanged for a casino cheque at the cage.

Structuring and Refining

The next common money laundering method is known as Structuring. Structuring involves the breaking up of large value transactions into a series of smaller value transactions in order to minimise attention/suspicion and, in the case of cash, to avoid threshold reporting requirements, if any.

For example, according to an advisory released by the Financial Crimes Enforcement Network in the United States (Financial Crimes Enforcement Network, 2009), there have been several incidents of structuring in casinos involving patrons and casino staff. One of the cases involved a patron obtaining assistance from a pit supervisor to allow him to intentionally coordinate buy-ins with the time of the day when the casino's business or gaming day concluded. This enabled large cash transactions to be split between two different gaming days to avoid the mandatory cash transaction reporting threshold in the United States.

Structuring can sometimes be used in combination with another methodology known as refining. Refining refers to the conversion of small denomination currency notes to large denomination currency notes. This particular method is commonly associated with drug trafficking or unlicensed money lending activities as the criminals running such illegal activities usually accumulate a large number of smaller denomination notes. The conversion of smaller denomination notes to larger ones is necessary for easy transportation or movement of the illicit cash and casinos offer a convenient avenue for such criminals to do so.

A straightforward example of using both methods of structuring and refining would involve a person going to the cage to exchange $9,000 worth of small denomination currency notes into 9 pieces of currency notes of $1,000 each. Assuming that the reporting threshold is set at $10,000, the launderer would have succeeded in refining his tainted proceeds into larger denominations and, at the same time, avoided any reporting requirements by structuring his transaction below $10,000.

Use of Casino Accounts

A third method of money laundering through the casinos is the exploitation of front money deposit accounts and credit accounts provided by the casinos. While such accounts provide great convenience to patrons for their gaming activities, they also offer opportunities for criminals to launder their money. Front money accounts offer similar services to those offered by traditional financial institutions with regard to the storage of funds and can be used in conjunction with many of the money laundering methods already described.

Similarly, even though credit accounts are only made available to customers following successful background checks, they can still be used to launder money. A simple way would be for the customer to establish a credit line with the casino for gaming, draw on the credit line, and subsequently repay it with illicit proceeds.

MITIGATING THE RISKS OF MONEY LAUNDERING IN SINGAPORE

It is clear that there are many ways of laundering money through the casinos. As law enforcers, we are well aware of the risks and the need to mitigate these risks through robust Anti-Money Laundering / Counter Financing of Terrorism (AML/CFT) measures.

Prior to the opening of the two casinos in 2010, the Commercial Affairs Department of the Singapore Police Force worked closely with the Casino Regulatory Authority of Singapore (CRA) to develop a strict and rigorous AML/CFT framework to deter domestic and foreign criminals from using Singapore's casinos to launder criminal proceeds. The CRA has prescribed comprehensive AML/CFT regulations for casinos, which are contained in the Casino Control (Prevention of Money Laundering and Terrorism Financing) Regulations or PMLTF Regulations. These regulations prescribe mandatory AML/CFT measures that Singapore's casinos must adopt including the development and implementation of policies, procedures and controls by the casinos to prevent money laundering and terrorism financing. These measures are benchmarked to the international FATF standards and are also on par with the regimes in established gaming jurisdictions overseas.

"Prior to the opening of the two casinos in 2010, the Commercial Affairs Department of the Singapore Police Force worked closely with the Casino Regulatory Authority of Singapore (CRA) to develop a strict and rigorous Anti-Money Laundering/ Counter-Financing of Terrorism framework to deter domestic and foreign criminals from using Singapore's casinos to launder criminal proceeds."

Besides the Casino Control Act, Singapore has its own anti-money laundering legislation in the form of the Corruption, Drug Trafficking and Other Serious Crimes (Confiscation of Benefits) Act (CDSA) as well as the Terrorism (Suppression

of Financing) Act (TSOFA) which criminalises terrorism financing.

These laws collectively give us five main tools to mitigate the risk of money laundering and terrorism financing, namely:

- Suspicious Transaction Reports
- Cash Transaction Reports
- Cross Border Cash Movement Reports
- Customer Due Diligence Measures
- Ongoing Monitoring

Suspicious Transaction Reporting

A cornerstone of our fight against money laundering and terrorism financing is the reporting of suspicious transactions to the Suspicious Transaction Reporting Office (STRO) which is also Singapore's Financial Intelligence Unit. A report has to be made if one has reasonable grounds to suspect that any property could be linked to illegal activities. To ensure compliance, a failure to report a suspicious transaction is a criminal offence.

The STRO has received more than 27,000 Suspicious Transaction Reports (STRs) over the past two years from various industries, and even members of the public. The increase is encouraging as it demonstrates an increase in vigilance, commitment and awareness of the community towards our AML/CFT efforts.

"The Suspicious Transaction Reporting Office has received more than 27,000 Suspicious Transaction Reports (STRs) over the past two years from various industries, and even members of the public. The increase is encouraging as it demonstrates an increase in vigilance, commitment and awareness of the community."

STRO is keenly aware of the importance of harnessing financial intelligence from the information contained in the STRs from various sources, including financial and non-financial businesses. Such intelligence has been an invaluable tool in helping us to detect crime and assist in the investigations of criminal activities ranging from syndicated crimes such as unlicensed money lending, to market offences such as insider trading, and public and private sector fraud. In fact some of the most significant cases in CAD's history were cracked or solved from STR information. An example would be the case of Chia Teck Leng, one of the world's top casino high rollers who misappropriated a total of S$117 million from his employer, Asia-Pacific Breweries Pte Ltd (APB). In 2003, CAD received information on some of Chia's activities at APB. This information led to the discovery that Chia had issued cheques from APB's foreign banks accounts to finance his extravagant gambling activities in overseas casinos. Chia was subsequently convicted of cheating, money laundering and other offences, and sentenced to 42 years imprisonment. CAD takes STRs very seriously, and each STR could very well lead to our next big case.

Cash Transaction Reporting under PMLTF Regulations

We have also implemented the mandatory filing by casinos of Cash Transaction Reports (CTRs) with STRO. A CTR is required for:

- Every cash transaction with a patron that involves either a cash-in or a cash-out of S$10,000 or more in a single transaction; or

- Multiple cash transactions, the aggregate of which is either a cash-in or cash-out of S$10,000 or more in any gaming day.

The purpose of the CTR reporting requirement is to establish an auditable trail to track the movement of large amounts of cash within the casinos. With this requirement, effectively all patrons whose transactions in the casinos hit the threshold of S$10,000 or more will be reported to STRO.

Between 2010 and 2011, there was a 35% increase in the CTRs filed by the two casinos here and we are encouraged by the steady increase in numbers. The information is an invaluable part of our financial intelligence.

Cross Border Cash Movement Reporting

A third reporting requirement that came into effect on 1 November 2007 is the reporting of cross border movements of physical currency and bearer negotiable instruments (CBNI).

Under the Corruption, Drug Trafficking and Other Serious Crimes (Confiscation of Benefits) Act, any person who moves into or out of Singapore any CBNI exceeding S$30,000 or its equivalent in a foreign currency is required to submit a Cash Movement Report or CMR, in respect of the movement. A recipient of CBNI above this amount is also required to make such a report.

Since its introduction, we have received an average of about 8,000 CMRs monthly. The quality of our financial intelligence is dependent on the combination of all three sources of information from STRs, CTRs and CMRs. The use of financial intelligence has helped our investigators seize more than $53 million of suspected criminal proceeds in 2011.

Customer Due Diligence and Ongoing Monitoring

Efforts from law enforcement agencies and regulators alone cannot fully mitigate all the risks of money laundering or terrorism financing activities that could be taking place in the casinos. Casino operators must also play an active role by exercising due diligence when conducting transactions with their patrons.

"Casino operators must also play an active role by exercising due diligence when conducting transactions with their patrons."

Singapore adopts a risk-based approach towards the performance of Customer Due Diligence. For example, casino operators are required to conduct customer due diligence for 'higher risk' patrons such as Politically Exposed Persons ('PEPs') and use reasonable means to ascertain the patron's sources of funds.

Identification and verification of patrons' identities would also be required when their customers open front money or credit accounts, and also in instances where patrons carry out deposits which exceed S$5,000.

Casino operators are also required to carry out ongoing monitoring of their patrons' transactions. In essence, this means that they must undertake efforts to determine whether transactions carried out in the casino are consistent with their understanding of their patrons' background and profile.

SOME MONEY LAUNDERING SCENARIOS

The following three hypothetical money laundering scenarios illustrate various methods of money laundering in the casinos. These cases identify each stage of the money laundering process, the suspicious indicators that can alert a vigilant casino and how the measures Singapore has introduced can address these threats.

Scenario 1: Structuring through the use of casino value instruments

In this example, we have a money launderer who utilises casino chips to launder his proceeds of crime. He engages several third parties to purchase chips on his behalf at the casinos. These third parties then cash out the chips at the cage, in amounts of less than S$10,000 which is below the CTR reporting threshold. The money launderer then transports the cashed out monies out of the country and deposits them into an overseas bank account.

Breaking down the the laundering process, the launderer is first placing his illicit funds into the casino through the purchase of casino chips. He then attempts to layer the funds by converting the chips to cash by cashing out the chips. To complete the laundering process, he brings the cash out of the country so that it can be

integrated back into the financial system when he deposits it into his overseas bank account.

There are a few red flags in this case that should alert the casino to consider filing an STR. Firstly, the frequent cashing out of chips just below threshold of S$10,000 indicates possible structuring attempts. Secondly, the minimal play recorded by the launderer or his associates indicates the absence of gaming intent, which is typical of criminals who are only seeking to "clean" their funds.

We recognise the risk posed by structuring transactions in the casinos. Therefore, one of the measures we have taken is to include the concept of aggregation and multiple cash transactions undertaken by a patron or on behalf of another within a gaming day into the cash transaction reporting requirement. This means that the money launderer who attempts to break down his transaction into smaller amounts but exceeds S$10,000 in the same gaming day will still be reported to the authorities.

Although the CMR regime is not a casino-specific counter-measure, it nonetheless adds yet another layer of deterrence to money launderers seeking to transfer cash out of Singapore from the casinos to complete the laundering process. As the cash crosses our borders, information such as personal details, purpose of transfers, source and beneficiaries of funds is all recorded and reported.

Scenario 2: Refining through the use of Electronic Gaming Machines (EGMs) and Electronic Table Games (ETGs)

The next example illustrates the method of refining using EGMs and ETGs. First, we have a money launderer approaching a few EGMs and loading the machines with small notes. After a few plays, he cashes out the credits in the EGMs and obtains a TITO ticket from these machines. He then redeems the TITO tickets for cash either at the cage or at the TITO redemption machines.

The use of EGMs to launder money is not surprising given the popularity of the games and also the minimal staff intervention involved. By loading the machines with his illicit funds, the launderer places the 'dirty money' into the casinos and layers them when he converts these monies into a TITO ticket. By redeeming the TITO tickets and leaving the casinos with the redeemed cash, the launderer integrates the illicit funds back into the financial system when the cash is used and completes the money laundering process.

In Singapore's context, we have about 2,300 EGMs and ETGs deployed in each of the two casinos. Given its sheer numbers and in recognition of the money laundering risks that EGMs and ETGs pose, we imposed a maximum credit meter limit and maximum cash out limit for each machine. A maximum credit meter limit prevents a gaming machine from accepting more bank notes when the amount of money it can accept is reached. On the other hand, the maximum cash out limit forces a hand-pay by a slot attendant if the payout is beyond the set limit. If the slot attendant discovers any suspicious behaviour by the patron such as cashing out large amounts of cash with little or minimal play, a STR filing should be triggered.

EGMs are also restricted from printing and dispensing TITO tickets of more than S$10,000 in value. A jackpot limit is also imposed, where a hand-pay (manual pay-out by casino employee) must be made for any jackpot prizes that are S$10,000 or more.

Scenario 3: Use of Casino Accounts

The last scenario illustrates how casino accounts can be exploited. Here, the launderer engages a frequent patron to the casino and requests to use his casino account. Within a short period of time, large amounts of funds are transferred into the patron's casino account from an overseas affiliated casino or company on the pretext of gaming. The patron then visits the casino and begins withdrawing these monies in a combination of cash and cheques.

In this scenario, the first stage of the money laundering process takes place when the funds

are deposited into the patron's casino account. It is then layered by the series of withdrawals performed by the patron and later on, integrated back into the financial system when the money is used or the cheques are deposited.

As a mitigating measure, we require our casino operators to conduct Customer Due Diligence for deposits exceeding S$5,000 and this would include recording the identity of the person making the deposit.

In Singapore, the withdrawal of monies from casino accounts without any gaming activities is also disallowed. This is a requirement under the PMLTF Regulations whereby the casino operators are required to prohibit any transaction that involves the conversion of money from one form to another without being used for gaming.

If there are withdrawals in cash exceeding S$10,000, the CTR reporting requirement is triggered, and if as part of the ongoing monitoring process, the casino operator finds that the deposits or withdrawals are inconsistent with the patron's profile it must consider filing an STR.

CONCLUSION

We have achieved much in these two years since the arrival of the casinos in Singapore and we are confident that the AML/CFT measures we have introduced will serve us well and be an effective deterrent to criminals seeking a place to legitimise their criminal proceeds.

As the gaming industry in Singapore matures, law enforcement agencies, regulatory bodies and the casinos must continue to work together in a tripartite partnership to keep the sector clean.

It cannot be emphasised enough, that governmental actions alone are insufficient. We require concerted efforts from the casino operators to remain vigilant in detecting attempts to launder money through the casinos and diligently report suspicious transactions to the authorities.

The most common question asked by CAD's compliance colleagues in the industry is: When is something suspicious enough to file an STR? We have provided guidelines to assist casino operators in the filing of STRs by providing a list of suspicious indicators or red flags. The test itself is an objective one, on whether there are facts or circumstances from which a reasonable person engaged in the casino business would have formed a suspicion of money laundering. And the essential element in the word 'suspicion' is thinking that there is a possibility, not a probability, but simply a possibility, of this happening.

In this regard, it should be emphasised that financial intelligence is larger than the sum of its parts. Each piece of information, by itself, whether an STR or a CTR, by itself may not disclose anything, but added together, will tell a different story. When considering whether to file an STR, one should not judge the indicator or red flag in isolation. Instead, it should be considered how it can potentially contribute to the total mix of information that we possess, and when in doubt, to always err on the side of suspicion.

"Financial intelligence is larger than the sum of its parts. Each piece of information, by itself, whether a Suspicious Transaction Reporting Office or a Cash Transaction Report, by itself may not disclose anything, but added together, will tell a different story."

This article is adapted from a speech Mr Tan Boon Gin made at the International Association for Gaming Regulators (IAGR) conference hosted by the Casino Regulatory Authority in Singapore in October 2012.

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EDITOR'S NOTES

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DELIVERING THE SINGAPORE PASSPORT

By Tan Kok Guan and Kong Yong Sin

A PASSPORT TO CALL OUR OWN

On 18 June 1966, the first permanent Singapore passport was issued. A sturdy hardcover book with 32 pages, its bright red cover was emblazoned with the Singapore state crest that proudly identified its holder as a Singapore citizen seeking entry into other countries.

About five years later in June 1971, the passport went through its first upgrade – the hardcover was changed to a soft and durable cover for easier handling. The new passport also came with a perforated book inventory control number on the passport pages. This recognised each Singapore passport as a unique booklet, and provided the basis for information sharing amongst enforcement agencies and countering passport forgery attempts by syndicates.

Over the past four decades, the Singapore passport with handwritten particulars with its holder's photograph affixed on the data-page has evolved with progresses in technology, changes in socio-economic and security landscapes, to become the Singapore biometric passport we have today.

Setting New Standards for Security and Automation

As Singapore grew and began to participate more actively in international commerce, the government made it a point to ensure that the passport was in line with international standards laid down by the International Civil Aviation Organisation (ICAO) to facilitate the ease of travel of its citizens. On 11 August 1986, Singapore introduced a new generation of the passport where the data-page with an affixed photograph was laminated to prevent the tampering of particulars. It came in either 64 pages or 96 pages, had a validity period of ten years, with the following additional security features (see box story for more details):

- Watermarked paper;
- Security laminate with State Crest; and
- Fugitive ink.

1966: 1st Singapore International Passport

1971: Soft Cover Passport

1986: Non-Biometric Passport with Laminated Photo

1999: New Passport System Passport

2006: Singapore Biometric Passport

- **FUGITIVE INK**

Fugitive inks are the printing inks that will distort, stain, bleed, change colour, or disappear when come in contact with solvents. Such solvent-sensitive inks are commonly used to complete the biographical information at the biodata page and also the background printing on the inner pages of a travel document. The inks offer a degree of security against tampering and unauthorised alteration of security documents.

The image bleeds into a smudged patch when it comes into contact with water

As the 20th century came to an end, ICA, then known as the Singapore Immigration & Registration introduced a new system known as the Automated Passport Processing System (APPS) that transformed and simplified the production and processing of passports in unprecedented ways.

ADDITIONAL SECURITY FEATURES IMPLEMENTED IN 1986

- ***Watermarked paper***

The most important security feature for security paper is the ***watermark***. The value of a watermark is in its technical quality and the high degree of skill to produce it. It cannot be reproduced by colour scanners, photocopiers and printers through the use of ink pigments, and is best viewed when using transmitted light that is shone through the paper from behind.

The watermark is the State Crest with the words "Republic of Singapore" circling it.

- ***Security laminate with State Crest***

It is a clear laminate with printed design of the state crest on the underside of the laminate. The laminate is affixed onto the passport biodata page to prevent tampering to the passport holder's photo and biodata details.

From October 1999, lengthy forms were replaced with personalised ones and the Unique Identification Numbers (UINs) of applicants were used as search keys to automatically retrieve records from the passport system. In this way, records were also updated upon the submission of their applications. Passport photographs and status of applications were scanned and stored in the system. From the perspective of the applicant, the waiting time was slashed from seven to three working days, reducing the waiting time by almost 60%.

A new 10-year Singapore passport termed the NPS (New Passport System) passport was also introduced. At a time when many countries were still using photo-laminated travel documents that were vulnerable to tampering, the photograph and particulars of the Singapore passport holder were printed onto a special security film, which was bonded onto the passport. Images of the Singapore skyline and the national flower were also incorporated as security features, as the intricate lines made it harder to forge or tamper with the passport. A second photo image, comprising a 30% reduction of the first image, was also scanned in. The enhancements helped to uphold the integrity of the Singapore passport as a trusted travel document that had strong security features to prevent tampering and forgery. Another security feature was the use of intaglio printing, where the lettering was raised above the page, and optical variable ink that took on various colours when viewed from different angles.

"At a time when many countries were still using photo-laminated travel documents that were vulnerable to tampering, the photograph and particulars of the Singapore passport holder were printed onto a special security film, which was bonded onto the passport."

With the new passport system, children below 15 years old were required to apply for single identity passports instead of riding on their parents' travel documents. One benefit of the change was children could travel on school trips overseas without their parents. Parents also no longer needed to re-apply for passport extensions every nine months, which was the case for National Service pre-registrants who were tagged to their parents' passports.

With these changes, the standards set by Singapore enabled the passport to stay ahead of passport forgery and tampering syndicates.

PREPARING FOR THE LAUNCH OF BIOPASS

The year 2006 marked the birth of the BioPass, a travel document containing unique biometric identifiers (the passport holder's fingerprint and facial images) on a contact-less chip. With the personal particulars digitally stored in the chip embedded in a polycarbonate data-page, the BioPass complies with the standards set by ICAO. The inventory book control number of the BioPass also replaced the identity card number as the passport number. This unique inventory number has made it easier for security agencies to share information on lost and stolen Singapore passports as part of global efforts to curb passport abuse.

In fact, Singapore went beyond compliance with ICAO standards by becoming among the first nations to issue biometric passports, to proactively engaging international partners to ensure global interoperability so that biometric passports become a truly global norm.

International 'Live' Tests

Making the Singapore biometric passport globally interoperable for verification at the foreign immigration borders was a critical requirement when ICA was preparing to introduce BioPass. While the general technical standard for chip was then discussed, there was no agreed specification for the reader, i.e. the machine that reads the electronic information in the chip.

ICA initiated a three-month International 'Live' Test (ILT) of the biometric passports to give Singapore the opportunity to assess the operational impact of reading biometric passports issued by other countries using our electronic scanners at our checkpoints and vice versa. In collaboration with the United States, Australia and New Zealand, the first ILT Meeting was hosted in Singapore at the Immigration & Checkpoints Authority (ICA) Building in November 2005 to discuss the methodology and arrangements to cross-test the reading of each country's passports at pre-identified checkpoints. The trial was then scheduled from 15 January to 15 April 2006.

The 'live' tests involved official and diplomatic passport holders as well as 2,000 Singaporean crew members of Singapore Airlines (SIA) as they were frequent travellers. The SIA crew members were issued with trial BioPasses for testing at designated points of entry, namely San Francisco Airport in the United States and Sydney Airport in Australia.

At the end of the three months, the ILT was pronounced a success by the participating countries, in view of the positive operational results of reading other countries' biometric passports using ICA's readers successfully, and vice versa. Not only had Singapore been assured that the passport readers and BioPass were interoperable through the ILT, the three countries had also benefitted from the test as they could apply these standards of e-passport and readers in their e-passport projects.

The encouraging results of the ILT and a local trial within ICA gave ICA the confidence that Singapore's first biometric passport fully met the standards set by ICAO. This set the platform for its public launch on 15 August 2006.

Forward Planning

Tested-and-validated approaches are a key success factor for Singapore's first biometric passport. Seven years on, Singapore is still issuing its first version of BioPass that meets the ICAO's evolving standards and specifications for e-passports, whereas some countries are working on second or third generations of their e-passports to counter forgery attempts. It is evident that the rigorous and calibrated approach taken to introduce the BioPass has ensured a robust e-passport system for Singapore.

A proud moment in history: Singapore's first-ever biometric passport

Successful International 'Live' Tests for the Singapore BioPass

APPLICATION, PRODUCTION AND DELIVERY: SATISFYING THE CUSTOMER

Changes to the physical aspects of the passport are merely the tip of the iceberg where ICA's dedication to customer service is concerned. Today, a Singapore citizen can submit a passport application in minutes over the Internet or by post. The collection can also be done in less than 10 minutes, at the ICA Building or from any designated Singapore Post (SingPost) outlet across the island.

"Today, a Singapore citizen can submit a passport application in minutes over the Internet or by post. The collection can also be done in less than 10 minutes, at the ICA Building or from any designated Singapore Post (SingPost) outlet across the island."

Multiple Channels, Minimum Visits and Many Benefits

In carrying out its immigration and registration functions, ICA is guided by this maxim: **M**ultiple Channels, **M**inimum Visits and **M**any Benefits, which we term '3M'. ICA aims to create more channels of interaction, which help to lower the frequency of visits by each customer, which in turn enables ICA officers to serve its growing number of customers. *Figure 1* illustrates the range of passport services that have been conceptualised and which benefitted from the 3M principle.

Customer Satisfaction through Customisation

In 1994, ICA recognised that customers preferred to minimise the number of trips needed to complete a transaction. To obtain a passport, Singapore citizens had to queue twice to apply and collect for their passports at the then main office in Pidemco Building or at the Joo Chiat branch. We broke out of the traditional paradigms of over-the-counter applications, and encouraged applicants to drop their forms into deposit boxes at ICA Building or mail them in. Within five years, close to three-quarters of the passport applicants were using these new modes of applications. Since the introduction of APPLES - Application for Passport online Electronic System – in 2002, the Internet has become the most popular medium of applying for a passport.

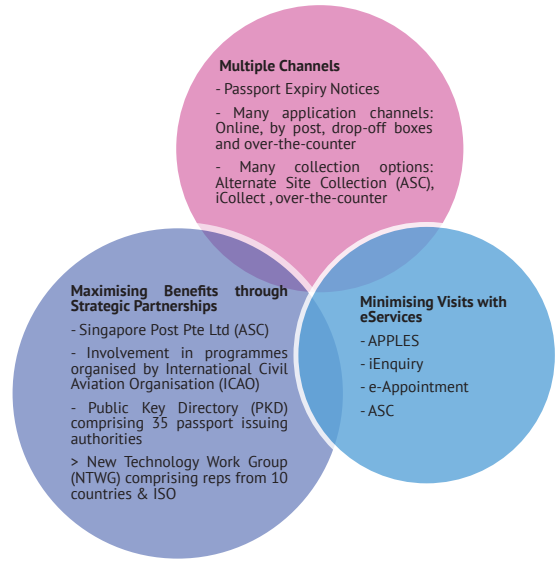
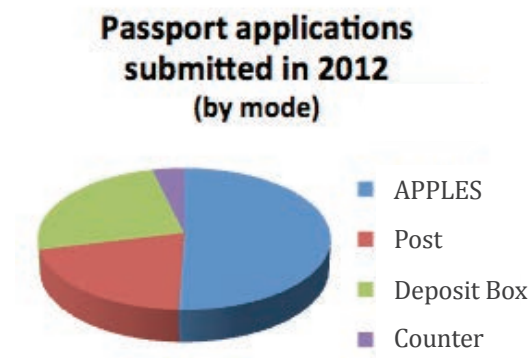


Figure 1: Service improvement efforts for the Singapore passport under the 3M principle



Today, only about 5% of passport applicants apply for a passport over-the-counter at ICA building while more than half use the Internet.

This change has happened because we sought to understand our customers' motivations. Through customer feedback, we found that because the passport is an important document, customers want to ensure that we receive their applications.

They were also receptive to monetary incentives. Hence, we introduced acknowledgement of the receipt of a passport application and a $10 rebate[1] for passport applications submitted through the mail or Deposit Box, or via APPLES.

In acknowledging that our customers are varied, we developed the Customer Segmentising Matrix to guide us in understanding and customising our modes of service delivery. In this matrix, we adopt a customer-centric perspective and recognise that not all are the same nor do they wish to be served in the same way, hence a 'one-size-fits-all' approach has no relevance in ICA. Customers are therefore segmented according to their *Ability* ('Can' and 'Can't') and *Attitude* ('Will' or 'Won't') towards the various service delivery options. By providing expanded options for customers and allowing them to make a choice of their preferred option, ICA seeks to empower the customer.

"We adopt a customer-centric perspective and recognise that not all are the same nor do they wish to be served in the same way."

As illustrated in Figure 2, by moving customers in the 'Can't and Won't' quadrant directly to the 'Can and Will' quadrant, we aim to achieve not just service excellence, but also to build social capital and optimise the deployment of resources.

In adopting new technologies, we are mindful not to isolate members of the public who may not have access to such resources. The challenge is to extend our hand to those who "Can't", such as elderly citizens who might not be tech-savvy. While they can request family members and friends to assist, ICA also offers alternatives by liaising with private sector partners such as photo studios and SingPost to offer application-assisted services for this group.

"In adopting new technologies, we are mindful not to isolate members of the public who may not have access to such resources."

ICA has also constantly improved service standards over the years – the average processing time for passport applications is now three working days, allowing applicants to collect their Singapore passports within a week of submission.

Another customer-focused initiative – Passport Expiry Notices – has also benefitted many customers. Since end-2009, ICA has been sending out reminder letters to Singapore citizens whose passports are expiring in nine months' time. The passport expiry notices also include a pre-printed, personalised passport application form that allows them to mail back their applications to ICA.

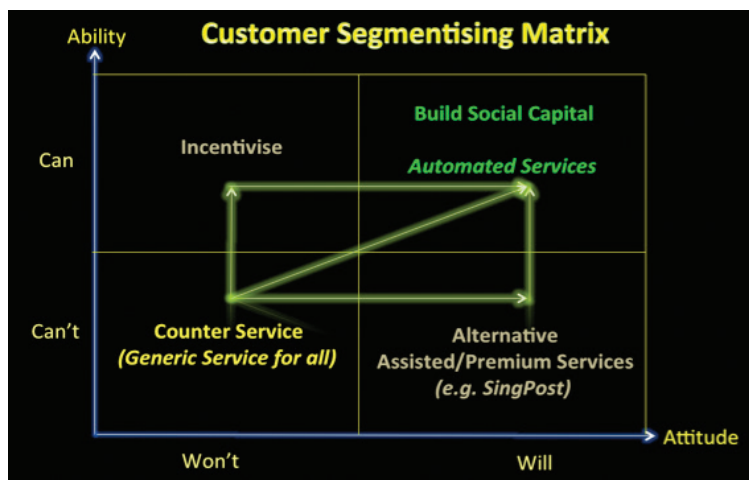


Figure 2: Customer Segmentising Matrix

PREPARING FOR THE LAUNCH OF BIOPASS

Year	ICA's Innovation Journey	Benefits
1994	More alternative application channels – by post	Citizens call at passport office only once instead of twice
1999	Alternative application channels by drop-off boxes at ICA	Citizens do not need to wait or queue at ICA counters to submit passport application forms
2002	Spearheaded ICAO NTWG and conducted rigorous 'live' international tests before launch of the Singapore Biometric Passport	Citizens were assured of a secure travel document that is acceptable by the international community
2008	e-Appointment (Online facility for customers to book appointment for document collection)	Collection can be done in under 15 to 30 mins, saving time for citizens and reducing crowd size at ICA Building
2009	System-generated notification to remind citizens whose passports expire in 9 months	Reduce last-minute applications and provides peace of mind for citizens
2010	Pioneered alternative site for secure passport collection at Singapore Post outlets (ASC)	More convenience of collection at more locations, longer hours and weekends
2013	iCollect (A self-service document collection machine)	A jukebox concept which offers Singaporeans and foreigners an added channel to collect their passports, ICs and Long Term Passes without visiting counters at ICA

LEVERAGING THE INTERNET

Winning Singaporeans over with APPLES

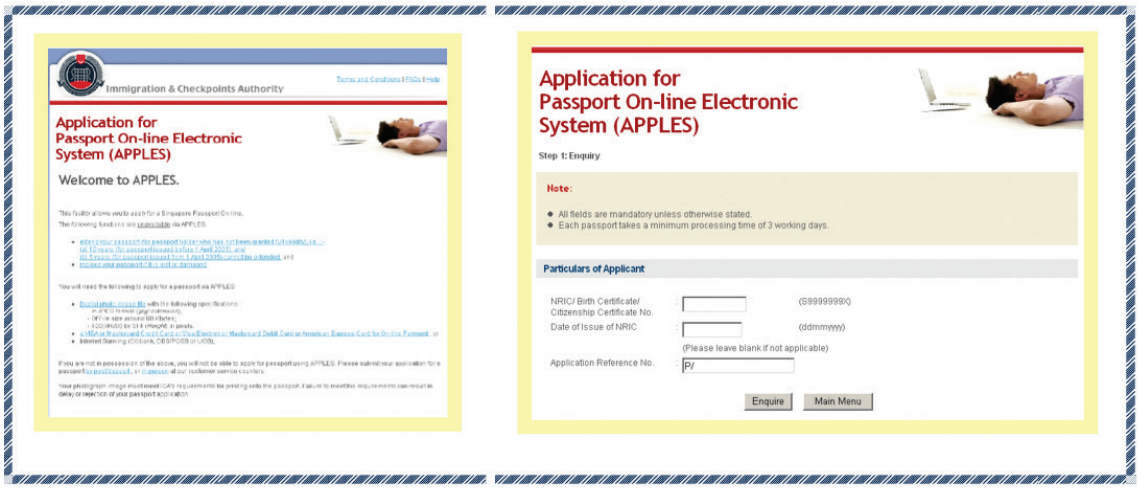
With the increased reach of the Internet in the late 1990s, ICA created APPLES - Application for Passport Online Electronic System - in 2002, the first e-service in the world to allow photo submission and payment for passport application online. Available 24/7, the online system gives Singapore citizens added flexibility and choice when applying for their passports. It also allows applicants to submit and enquire on their passport applications online, bringing convenience to customers without compromising our system security.

"With the increased reach of the Internet in the late 1990s, ICA created APPLES - Application for Passport Online Electronic System - in 2002, the first e-service in the world to allow photo submission and payment for passport application online."

With the take-up rate of two per cent when it first started in mid-2002, APPLES has since won over more than half of the local population applying for Singapore passports.

APPLES continues to receive compliments more than a decade after its introduction. At the ICA Lean Executive Forum on 4 August 2011, Professor Tang Loon Ching, Professor and Head of the Department of Industrial and Systems Engineering of the National University of Singapore said he was impressed by the intelligence of APPLES as it was able to recognise that his submitted photograph did not meet ICA's photograph requirements. He was then guided by the system to submit an acceptable photograph.

Another customer-focused initiative – Passport Expiry Notices – is also much appreciated by many customers. Since end-2009, ICA has been sending out reminder letters to Singapore citizens whose passports are expiring in nine months' time. The passport expiry notices also include a pre-printed, personalised passport application form that allows them to mail back



Screenshots of APPLES

Proactive reminder

"Other organisations should learn from ICA how this is done."

MR WILSON CHOO: "The Immigration and Checkpoints Authority (ICA) sent me a reminder of my passport's expiry which provided me with accurate information as well as the application form. Well done, keep it up. Other organisations should learn from ICA how this is done without wastage of precious paper."

Source: The Strait Times © (15 Oct 2010). Singapore Press Holdings Ltd. Permission required for reproduction.

their applications to ICA. Mr Wilson Choo was so delighted by this initiative that he wrote to The Straits Times on 15 October 2010 to applaud ICA for the proactive reminder.

With empathy and constant improvement, ICA aims to deliver effective and efficient public services.

Hassle-free e-Appointments

Some initiatives may seem small, yet they have gone a long way. Take for instance ICA's online appointment system, which cuts the time taken to collect a passport by more than 75 per cent, from 2 to 3 hours to the current 15-minute promise. Furthermore, it alleviates the issue of crowd management at ICA Building. In 2010 alone, the three services centres in the building handled a record total of 3.5

"ICA's online appointment system cuts the time taken to collect a passport by more than 75 per cent, from 2 to 3 hours to the current 15-minute promise."

million transactions, doubled from 1.3 million transactions handled in 2003 when ICA was first formed. When e-Appointment was introduced, it aided ICA in spreading the workload and optimising the deployment of our resources.

As reported by the media, this customer-friendly move has been much appreciated. One polytechnic student, Ms Eunice Teo was reported as saying, 'I hardly waited. I didn't really get a chance to sit down.'

Increasing Collection Channels

The next step was therefore to give the public the option of going to a location most convenient to them, should they require certain e-services offered by ICA. Armed with robust compliance checks and audit processes to ensure that ICA's requirements and procedures are strictly complied with, SingPost was identified as a trusted partner of ICA. On 1 April 2008, APPLES became one of the five e-services to be offered at post offices.

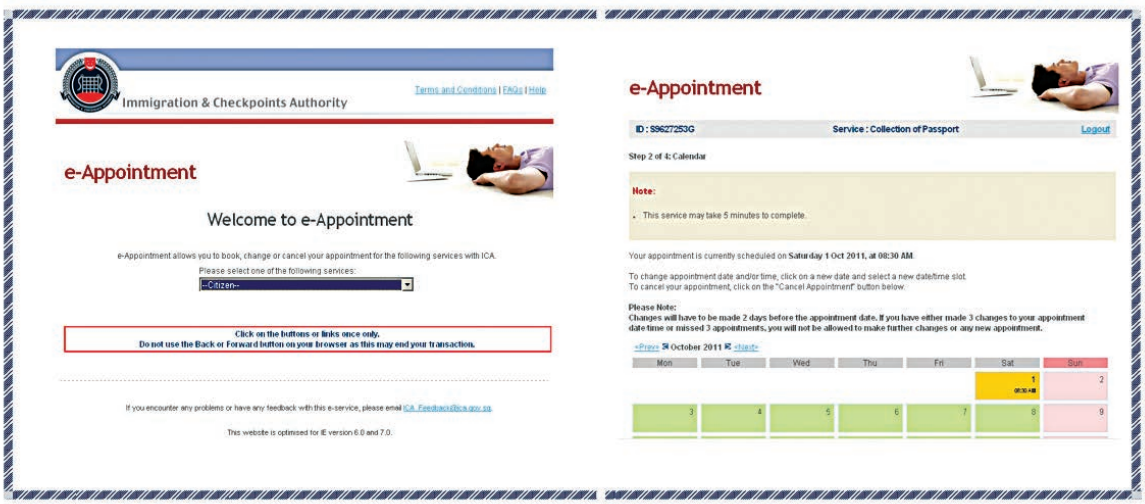
Two years later, in mid-October 2010, Singaporeans were offered the option of collecting their new passports, at a service fee payable to SingPost, from any of the 20 designated SingPost outlets strategically located across the island. Akin to the introduction of the BioPass, ICA embarked on a three-month trial to test the robustness and security processes of this initiative, which provided not only alternative collection centres but also extended operating hours, including Sundays.

A satisfied customer of ICA. Source: Lianhe Zaobao (24 May 2008) © Singapore Press Holdings Ltd. Permission required for reproduction.

Today, the number of SingPost outlets offering the collection service has grown from 20 in October 2010 to 28. Moving ahead, the success of the alternate site collection (ASC) initiative will be further tapped on and rolled out for the collection of identity cards and Long-Term Passes from SingPost outlets.

TAKING THE NEXT LEAP: THE SELF-HELP MACHINE

ICA's journey of expanding the innovation options for the Singapore passport is far from over. The



Screenshots of e-Appointment

next stage is the self-help collection machine – iCollect, which became a reality in April 2013. The plan is to install downsized versions of this machine in the premises of selected strategic partners so that collection of the Singapore passport and other ICA documents can be available 24/7. This level of automatic self-help collection has the bonus of achieving productivity savings for manpower.

Advertorial promoting passport collection at SingPost outlets

THE ICOLLECT

As iCollect is a world's-first facility, there was no precedence for ICA to emulate the setup and functionalities. This secured document self-service machine was the product of a tight-knit tripartite collaboration among the public service (ICA), the private sector (NEC and Walta Technologies), as well as an Institution of Higher Learning (Singapore Polytechnic) through the innovative synergy of 3 technologies, i.e. biometrics security, RFID technology and intelligent robotic arm mechanics. This is in line with the Singapore government's directive of promoting the Public and Private Partnership Programme (PPP).

When developing iCollect, many test scenarios were conducted to simulate possible impersonation attempts for collection of documents during the Site Acceptance Testing. Hence, iCollect has incorporated robust anti-impersonation measures in its design of the two-factor biometric verification checks.

Prior to the soft launch of iCollect, many rounds of user acceptance tests were conducted. They were conducted both at the factory and at eLobby@ICA without any occurrence of hardware or system failure. A transportation stress test was also conducted using up to 1,500 documents to ensure the accurate alignment of robotics.

In order to improve the system from the customer perspective, focus group discussions were conducted with ICA participants to streamline the operational workflow and collection process at iCollect. Constructive feedback was gathered for fine-tuning of the system user interface and the collection process, thus ensuring that the product is customised to the needs of its customers.

Believed to be the first of its kind, iCollect allows Singapore citizens, permanent and foreign residents to self-collect their passports, Identity Cards and Long Term Pass cards after their identities have been verified via biometrics – fingerprint and facial verification. On 1 April 2013, the iCollect, using automated collection jukebox concept combined with biometrics security, robotic arm and RFID technology, was launched officially. Again, this new initiative is consistent with the 3M principle in terms of collection process.

Now that ICA has successfully implemented the offsite self service collection of our secured documents, we believe that the self-service collection concept can be adopted by other government departments that issue secure documents such as passes, permits and licences.

There are also plans to extend the self-collection concept at ICA counters with the use of RFID technology, pneumatic tubes for distribution and biometric verification for applicants to collect their documents at unmanned counters. The implementation of this project will enhance productivity and reduce overall reliance on manpower in the document collection process.

ALTERNATIVE SITE COLLECTION (ASC) INITIATIVE

There has been a tendency for Singapore citizens to come personally at ICA to collect their passports at the same time i.e. Mondays, Fridays, Saturdays, the eve of public holidays, and before and during school holidays. This is a phenomenon which is hard to change due the fast-paced and busy lifestyle of many Singapore citizens. Where some countries may advocate the introduction of daily collection quotas on their citizens, ICA tries its best to be customer-centric.

While ICA has introduced multiple channels for submission of passport applications through by post, by drop-in deposit box, online or over the counter, there had been no additional option or channel for passport applicants to collect their passports besides the ICA Building. Offering alternative collection sites is therefore the next natural step to take in order to reduce the waiting time for ICA's customers.

The self-collection platform holds great potential – the possibility of providing more ICA documents for collection using mobile biometric authentications at multiple locations chosen by eligible customers. With this, it is foreseeable that the iCollect concept can be the launch pad for ICA to move towards the possibility of providing doorstep delivery of ICA documents using existing 'portable biometric verification devices', to facilitate document collection on the fly.

The advent of iCollect demonstrates that ICA's earlier investments in innovation have helped create a synergy allowing for out-of-box conceptualisation and implementation of delivery protocols. In essence, when we connect the dots, we see that innovation begets more innovation.

"When we connect the dots, we see that innovation begets more innovation."

As illustrated in Figure 3, through anticipating customer needs and the application of 3M, ICA can not only provide greater access and timeliness in the service delivery of the Singapore passport, but also influence customer perceptions of how ICA services can be delivered without compromising security.

TAKING THE LEAD IN ENHANCING GLOBAL BORDER SECURITY

Pioneering the key encryption technology

The Singapore passport story has not stopped within Singapore boundaries. Singapore spearheaded the concept of a Public Key Directory (PKD) system through ICAO to e-passport authorities and was one of the six founding members to set up an ad-hoc Public Key Directory Board in 2006, comprising the UK, US, Australia, New Zealand and Canada. The PKD is designed to be used by all e-passports issuing authorities to improve global security and operational efficiency. It allows immigration border agencies to extract the country signing key for the purpose of passport authentication and border clearance at foreign immigration checkpoints.

The PKD system was formally commissioned in March 2007 and Singapore was appointed by ICAO Council as one of the seven PKD board members for three years. The PKD Board advises the ICAO on technical, financial, and policy decisions for the implementation of the ICAO PKD. Re-elected twice for consecutive terms on the PKD Board owing to our active contributions in development of PKD, Singapore will now be on the Board until November 2016. In the most recent election, Singapore received 100% votes from eligible participants

"In the most recent election, Singapore received 100% votes from eligible participants – a testament to Singapore's significant standing in the international passport forum."

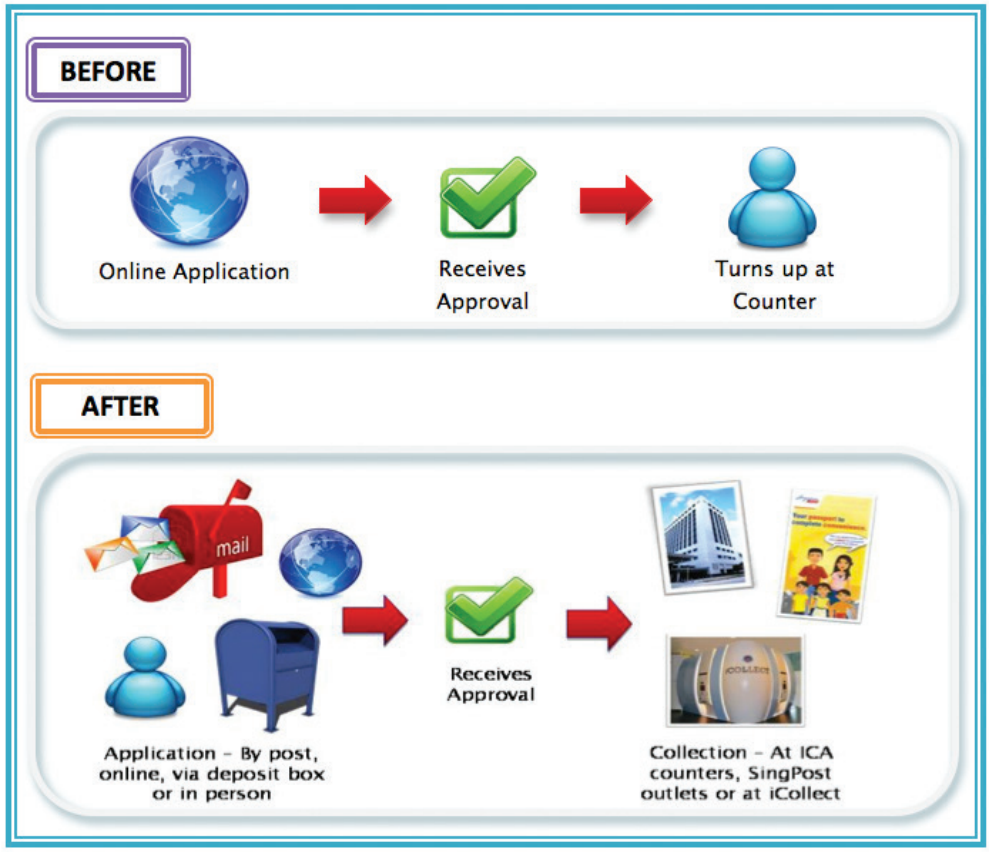


Figure 3: Improvements in service delivery for the Singapore Passport

– a testament to Singapore's significant standing in the international passport forum.

Extended Access Control

Besides putting in place internal measures to keep passport abuse in check, Singapore actively participates in global efforts to enhance the security of our passports. Singapore's BioPass has been compliant with ICAO's 'write-once' policy from day one. The 'write-once' policy does not allow any changes to the holder's particulars (including the photograph) once the passport is issued. Under this policy, the BioPass holder will have to apply for a new passport if he needs to update any of his personal particulars. This prevents the passport from being tampered with and used for criminal means. Singapore has taken a further step to ensure passport security by implementing the Extended Access Control (EAC), a protection mechanism for additional biometrics (fingerprint) to be included in the BioPass.

Singapore is the first country to implement an enhanced EAC for secondary biometrics, which allows a secure and protected mechanism of storing the additional biometrics in the BioPass. Our proposal of the enhanced EAC has been supported by the New Technologies Working Group (NTWG),

"Singapore is the first country to implement an enhanced Extended Access Control for secondary biometrics, which allows a secure and protected mechanism of storing the additional biometrics in the BioPass."

which deems our concept to be a simple and static solution suitable for international use.

LOCAL AND GLOBAL CHALLENGES

As ICA continues to deliver public service, our operating landscape continues to evolve, with new threats emerging. Globalisation and advances in technology have changed the dimensions of time and distance. These have a significant impact on document (passport) security, because threats can develop quickly and can be omni-directional, where terrorist groups can assert themselves in the space created by weaknesses in the linkages. It is therefore critical for passport issuing authorities to guard against the possible forgery of passports and other travel documents, which can be exploited for the purposes of terrorism.

It is not possible to do this in isolation. With the increasing attractiveness of international civil aviation as a target; and with the additional challenges presented by developments in the way we communicate, success is more than ever dependent on strong collaboration with like-minded partners overseas.

In this connection, ICA cannot afford to be complacent. While the existing BioPass has never been successfully forged or replicated with its current security features, forgery syndicates are becoming more complex and tech-savvy. It is therefore in the pipeline for ICA to raise our game with a next generation of biometric passports in the next five years. By engaging technical experts in formulating e-Passport standards, this move allows ICA to incorporate new technologies into the Singapore BioPass and deter people from misusing our passports, hence upholding the integrity of the Singapore passport, and facilitating our citizens' travels overseas.

"While the existing BioPass has never been successfully forged or replicated with its current security features, forgery syndicates are becoming more complex and tech-savvy."

CELEBRATING SINGAPORE'S PASSPORT

Since the advent of the Singapore BioPass, it has been heralded as a highly-secure travel document, with many countries making visits to ICA to learn about our planning, design and implementation of the Singapore passport. Developed countries like New Zealand, Hong Kong and Australia have sought to pick up some of the key features of Singapore's BioPass for their reference in enhancing their passport design as well as electronic passport (e-passport) systems.

From a 32-page booklet with few security features to a 64-page biometric passport; from over-the-counter applications to an array of application choices including submission by post or online; from collecting the Singapore passport from ICA Building to multiple collection sites all over the island and even self-service collection, the Singapore passport has evolved through changes in passport technology, resource constraints, paradigm shifts and ever-rising customer expectations. Our little red book has indeed come a long way in four decades. And the story of the Singapore passport will continue to unfold.

ENDNOTES

[1] The passport processing fee is $80. To encourage applicants to apply for passports away from ICA Building, applicants enjoy a $10 rebate if they apply for their passports through non-counter means i.e. by Post or Deposit Box or online via APPLES. Thus, for these non-counter submissions, the passport fee is $70, while applications over the counters cost $80.

EDITOR'S NOTES

Mr Tan Kok Guan is the Director of the Citizen Services Centre in the Immigration & Checkpoints Authority (ICA). He leads a team in performing the identification functions of Singaporeans from cradle to grave. This includes birth and death registration, issuance of identity card, grant of Singapore citizenship, as well as the issuance of Singapore passports. Mr Tan has been with the public service for 33 years, and held several leadership positions in the then-National Registration Department and then-Singapore Immigration & Registration. He was awarded the Efficiency medal in 1994, as well as the Long Service medal and Public Administration Bronze medal in 2002.

Mr Tan is a strong advocate of harnessing innovation to streamline work processes, where his passion led him and his team to successfully undertake the National Registration Identification Card (NRIC) conversion exercise for all Singapore NRIC holders in 1991. To this day, Singaporeans are still using the version of polycarbonate credit-card sized NRICs introduced then. In 1995, the team went on to implement an online system for citizens to report their change of addresses at ICA or at police neighbourhood posts/centres, with the updated data transmitted to participating government agencies as a one-stop whole-of-government service (OSCARS). Later in 2002, they pioneered the online application service for Singapore passports (APPLES) in 2002, and more recently in April 2013, they launched the unprecedented self-service secured document collection machine, iCollect.

Co-authoring the article is Deputy Superintendent (DSP) Kong Yong Sin, who is the 2nd Deputy Head of Passports Unit in the Citizen Services Centre. Before her current post, she has served with the Tuas Checkpoint and the Corporate Communications Division of ICA. In her latter stint, she had the opportunity to work with MediaCorp to showcase ICA's works on national television for the first time, through a Channel 5 drama serial, Point of Entry (POE), which aired its debut in December 2010.

CURRENT EVIDENCE-BASED PRACTICES IN THE SINGAPORE PRISON SERVICE

By Timothy Leo

INTRODUCTION

The mission of the Singapore Prison Services (SPS) is the protection of society through the safe custody and rehabilitation of offenders, with the vision of a society without reoffending. Key to this mission is to find out 'what works'. To achieve this, successful overseas practices are studied to distil what best practices may be applied to the Singapore context. While they are evidence of what works, these best practices are evaluated to identify their effectiveness within SPS. Understanding and using 'what works' in the SPS is the essence of evidence-based practice. SPS has developed evidence-based practices throughout its organisation as a means to best achieve its vision of a society without reoffending.

"SPS has developed evidence-based practices throughout its organisation as a means to best achieve its vision of a society without reoffending."

Evidence-based practice is the use of best available empirical evidence to govern the techniques and approach used by SPS to best carry out its goals. This moves away from value-driven decision-making based on theories from 'common sense', and that offers little in effectiveness or measurability. An evidence-based approach allows for decisions on best practice to be coherent and justified. It offers a clear decision making process that focuses on value-free judgements based on the best available evidence.

The drive for SPS to be evidence-based in its practices has culminated in the formation of two Divisions, the Rehabilitation and Reintegration Division (RRD) and the Psychological and Correctional Rehabilitation Division (PCRD). The RRD focuses on the development of policies and frameworks to facilitate the rehabilitative and reintegrative efforts, engaging and collaborating with external agencies for rehabilitation or reintegration purposes. The PCRD functions as the scientific think-tank for rehabilitation programmes, to assess and deliver criminogenic interventions to offenders, provide specialised training and support to Prison staff and community partners. Correctional research and programme evaluation also come under the purview of the Division.

SPS rehabilitates its inmates based on the Risk, Needs and Responsivity (RNR) model developed by D. Andrews and J. Bonta (2001). The RNR model is a well-researched rehabilitation model that has been found to be empirically robust. The basis of the model is that criminal risk factors have cognitive and behavioural markers that can be used to determine the risk of future criminal behaviour. These criminal risk factors have associated static and dynamic aspects. The dynamic factors are known as criminogenic needs of the offenders and are seen as the pathway to change reoffending behaviour in offenders. To reduce the risk of reoffending, the criminogenic needs of the offenders are

"To reduce the risk of reoffending, the criminogenic needs of the offenders are targeted with interventions that will change the way they deal with their problems or give them the cognitive resources to make changes to their lives."

targeted with interventions that will change the way they deal with their problems or give them the cognitive resources to make changes to their lives. The responsivity of the inmate determines if the inmate receives an intervention and the type of intervention the inmate receives. The inmate's responsivity is used to maximise the intervention to suit each inmate. This model is a cornerstone of rehabilitation literature, stating that high risk offenders should be placed in more intensive interventions based on their responsivity and should focus on their criminogenic needs. Low-risk inmates should be kept out of intensive interventions so as to prevent contamination from increased association with higher risk inmates, diminishing their existing strengths and positive relationships. Research has shown that interventions that adhere to the RNR principles have had significant reduction in reoffending (Gendreau, 1996; Landenberger & Lipsey, 2005). Furthermore, programmes that fail to adhere to the principles of RNR often do not affect reoffending rates or may even end up increasing the rate of reoffending (Bonta & Andrews, 2007).

ASSESSMENT FRAMEWORK

RNR's foundation is in risk management and thus requires the use of strong credible classification tools to differentiate the risk of offenders. Risk assessment tools have grown in strength and evidence has shown that they are able to predict with reasonable accuracy the probability of an offender committing another crime (Bonta & Andrews, 2007). The Level of Service (LS) series of assessment tools have been shown in studies to have a high level of reliability and validity in generating the risk profiles of offenders (Andrews et al, 2011). Following the strength of such evidence, SPS started using the Level of Service Inventory–Revised (LSI-R) tool to classify offenders in October 2000. The scoring of the risk assessment tool was normalised to our local population so as to provide the best accuracy for our local context.

The introduction of the risk assessment tools serves as the impetus for a shift towards the evidence-based practice of structured decision-making. Structured decision-making refers to a formal and standardised procedure for guiding decision makers with defined criteria during their deliberations. The key principles that guide this practice are objectivity, consistency, transparency, and defensibility. Objectivity is maintained by adhering to evidence-informed practices driven by the principles of effective rehabilitation. An evidence-informed approach also ensures consistency of decisions across time and decision makers. The structured approach further ensures fairness to all offenders. It is transparent and accountable to various stakeholders (e.g., courts, offenders, decision makers). The objectivity and evidence-informed approach ensures that this practice is defensible if such a need arises.

The classification of adult prisoners is essential to the SPS' goal of rehabilitating offenders to prevent reoffending. SPS' assessment framework is conceptualised and designed to guide its assessment processes for inmates throughout their incarceration. The assessments are designed to identify an inmate's (1) general risk of re-offending, (2) criminogenic needs and specific risk of re-offending, (3) non-criminogenic needs, and (4) responsivity issues. This is in line with the strongly established RNR principles and the current framework ensures that the inmates are appropriately matched to suitable rehabilitation programmes, thus maintaining the integrity of the evidence-based interventions practised in SPS.

A robust classification capability is essential to enable the accurate and systematic selection of inmates for rehabilitation. From 2011, SPS moved from the Level of Service Inventory–Revised (LSI-R)[1] and began using the Level of Service/ Case Management Inventory (LS/CMI; Andrews, Bonta & Wormith, 2004) for assessments of the adult offenders. These assessment tools use a structured interview to assess the risk and needs of the offenders. The level of service family of tools evaluate the central eight domains that have been shown to have strong associations with the risk of reoffending. The eight domains are made up of four strongly established risk

factors of reoffending, which are: criminal history, antisocial personality pattern, antisocial cognition and antisocial associates; as well as four more moderate risk factors of reoffending, which are: substance abuse, employment instability, family problems and low engagements in pro-social leisure activities.

The reason for the change was to include a portion for case management and the need to shift to using a 4th generation risk assessment instrument which documents specific responsivity factors, in keeping with best practices. Evidence has shown that the questions asked by the tool are consistent in establishing the associated risk factors of the central eight domains across multiple samples and populations (Bonta & Andrews, 2007). The data from the original Singapore LSI-R validation study was also used to determine the scoring norms for the LS/CMI, as was reflected by the best practice in the LS/CMI manual.

SPS' current rehabilitation classification process plays a significant role in supporting evidence-based practices in the Service. The LS/CMI is a fully functioning case management tool that informs the user of an individual's general risk of re-offending. This single application provides the essential framework needed to help plan treatments and manage offenders. This assessment framework ensures that intervention plans made by Prison officers are guided through risk classification and targeting relevant treatment.

Besides the use of LS/CMI, there are other highly validated tools that are used to assess specific risk. For example, violence risk of an offender is assessed by the Violent Offender Risk Assessment Scale (VORAS; Howells, Watt, Hall & Baldwin, 1997) and sex offenders are assessed by STATIC-99 (Hanson & Thornton, 2000), a validated actuarial tool that taps 10 static factors to inform whether possible criminogenic intervention or further risk assessment is required. These tools determine the level of risk the offenders pose and if there is a need for the offender to receive further assessment.

Given the extensive reach of the rehabilitation classification process and its implications on Prison's rehabilitation efforts, measures were put in place to ensure that the assessment process is operating at appropriate service quality standards. This is so that there is consistency and reliability in the scoring and classification process. The SPS' Intake Rehabilitation Classification process was first certified as meeting ISO 9001[2]:2000 standards on 20 February 2003 and obtained ISO 9001:2008 certification in 2009; this has been maintained to date. The formation of a unit to look at the management and development of the rehabilitation classification process has also ensured quality and that monitoring of the classification process is carried out appropriately. The continuous review of the assessment framework is necessary to maintain a robust and relevant classification system. This ensures that information gathered during assessment is useful and relevant for inmate management and rehabilitation.

PROGRAMME DEVELOPMENT

The employment of evidence-based practices and principles has resulted in many advances in programme development and delivery. SPS has conducted many literature reviews to ensure that the programmes in the organisation adhere to the principles of effective rehabilitation. Fundamentally, the current treatment programmes in SPS are based on Cognitive-Behavioural Treatment (CBT) practices and Motivational Interviewing (MI) principles. There is plenty of literature to suggest the effectiveness of these two methodologies

"Fundamentally, the current treatment programmes in SPS are based on Cognitive-Behavioural Treatment (CBT) practices and Motivational Interviewing (MI) principles. There is plenty of literature to suggest the effectiveness of these two methodologies in the field of offender rehabilitation."

in the field of offender rehabilitation (Landenberger & Lipsey, 2005; McMurran, 2009). Notably, the responsivity principle of the risk-need-responsivity (RNR) model mooted that treatment programmes and interventions should be founded on CBT and MI principles due to the large effect sizes found for rehabilitation programmes that use these two methodologies.

Within the prison, there are a number of treatment programmes that were developed following such treatment theories. The first generation of programmes based on these treatment theories were MOVE (Managing and Overcoming ViolencE) and 3R (Respect, Responsibility, Restraint), developed to address general violence and sexual violence respectively. Following these, the DATP (Drug Abuse Treatment Programme) and the STAR-CT (Stop, Think, Alter, Respond – Correctional Trainees) programmes were developed based on these same treatment theories. DATP was developed for drug offenders while STAR-CT was developed for high-risk offenders with general criminal behaviours. Key innovations during this phase of programme development included incorporating a motivational phase in the treatment programmes as well as a process known as cognitive restructuring. Currently, MOVE has been revised for youth offenders with violent offences. STAR-CT has been replaced by a new programme that similarly addresses general criminal behaviours. Both 3R and DATP are still running in the Prison Service.

In 2008, programme development took on a new direction. A new rehabilitation theory, the Good Lives Model (GLM), was gaining ground in the correctional literature (Ward & Brown, 2004). SPS decided to develop new treatment programmes that will attempt to include elements from GLM in its programme model. The identification of 'primary goods', or the intrinsic desires of humans, and approach-goal solutions were key introductions to this generation of treatment programmes. The two new treatment programmes developed from this move were TAC-TIC (Thinking About Change – Thinking Influencing Change) and KICKSTART. TAC-TIC addresses general criminal thinking whereas KICKSTART addresses substance abuse problems. KICKSTART is currently not running due to resource constraints, while TAC-TIC is being run at the Reformative Training Centre (RTC) for youth offenders with general criminal behaviours.

In the same year these developments were taking place, SPS piloted a programme that was adopted from the United States called 'MANALIVE'. 'MANALIVE' is an open-group CBT-based violence treatment programme. Apart from adopting CBT practices, 'MANALIVE' incorporated elements similar to narrative therapy within the programme. The treatment programme includes a process that generates separate narrative identities for the participants which in turn facilitates the externalisation of their violent behaviours and increases their hope for change. Preliminary analyses revealed a good effect size for the treatment programme, and 'MANALIVE' is currently provided for adult violent offenders.

'MANALIVE' sparked an important step in programme development. Apart from the GLM, there was also a growing interest in the area of desistance. Desistance is the process in which offenders cease their offending behaviours and refrain from offending over an extended period of time (Maruna, 2001). The treatment methods of 'MANALIVE' were aligned to the factors that the literature of desistance purported would increase an individual's chances of desisting from crime. Specifically, this involved the importance of hope and the "knifing off" of a criminal identity (Maruna & Roy, 2007). 'MANALIVE' was crucial in providing Prisons with insights into how these factors can be operationalised in a treatment programme. The 'MANALIVE' experience initiated an attempt to integrate RNR, GLM and desistance as a coherent programme model. The integration of these rehabilitation theories has an important influence on the current landscape which has led to new programme developments.

EVALUATION SYSTEM

The concept of programme evaluation within Prison was first proposed in 2005. Since then, SPS has embarked on several programme evaluation efforts. The programme evaluation unit in the Prison Service tracks the performance of all criminogenic programmes through a monitoring and evaluation framework that details the necessary structures such as programme development, implementation, and maintenance. Two types of evaluations, process and outcome, are carried out under this framework. In process evaluations, implementation and quality of programmes are examined to determine whether they are carried out as planned, running smoothly, and are in line with industry standards. Outcome evaluations, on the other hand, investigate whether programmes are effective in achieving their intended aims.

The process evaluation of treatment programmes within the Prison Service involves the continuous monitoring of key processes and activities through data collection and analysis, site checks, and stakeholder meetings. This ensures that the programmes are implemented according to design. In addition to monitoring programme processes and activities, offender treatment programmes are also reviewed on a yearly basis against industry standards. For this purpose, the evaluation standards are benchmarked to internationally recognised standards and practices for correctional interventions (Latessa, 1999; Latessa & Holsinger, 1998). Items in the review checklist correspond to the characteristics and features of effective correctional programmes identified in the 'what works' literature, and hence facilitate evidence-based practice in the treatment programmes delivered within the Service.

Evaluating existing as well as new programmes is an essential process to ensure the integrity of evidence-based practices in the SPS. The findings from programme reviews are documented in annual reports that serve to inform stakeholders of the 'health' of the programmes. This allows stakeholders to identify and close gaps in their treatment programme, and hence allows for continuous improvement.

Process evaluations also help to ensure programme integrity and set the stage for an outcome evaluation, as it allows findings about the effectiveness of the treatment programmes to be attributed to the execution of programme activities. In the context of treatment programmes run by SPS, effectiveness is measured in terms of the programme's ability to reduce the attitudes of offenders that support criminal behaviours, as well as recidivism.

In 2006, a consultancy team from the University of South Australia (UniSA) was brought in to review and evaluate selected treatment programmes. Of the five treatment programmes in operation at present, three were formally evaluated by the external consultants between 2006 and 2008 and showed positive findings with regard to effectiveness in achieving programme goals. Since 2010, programme reviews of the five treatment programmes in operation have shown that they possess the main components of effective correctional intervention, and generally conform to industry best practices. Having determined their stability and integrity, these treatment programmes are ready for a formal outcome evaluation study that commenced in July 2012 and represent a collaborative effort with Deakin University, Australia. The aim of the collaboration with Deakin University is to improve the capacity and capability of the Service to provide high quality and evidence-based services that are in line with current internationally accepted best practices.

In addition to formal evaluation studies, SPS also evaluates the pilot runs for newly developed treatment programmes. Findings from pilot evaluation studies aid management in making decisions on whether programmes should be

"Evaluating existing as well as new programmes is an essential process to ensure the integrity of evidence-based practices in the SPS."

continued and how the programmes should be deployed. For example, 'MANALIVE', a violence intervention programme, was piloted separately on youth and adult populations. Findings of the pilot evaluation study for 'MANALIVE' showed that the programme was more effective in treating the local adult population, and the management decided to continue running the programme for adult offenders only.

Needs analysis, an evaluation activity, is also conducted on a regular basis to investigate the treatment needs of offenders and to identify gaps in the interventions provided to the various inmate populations. One such profiling study conducted in 2010 identified a gap in the programming given to high-risk offenders. The study found that high risk offenders had multiple criminogenic needs. As the existing criminogenic programme, 'STAR-CT', used in the treatment of high risk offenders only addressed a single risk factor (antisocial cognitions), the programme was found to be inadequate in meeting the treatment needs of that population. A decision was then made to develop a new programme from scratch to replace STAR-CT. The new specialised treatment programme, known as the Integrated Criminogenic Programme (ICP), incorporates the latest in correctional treatment research, as well as addresses gaps identified in previous programme reviews.

The monitoring and evaluation system in SPS allows for the learning of what has or has not worked in the types of evidence-based treatment delivered to the local offender population, and facilitates continuous improvement to the quality of treatment.

RESEARCH

Research is another process in place to ensure continuous development and quality improvement in the Service. The research agenda focuses on four broad areas:

1. Advance rehabilitation and reintegration efforts to prevent offending and re-offending,
2. Enhance inmate management and operational capabilities,
3. Enhance management and rehabilitation of special populations, and
4. Develop staff capabilities in the correctional environment.

The first focal area is advancing rehabilitation and reintegration efforts to prevent offending and re-offending. This includes validation studies of assessment instruments and questionnaires used in Prison, such as the LSI-R and Corrections Victoria Treatment Readiness Questionnaire (CVTRQ). CVTRQ is used to assess offenders' motivation to change and offenders' suitability for specific intervention programmes in SPS. It is also used in programme evaluation studies. These validation studies ensure that the tools used to inform evidence-based practices are valid and relevant for the local population.

The second focal area is the enhancement of inmate management and operational capabilities. The research branch conducts evaluation of inmate management regimes. Evaluations are conducted to ensure that they are effective in maintaining order and reducing infractions within the institutions. The outcomes of these evaluations will serve to inform management about policies dealing with the general inmate population. Maintaining order and reducing infractions help support the effectiveness of our treatment programmes as it ensures smooth running of the evidence-based practices in SPS.

Another focal area of research in SPS looks at enhancing management and rehabilitation of special populations such as youths and females offenders. This involves studies on special populations to identify the specific criminogenic needs of these populations. Findings from these studies provide the empirical evidence to tailor

"Findings from these studies provide the empirical evidence to tailor interventions to better meet the criminogenic needs of these special populations, thus allowing interventions to be delivered in a way which maximise responsivity."

interventions to better meet the criminogenic needs of these special populations, thus allowing interventions to be delivered in a way which maximise responsivity. One of the studies that SPS has embarked on is the drug profiling study. The Service collaborated with the Central Narcotics Bureau (a law enforcement agency focused on drug-related crime) and the Home Team Behavioural Sciences Centre (a research centre supporting the work of the Ministry of Home Affairs and its Departments) to study the profile of first-time drug abusers in Singapore. The findings of the study contributed to national strategies to combat drug-related crimes and to provide evidence-based interventions for drug offenders. Another research project was the evaluation of the effects of nutritional supplements on antisocial behaviours in young offenders. Any significant findings from this study may add to the management and rehabilitation strategies for young offenders. Such research helps ensure that practices in SPS are evidence-based and are carried out in an effective and targeted manner.

The fourth focal area of research looks at developing staff capabilities in the correctional environment. For instance, research studies were carried out to look at the interaction between job and personal resources amongst correctional staff and its subsequent impact on levels of work engagement. This study provided support for the ongoing development of staff interventions targeted at strengthening personal resources and suggested the presence of other factors that buffered against increased job demands and lower job autonomy among officers in maximum security institutions (Menon, Chua, & Ho, 2011). The SPS research branch also conducted a re-validation of an array of psychological assessment tools used in the recruitment process to update scoring norms for more effective assessment and recruitment of prison officers. Overall, these studies help inform the steps needed to develop staff capabilities to further ensure that evidence-based practices are carried out in an effective and efficient way.

STAFF TRAINING AND SUPPORT

In conjunction with the shift in the role of a correctional officer as defined by the Captains of Lives (COL), there was a need to equip correctional officers with the necessary skills and knowledge to fulfil that role. A training framework was designed to ensure that new correctional officers are sufficiently trained in basic knowledge regarding offender rehabilitation, mental health issues relevant to offender population as well as basic counselling skills. Additionally, there is a need to provide evidence-based support systems to assist staff to excel in their roles as COLs.

1. Mental Resilience

It is established in literature that correctional staff are exposed to unique and powerful stressors including the physical danger of the working environment and stress associated with dealing with problematic inmate behaviours. This can potentially lead to high burnout rates among correctional staff, affecting their personal well-being and the quality of work. The SPS recognises the importance of mental resilience of staff and the possibility of staff burnout. A Mental Resilience (MR) team consisting of psychologists was set up in 2003 to develop mental resilience capacity of staff and provide critical incident crisis support for staff and inmates.

Since the set-up of the MR team, Prison staff have been receiving training in stress management skills. The trainings are pegged at various levels depending on the seniority and appointments of the trainees involved, as well as the types of inmates they are working with (e.g., youths, violent inmates, and defiant inmates). The MR team took an important step recently to engage Professor George Everly, a leading psychologist in the area of resilience, to train ground leaders to display leadership behaviours that will foster a resilience culture within their teams. The training, called Resilient Leadership training, is based on validated theories and empirical evidence and was developed by the Resiliency Sciences Institutes and Johns Hopkins University.

2. Critical Incident Response System

In addition to resiliency training, SPS is well-positioned to respond to critical incidents experienced by its staff. Critical incidents are defined as unusually challenging events that have the potential to create significant distress and can overwhelm one's usual coping mechanisms. The SPS adopts the Critical Incident Stress Management (CISM) approach to deliver crisis intervention. CISM is an integrated multi-component continuum of crisis and intervention services developed by George Everly and Jeffrey Mitchell (1999). It has also been found to be effective in reducing distress related to assaults upon healthcare staff (Flannery, in press). Numerous studies support the efficacy of CISM in promoting post-crisis recovery and reducing the development of acute stress symptoms or PTSD.

CONCLUSION

Since 1998, SPS has transitioned towards an evidence-based organisation. This transition is emphasised by its updated mission and vision in 2000, to protect society through the safe custody and rehabilitation of offenders. Since then, the Prison Service has vigorously sought learning opportunities from overseas counterparts to achieve rapid knowledge transfer and to assist in fine-tuning organisational systems and work processes. The ambition of the Service in ensuring top quality services both in operations and rehabilitation has resulted in a strong thirst for knowledge in evidence-based practices. The current evidence-based practices within the SPS system have been carefully selected and developed through research, leadership dialogues and gathering of feedback from both correctional and professional staff. The development of research and programme evaluation capabilities will ensure that the evidence-based practices continue to influence and guide rehabilitation efforts currently and into the future.

"The ambition of the Service in ensuring top quality services both in operations and rehabilitation has resulted in a strong thirst for knowledge in evidence-based practices."

ENDNOTES

[1] LSI-R is a 3rd generation risk assessment tool that examines the risks and needs of offenders interviewed.

[2] The ISO 9001 certification process is the premier means of showing the achievement and maintenance of high service standards.

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EDITOR'S NOTES

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THE STAGES OF CHANGE IN THE REHABILITATION OF TERRORIST OPERATIVES

THE SINGAPORE EXPERIENCE

By Counter-Terrorism Operations Division, Internal Security Department

THE REHABILITATION PROGRAMME

To neutralise the threat posed by terrorists, it is not sufficient to just apprehend and detain them to disrupt their networks and terrorism plots. In Singapore, the Internal Security Department (ISD) has been running a holistic rehabilitation programme in partnership with various Muslim organisations to ensure those detained for terrorist activity do not re-engage in such activity upon their release. Detainees and Restriction Order (RO) supervisees receive counselling from psychologists employed by ISD as well as religious guidance from the Religious Rehabilitation Group (RRG) and welfare assistance from the Inter-Agency Aftercare Group (ACG), which is a network of Malay-Muslim organisations. The focus of the Singapore programme is to maintain the safety and security of Singapore, which is to prevent people with a commitment to violent extremist ideology from engaging in terrorist-related activities. As ISD's research on the Singapore detainees has shown that radical ideology is central to their going down the path of terrorism, a huge component in the rehabilitation programme is aimed at weaning them away from the radical ideology.

The Singapore rehabilitation programme consists of three components: psychological rehabilitation, social rehabilitation and religious rehabilitation. Throughout their detention, detainees are visited regularly by psychologists, who provide psychological counselling and assess their ability to cope with the mental stressors of detention as well as their psychological reasoning to establish their propensity for hatred and violence, and vulnerability to radical influence. The psychologists also assess behavioural and cognitive aspects of the detainees' progress in rehabilitation.

Social rehabilitation in the form of social support is also given to enable the detainees to reintegrate smoothly into society upon release. The family also plays a significant role in this regard. Detainees are granted family visits to preserve the family unit as much as possible. An aftercare officer is assigned to each detainee's family to provide social and financial support for the detainees. The support provided by the ACG ensures that the family remains functional. Detainees can then focus on cooperating with the investigation and rehabilitation. Regular interactions with ISD case officers also provide the detainees with another source of social affiliation and support. Regular assessment, monitoring and guidance by the case officers are also conducted. Efforts are also undertaken to help detainees improve their academic and other vocational skills. This is to help the detainees find employment upon release.

"Detainees are granted family visits to preserve the family unit as much as possible. An aftercare officer is assigned to each detainee's family to provide social and financial support for the detainees. The support provided by the Inter-Agency Aftercare Group (ACG) ensures that the family remains functional. Detainees can then focus on cooperating with the investigation and rehabilitation."

The religious rehabilitation aspect of the programme is conducted by the RRG whose members are volunteer religious teachers and scholars acting in their individual capacities. They conduct regular counselling sessions with

the detainees and RO supervisees to educate them on the proper teachings and interpretations of Islam to counter the radical ideology they had imbibed previously.

Studies (Prochaska, Velicer, DiClemente & Fava, 1988; Prochaska, DiClemente & Norcross, 1992) have found commonalities in the manner people modify their behaviour. They showed that it was necessary to assess the client's level of readiness for change and to customise interventions accordingly. Thus, through interviews with detainees and RO supervisees, ISD psychologists have identified seven positive changes that take place in the course of rehabilitation.

This paper describes the seven stages of change, from a psychological perspective, seen in individuals detained by ISD for involvement with regional terrorist groups, as they disengage from radical ideologies to finally renouncing the use of violence. The stages described in this paper do not necessarily follow a fixed pattern. They develop in different directions for different individuals. In some cases, the stages feed off one another in a mutually reinforcing way. In other words, they strengthen one another as they interact. The stages are illustrated using public comments made by former detainees and RO supervisees who have been through the ISD rehabilitation programme. The examples cited here are of necessity few, but are representative of the dozens who have been released from custody.

"This paper describes the seven stages of change, from a psychological perspective, seen in individuals detained by ISD for involvement with regional terrorist groups, as they disengage from radical ideologies to finally renouncing the use of violence."

Stage 1 – Self Re-Evaluation

During the initial period of detention, detainees begin to reflect on their past actions and their consequences. According to M, an ex-member of Jemaah Islamiyah (JI) who had received military training in Afghanistan, 'When the detention order was served to me, I accepted the danger that I had posed to national security' (Hussain, 2012). Another former JI member felt that he was fortunate in that he was arrested in Singapore, otherwise he would have been deeply involved in JI activities and committed more harmful and serious acts (Ibrahim, 2007). This detainee felt guilty and remorseful for all that he had done, and felt that the move by the JI members to create chaos in Singapore had tarnished the good name of the Muslim community here. 'We had not been fair. Because of the actions of a minority, the majority Muslim community had to bear the brunt. I am guilt-ridden,' he said.

By not being defensive about their past actions, detainees are able to appreciate the process of self re-evaluation in their reflections.

Stage 2 – Environmental Re-Evaluation

A re-evaluation of their environment occurs when radicalised individuals realise that they have wrongly assumed that their actions are supported by the community-at-large. During detention, this assumption is debunked when their radical beliefs are denounced by religious counsellors and, sometimes, by their family members as well.

A former JI member shared: 'My wife was not really aware of my involvement in JI but she was anxious when I left for the Philippines… I was deeply contrite. My children could not accept (my detention). My older children were devastated and under a lot of stress. They asked my wife why I did all these (referring to his involvement with the JI). I was very sad. They went through the most trying time and endured it.' (Ibrahim, 2007)

In another example, 'Abu Harith', another former JI member, said: 'When (my wife) learnt about my JI activities, she was disappointed and angry that I did not confide in her, and had betrayed

her trust. She was ashamed of my actions and could not even face her family… My brother who visited me was very angry. He asked me if I wanted to kill him with the bomb at Yishun MRT. I did not know what to say. I was ashamed and remorseful.' (Abdul Rahman, 2013)

"My brother who visited me was very angry. He asked me if I wanted to kill him with the bomb at Yishun MRT. I did not know what to say. I was ashamed and remorseful."

Through their interactions, detainees eventually realise that radical Islamic scholars who supported armed Jihad misinterpreted Islamic religious texts and their ideas promoting hate and violence are not accepted by the mainstream.

Stage 3 – Formation Of Therapeutic Relationships

Through their care and concern for the detainees and their families, the case officers and counsellors develop a close rapport and therapeutic relationship with the detainees. The detainees then develop confidence that the help and advice rendered are well-intentioned and will be of benefit to them and their families. Former JI member M said: 'Throughout (my) detention, I was treated well, and given encouragement and guidance when required. This on its own was an encouraging factor.' (Hussain, 2012)

Another ex-JI member 'Abu Harith' shared: 'What kept me going was the constant support I received – from the doctors and psychologists and members of the community who volunteered their time to counsel me. Everyone had words of advice and comforted me. My case officer played a very vital role… The people I once deemed kafir (infidels) and enemies of Islam were the source of my strength. The one who opened my eyes to true Islam was a non-Muslim.' (Abdul Rahman, 2013)

As time passes, a trusting relationship is developed between the detainee and his case officers. This leads to the detainee becoming more cooperative with investigations and rehabilitation efforts.

Stage 4 – Awareness of Radicalisation Pathway

Through interactions with case officers, psychologists and religious counsellors, the detainees become aware of the factors and processes leading to their radicalisation. 'Abu Harith' conceded that he was gradually indoctrinated by the JI (Abdul Rahman, 2013). He recalled that the turning point for him was when he listened to Abdullah Sungkar citing the first few verses of Surah Al-Baqarah (the second chapter of the Quran); it hit him hard that he had neglected his religious duties.

According to 'Abu Harith', in 1991, he travelled to Negri Sembilan to attend a religious lecture and was introduced to Abdullah Sungkar, the founder of the JI which was then known as Darul Islam (DI). 'Abdullah Sungkar lectured on jihad… I was struck by his charisma and knowledge. His eloquence opened my mind to the notion of jihad and left a burning passion in me to perform jihad,' he recalled.

Former JI member M recollected that that he was impressed by the religious knowledge and apparent piety from the white robe of the Singapore JI leader, Ibrahim Maidin (Hussain, 2012). He recounted the seemingly innocuous beginnings where Ibrahim Maidin suggested that he attend a class conducted by an Indonesian preacher (Abu Jibril – a prominent figure in DI). He shared that he did not question the JI spiritual leader because of his trust in his friend. Ex-JI member M added that soon, he and several others went for an intensive course, which stressed the need to start a struggle to establish an Islamic state. He explained: 'The preachers told us that the establishment of an Islamic state must be pursued by waging jihad. According to the JI's terminology, this meant the use of armed force to take over control of the state…. I accepted their explanations because they were charismatic

and very convincing. The way they presented themselves gave the impression that they were sincere and wanted only the best for Islam.'

Recognising their path of radicalisation helps detainees to understand their actions and to avoid making the same mistakes in future.

Stage 5 – Ideological Rectification

Having been exposed to and subsequently imbibed radical ideas through books, the Internet, and from terrorist personalities, the detainees believed that hate and violence was what Islam required of its adherents. Through counselling by religious counsellors and reading mainstream literature promoting peace and non-violence, detainees undergo the processes of change that help keep them inoculated against terrorist ideas. Former JI member M said: 'Unlike the Indonesian preachers, (the religious counsellors from RRG) stressed that Islam is a peaceful religion and violent ideology that JI advocated is actually against Islam. …In Singapore's multiracial and multicultural context, the JI's form of jihad will lead only to racial violence and disharmony.' (Hussain, 2012) The RRG counsellors helped M see that jihad, rather than causing harm to the society, is a challenge to develop oneself and one's society.

'Abu Harith' shared what he discovered during his detention: 'On studying the Quran, I came to the realisation that what I had done to obtain Allah's blessings was in fact something that Allah condemned. While Muslims should show compassion and mercy, JI, on the other hand, killed innocent people who did not utter a word against Islam or Muslims, let alone wage a war against Muslims. I felt betrayed as I had sacrificed 10 years of my life to the JI cause.' (Abdul Rahman, 2013)

In short, the detainees start to realise that terrorists have been misinterpreting Islam and that hate and violence is not propagated by the religion. They also learn to identify inconsistencies between these values and how they behaved in the past. (Robinson & Porporino, 2001) The work of the RRG counsellors is crucial in helping detainees achieve this change. Many detainees continue to see their religious counsellors after release and are also encouraged to seek guidance from their local mosques.

Stage 6 – Cognitive Restructuring

Radicalised individuals have a distorted sense of reality and a tendency to focus solely on information which confirms their biases while disregarding alternative views. Through counselling, these cognitive distortions are restructured and detainees start to develop the cognitive tools that help prevent themselves from falling prey to aberrant influences again. (Robinson & Porporino, 2001)

An example of cognitive restructuring can be seen when the detainees gradually learn from the psychologists how to manage emotion and develop the capacity to objectively frame global events. Detainees also learn personal problem-solving skills, to evaluate ideas critically and to be more open-minded.

'Abu Harith' said: 'I wanted to tackle my misgivings and put all my doubts about the JI to rest – where JI's teachings were wrong and where I went wrong. I wanted to come to terms with my wrongdoings in JI and heal my soul. The sessions (with the religious counsellors) clarified my doubts… I shared my concerns and fears with the psychologists and we discussed many issues… They taught me skills to cope with the stress of detention, and manage my anxiety, worries and emotions… Their advice strengthened me, helped me to see things differently and gave me hope. The fears that haunted me faded, and I started to

"The sessions (with the religious counsellors) clarified my doubts… I shared my concerns and fears with the psychologists and we discussed many issues… They taught me skills to cope with the stress of detention, and manage my anxiety, worries and emotions…"

STORY OF FORMER JI MEMBER[1]

Former JI member, D, was introduced to the JI class by acquaintances made at a religious class. He wanted to enhance his religious knowledge. He found that the JI class was initially conducted like any other religious classes, but the teachers gradually began to discuss global events and turmoil in countries such as Afghanistan and Palestine. The JI teachers also incited the students to respond to these perceived atrocities. D participated in the JI activities because he sympathised with its cause. He brought several people to join the JI and went to the Philippines to undergo weapons training.

Whilst in detention, D felt distressed. His children could not accept his detention and asked his wife the reason behind his involvement. He found his four years in detention to be very difficult. He lost his freedom, and was separated from his family. He regretted his past actions. He began to recognise what he did was wrong, and treated the entire episode as a lesson learned.

In detention, D was well-treated. He had time to exercise, and spent the rest of his time reciting the Quran and reading books. He also underwent counselling. Each week, his family would visit him faithfully.

forgive myself. Through their counsel, I overcame my emotional baggage.' (Abdul Rahman, 2013).

He added: 'I remain a pacifist as I have realised that violence does not solve anything. Peace and understanding are necessary ingredients for a harmonious existence. We should not let our emotions take control of us. I'm not saying we should not care or empathise with the plight of fellow Muslims around the world. My point is our actions should be rational. If there is one thing I have learned, it's that I should not accept anything without checking.'

Through counselling, detainees learn: (i) that their actions carry consequences for others, (ii) how to evaluate ideas objectively and consider a variety of sources of information in the process of decision-making, and (iii) to become less rigid and narrow in their thinking and less prone to externalise blame.

Stage 7 – Individual Commitment

When the detainees' beliefs have been restructured, they are guided to commit themselves not to be re-involved in terrorist activity. They make resolutions, testimonies, and post-release plans to show their determination to fulfil what they have committed themselves to.

Before a detainee is released, they are encouraged to share their reflections of their detention, including their regrets, and resolutions and plans for the future. For example, M said: 'I would like to make a strong statement that what the JI did was wrong. Muslims must be aware that violence advocated by the JI and like-minded groups has no place in Islam.' (Hussain, 2012)

M's current mission is to ensure his children continue to get the best education they can. Another former JI member said: 'I could have become a suicide bomber. I would like to share the lesson that I've learnt – do not be easily swayed, but be part of the mainstream society.' (Ibrahim, 2007)

Another former JI member said: "I could have become a suicide bomber. I would like to share the lesson that I've learnt – do not be easily swayed, but be part of the mainstream society."

With their commitment not to be re-involved in terrorist activities, detainees are more likely to focus on constructive activities to rebuild their lives and reintegrate into the community.

CONCLUSION

Every case is reviewed regularly to determine if the detainees will still pose a security threat. Even after detainees are released on Restriction Orders, rehabilitation efforts continue to ensure that they are well re-integrated into society. In the words of M: 'Due to the support and help my family received (from ISD and Muslim groups), I was able to re-integrate into the society fairly quickly. I was not treated like an outcast and my neighbours were friendly and polite to me.' (Hussain, 2012)

'Abu Harith' also noted that 'after my release, I was placed under a Restriction Order with conditions including a curfew. Hence, getting a job was tough.' But he added: 'I could not get a job at first. It was a strain on the family which had to depend on my wife's small income. After some months, an employer agreed to take me despite my background… My better understanding of Islam and the world at large have played an important part in my reintegration into Singapore society. The rehabilitation and national events like National Day made me reflect on my national identity and responsibility to preserve peace and harmony in Singapore.' (Abdul Rahman, 2013)

The above examples suggest that the results of the ISD rehabilitation programme have been encouraging. A good number of the detainees have been released. They continue to maintain a close rapport with their case officers, religious counsellors, and psychologists. They have also integrated well into society – among friends, at work and at home.

ENDNOTES

[1] Former JI member interviewed by Berita Harian in 2007 (Abdul Rahman & Ibrahim, 2007).

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EDITOR'S NOTES

The article was contributed by ISD's Counter-Terrorism Operations Division which has a team of psychologists involved in the rehabilitation programme for detainees of violent extremism.

DEVELOPMENT OF FAÇADE MODELLING SOFTWARE TO COUNTER BLAST IMPACT

By Protective Security Command, Internal Security Department

INTRODUCTION

On 5th August 2003, a suicide bomber detonated a car bomb at the drop-off driveway of the JW Marriott Hotel in Jakarta, killing 12 people and injuring 150 ('JW Marriott Hotel Bombing', n.d). Most of the injuries were sustained by patrons of the Sailendra restaurant, located beside the driveway, as the restaurant was packed with the lunch crowd (Figure 1). When the bomb exploded, it caused the restaurant's glazing façade facing the driveway to shatter and glass fragments were propelled into the restaurant area causing laceration injuries. Seven years earlier, on 9th Feb 1996, the Provisional Irish Republican Army (IRA) had used a similar mode of attack; it detonated a large bomb in the Canary Wharf area of London, causing severe damage to the façade of the office buildings in the proximity ('Docklands bomb ends IRA ceasefire', 1996).

After progressive collapse where the failure of key structural elements of a building results in mass casualties due to falling building materials, blast consequences of failing glass façade presents the next biggest challenge in the protection of human lives. This is exacerbated by the increasing use of extensive glass façade in modern architecture (Glass Association of North America, 2006).

To mitigate against disproportionate injuries due to façade failure, there is a need to analyse and understand the response of the façade when subjected to blast loading. Unfortunately many existing glazing analysis tools for blast are derived from tests conducted on conventional rectangular glazing that are supported on all 4 sides in a frame. They cannot be directly extended to glass facade with complex geometries and supports that are usually minimal for aesthetic reasons. This presents a challenge to analysis the blast resilience of modern glass facade.

"Blast consequences of failing glass façade presents the next biggest challenge in the protection of human lives. This is exacerbated by the increasing use of extensive glass façade in modern architecture."

USE OF HIGH-FIDELITY PHYSICS-BASED FINITE ELEMENT MODELS

Figure 1: JW Marriott Hotel after a suicide bomb attack, 5 August 2003 (Source: Kompas Daily)

In line with other ongoing efforts to analyse blast propagation with complex geometries typical of urban environment, and response of structures components to blast effects, Singapore's Internal Security Department (ISD) has been increasingly relying on high-fidelity physics-based finite element (HFPBFE) models. Such HFPBFE models allow the flexibility of simulating different scenario encountered in a virtual environment. The uses of HFPBFE models have been more popular in recent years with the increase in economical computational power.

LS-Dyna is one commercial HFPBFE solver that is robust at handling non-linear and dynamic problem such as blast response. To undertake a valid analysis, an experienced user would have to ensure that suitable boundary conditions, material models, grid size, material properties and numerical schemes are entered into the model. This is known as the pre-processing phase and requires the most effort in a typical numerical analysis (including the fine-tuning and de-bugging of the model). Once the model has been created, the computational hardware will perform an analysis and the results generated for review.

FAÇADE MODELING SOFTWARE

To improve the efficiency of the pre-processing the inputs for analysis of glass façade using the LS-Dyna, ISD developed the façade modeling software, BEA_CW – an automated numerical model creation tool that is capable of expediently creating a numerical model for typical façade systems found in Singapore that is suitable for the LS-Dyna solver. Using a Graphical User Interface (GUI), it allows the user to create the model of the façade in an intuitive manner, which drastically reduces the effort needed to create a similar numerical model with conventional methods. Prior to this, ISD had conducted an extensive study to identify and classify various types of façade systems commonly found in Singapore.

There are three categories of Curtain Wall (CW) systems, namely, the unitised system, monumental glazing system and the window system, as shown in Figures 2 to 4 respectively.

a) The unitised system is commonly used for multi-storey office buildings and usually comprises a frame system that spans between supporting columns floor to roof. The frame provides the necessary support for large glass panels. The entire façade is typically assembled on site from a collection of components, and is therefore not well tied together and exhibits little resistance to blast loading.

b) The monumental glazing system is commonly used at large public facilities, such as airport terminals and exhibition halls. To present a frameless façade, large glass panels are supported with a framing system that is located behind the glass façade and connected together using clamp systems. The glass panels are "points" supported and these are the likely locations of failure when the façade is subjected to a blast loading.

c) The window system is commonly used in multi-storey residential buildings. Pre-cast concrete or other forms of pre-manufactured panels are used to form the bulk of the exterior wall of the building. Windows and frames are then attached onto these panels on site to form the façade. This is the traditional glazing system that usually offers more resilience due to their smaller sizes and supports.

Some of the input parameters that are required are discussed below:

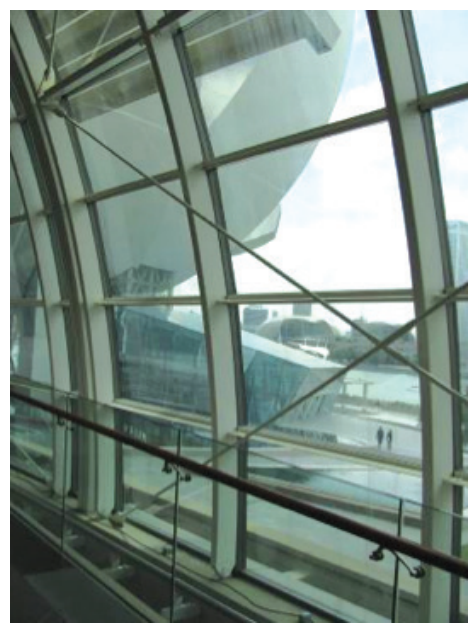

Figure 2: Unitised system

a. Specification of bomb location

The distance of the bomb to the façade panel under analysis, as determined through a threat, vulnerability, risk assessment (TVRA), can be defined as shown in Figure 5 below. The façade panel under analysis can either be directly facing

Figure 3: Monumental glazing system

Figure 4: Window system

the bomb (Front), at the side of the building (Side) or at the rear of the building (Rear). The software will automatically calculate the blast over-pressure, based on the US Army Corps of Engineers Technical Manual TM5-855-1, accounting for the variation of over-pressure depending on the direction of the blast wave as it impacts the façade. This is an important parameter as over-pressure, which determines the structural response, is a function of both the distance and the angle of impact.

b. Physical dimensions

The size and dimensions of the façade and details of how the façade is designed determine the response of the façade under blast loading. The required inputs are dependent on the type of Curtain Wall system. For example, window size and spacing (Figure 6) are required for a window system. For monumental glazing and unitised system, dimensions of supporting glass fins, mullions (Figure 7), and configurations of truss frame (Figure 8) are essential details that are needed for the analysis. With the capability to vary these inputs, a wide range of designs can be modelled and analysed.

c. End Conditions

"In the event of a blast, the glass panels will absorb most of the blast energy causing it to break and deform. If it is not adequately embedded or secured, it will detach from the frame and be thrown into the building."

The end conditions refer to how the glass panels interface with the frames and/or structures at the edge, as shown in Figures 9 to 11. This is defined by how much of the glass panel is embedded into the frame structure or secured by clamps at the edge. In the event of a blast, the glass panels will absorb most of the blast

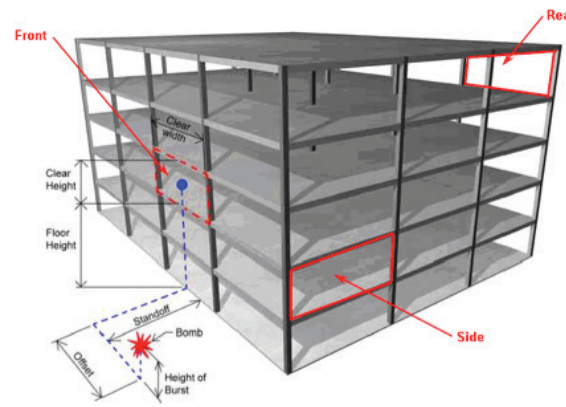

Figure 5: Definition of bomb location

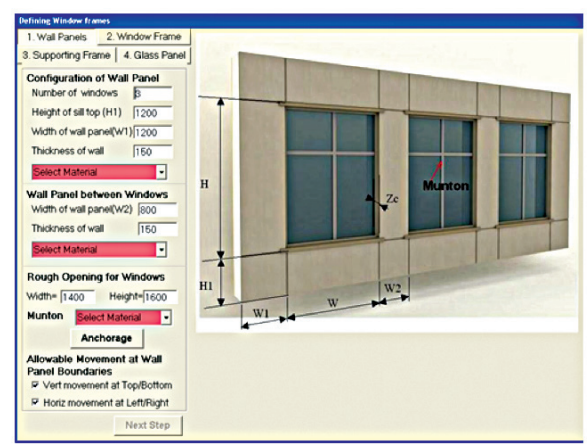

Figure 6: Configuration and layout of typical window system

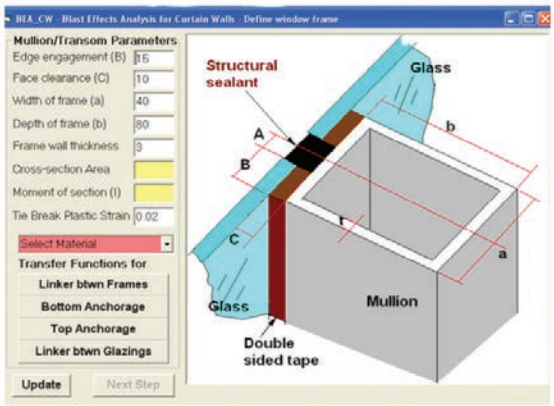

Figure 7: Specification of mullion details

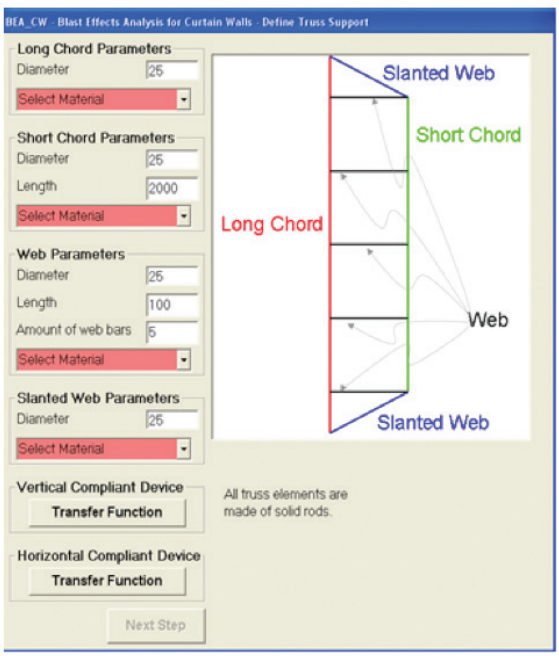

Figure 8: Specifications of truss frame

energy causing it to break and deform. If it is not adequately embedded or secured, it will detach from the frame and be thrown into the building. To provide a certain level of blast resistance, the design of the end conditions is crucial as it allows for more energy to be transferred to the framing system, thereby retarding the glass panels or even stopping it from dislodging.

d. Bolting

In the window system, the window panels are attached to window frames which are then secured to the building structures as shown in Figure 12. It forms part of the system where energy is transferred from the glass panels to the building. If this is not designed properly and not

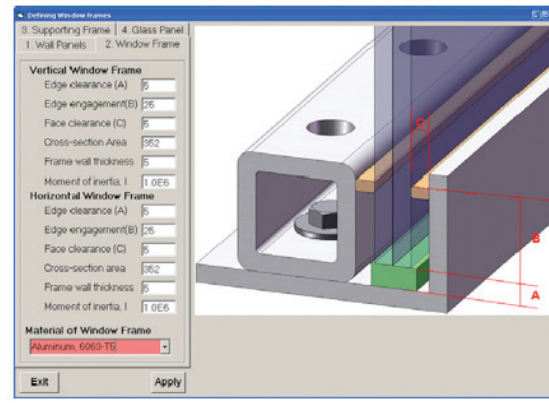

Figure 9: Glass panels of window system

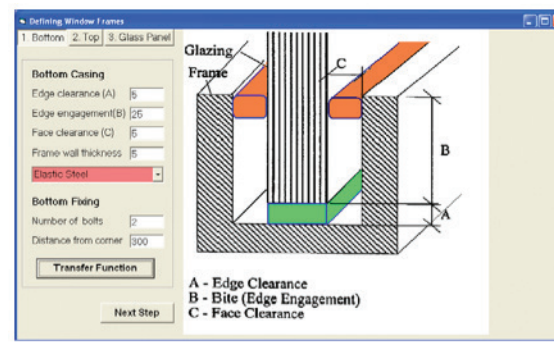

Figure 10: Glass panels of monumental glazing and unitised system

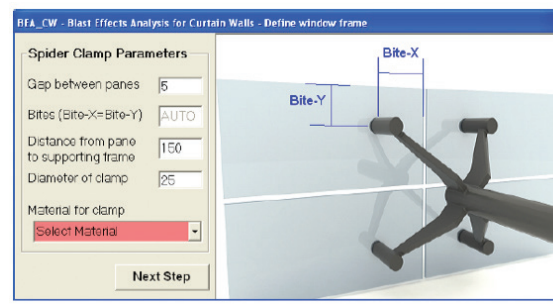

Figure 11: Glass panels secured using spider clamp system

catered for adequately, it becomes the weakest link and failure will occur from the shearing of the anchor bolts.

e. Glass

The type of glass used in the design of a façade is an important characteristic in its overall

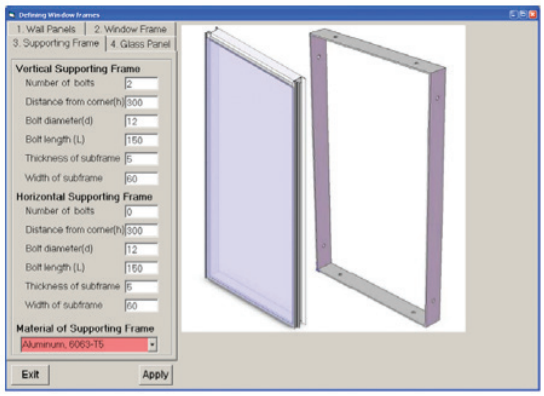

Figure 12: Specification of anchor bolts details for window system

response. At the lower bound, float/annealed glass simply shatters into sharp fragments while at the other extreme, multi-layer laminated glass is capable of remaining intact even as it undergoes large deformation. The software enables these parameters to be varied and analysed as shown in Figure 13.

f. Retrofit options

Three types of retrofit options are available in the façade modeling software:

1. Cable catcher system involves the placement of cables of varying sizes behind the glass panels to catch them should they be blown in by the blast force.

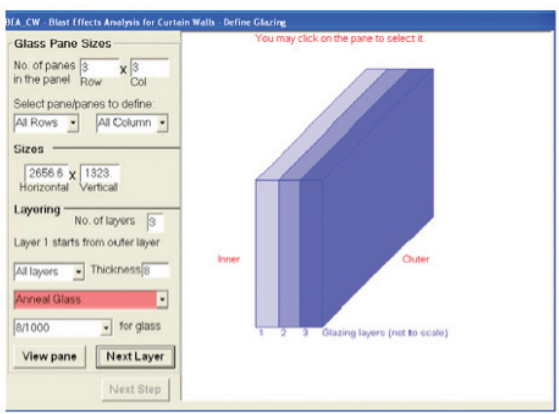

Figure 13: Specification of glass

2. Fabric catcher system functions like the cable catcher system except that a continuous piece of fabric is used instead of cables.

3. Anchored polymer film system involves attaching a thin film of transparent polymer to the glass and then anchoring it to the frame so as to both strengthen and provide greater ductility to the glass panel.

The types of retrofit that can be employed are dictated by the type of curtain wall system under analysis. For example, cable catcher may be used with monumental glazing system (Figure 14) while fabric catcher and anchored polymer may be used with window system (Figures 15 and 16).

RESULTS

The BEA_CW software creates an input file that is ready for solving using LS-Dyna FE solver. The outputs generated will be transient information documenting the dynamic response of the façade as it is subjected to the blast loading.

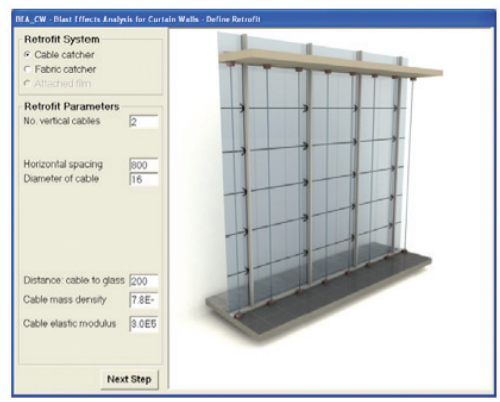

Figure 14: Cable catcher retrofit of a monumental glazing system

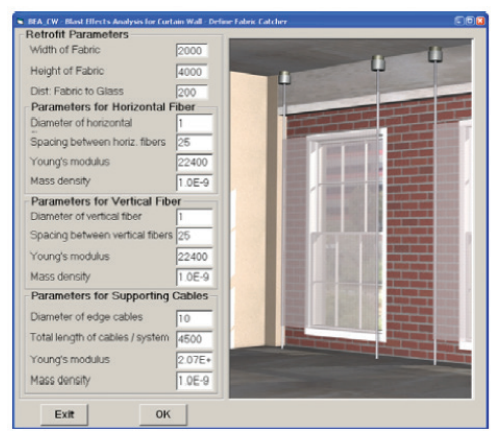

Figure 15: Fabric catcher retrofit of a window system

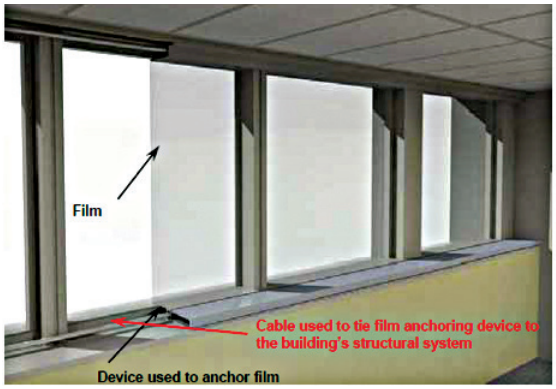

Figure 16: Anchored polymer film of a window system

An illustration of an analysis of a blast loading on a window system can be seen in Figures 17 to 19.

It shows the uni-direction displacement of the glass at various time intervals.

From the analysis, it can be deduced that the glass windows, comprising non-strengthened glass, will break and dislodge from its frame, and be propelled into the room. From the results, it is also possible to establish the velocity of the glass fragments as they break away.

Further analyses of varying parameters such as explosion location, glass type, bolting detail can be performed to predict their responses and provide important information for decision making on the siting of critical infrastructure and appropriateness of proposed façade designs.

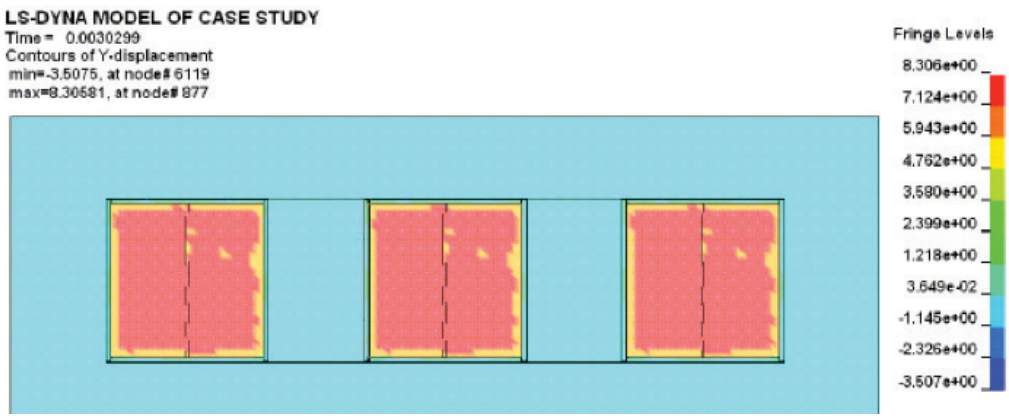

Figure 17: Response of façade at time = 3 milliseconds Onset of glass breakage

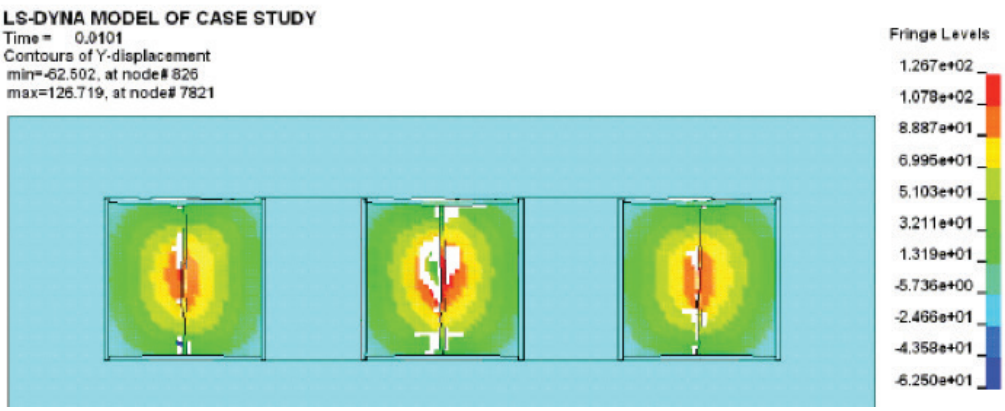

Figure 18: Response of façade at time = 10 milliseconds Glass fragments dislodged from window frames

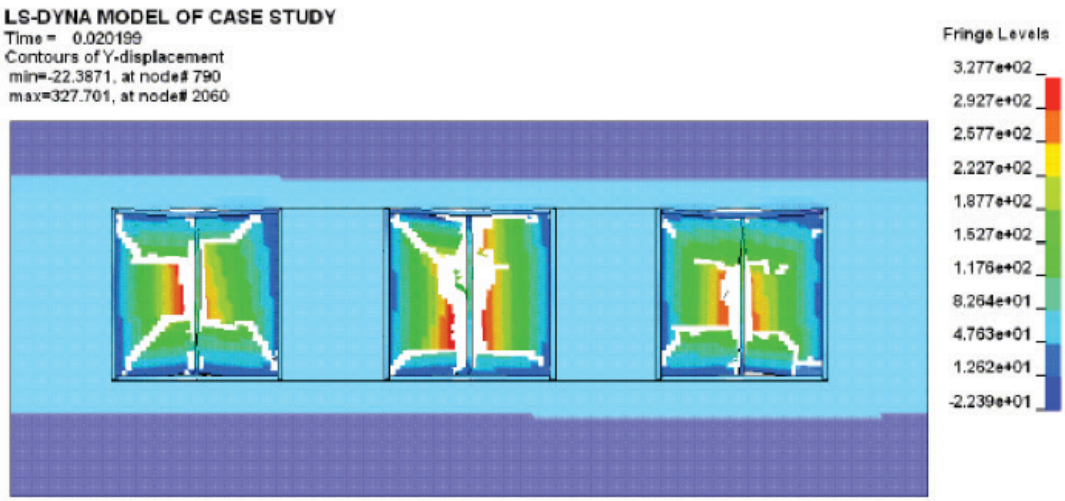

Figure 19: Response of façade at time = 20 milliseconds Glass fragments propelled into the room

CONCLUSION

With the façade modeling software, the amount of effort, time and resources required to create a HFPBFE model using LS-Dyna can be drastically reduced. In addition to the analysis, retrofit measures such as the incorporation of cable catcher, fabric catcher or anchored film can also be added to the system to compare and contrast the potential benefits of such measures. In our ongoing effort to further improve the accuracy of the software, validation of different types of system with field test results will be performed progressively. The BEA_CW software adds to the arsenal of software tools used by Protective Security Command, ISD, to analyse the consequence of a terrorist blast incident in an urban environment.

"The BEA_CW software adds to the arsenal of software tools used by Protective Security Command, ISD, to analyse the consequence of a terrorist blast incident in an urban environment."

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EDITOR'S NOTES

The article was contributed by ISD's Protective Security Command. One of the roles of Protective Security Command is to provide engineering consultation on security and protection of critical infrastructures. It has a team of engineers who look into blast consequence assessment and protective design to enhance building resilience.

FIGHTING THE SHELL PULAU BUKOM FIRE: STRATEGIES THAT WORKED FOR THE SCDF

By Ling Young Ern and Anwar Abdullah

INTRODUCTION

At approximately 1315 hrs on 28 September 2011, a fire started at Pump House 43 of the Shell Eastern Petroleum (Pte) Ltd oil refinery located on an offshore island named Pulau Bukom. Pulau Bukom is an island about 5 km away from mainland Singapore and houses the largest Shell refinery in the world in terms of crude distillation capacity. Responders faced a situation where the highly erratic fire had engulfed large parts of the pump house and was threatening to spread to nearby fuel storage tanks. The complexity of the blaze was compounded by two escalations in the fire that forced responders to temporarily withdraw from the pump house.

"Pulau Bukom is an island about 5 km away from mainland Singapore and houses the largest Shell refinery in the world in terms of crude distillation capacity."

Operations Civil Emergency, Singapore's national response plan for any Civil Emergencies[1] in the country, was declared at 1830 hrs on the same day and personnel from the relevant Ministries and public sector agencies were mobilised to support SCDF in managing the incident. While the fire took 32 hours to extinguish, the entire operation lasted for eight days[2] and saw a total of some 40 fire-fighting and support appliances and more than 100 personnel from SCDF, Shell's in-house fire-fighting team, and several public sector agencies involved in jointly tackling the incident.

The last major fire on Pulau Bukom occurred in April 1981, involving a floating roof gasoline tank. While SCDF had dealt with oil tank fires before (another example being the Pulau Merlimau fire in Oct 1988 involving three storage tanks), a pump house fire at Pulau Bukom presents SCDF with a different magnitude and complexity from both strategy and tactical point of view, which will be elaborated below. This fire also marked the first time that Operations Civil Emergency was declared since SCDF was appointed as Incident Manager of Civil Emergencies in 1997.

"This fire also marked the first time that Operations Civil Emergency was declared since SCDF was appointed as Incident Manager of Civil Emergencies in 1997."

THE FIRE

SCDF received the call for assistance from Shell at 1815 hrs and arrived on the island within 35 minutes. Fire fighting operation is already on-going by the Shell CERT at the west end of Pump House 43.[3]

A huge fireball at Pulau Bukom. ***Source: The Straits Times © Singapore Press Holdings Ltd. Permission required for reproduction.***

This is a large and open pit approximately the size of one and a half soccer fields, with varying floor depths of 0.3 to 2 metres. Numerous overlapping and criss-crossing pipelines of

different diameters run within the pit, forming a dense three-dimensional network of pipelines. Above the pipelines is a metal walkway structure that allows human access into the pit. A central drain across the floor of the pump house removes rainwater and minor spills into a holding basin.

The fire was erratic and always threatening; it spread and receded several times across the pit and many spots of fires also developed at various sections of the pump house and at times threatened to spread to the nearby gasoline tankers, especially after several major explosions. The intensity and size of the fire at each hotspot changed frequently. The presence of a variety of liquid and gaseous hydrocarbons as well as multiple pipelines, flanges and valves on fire exacerbated the situation. Due to the complexity of the dense network of pipes as well as the impaired visibility caused by the raging fires, there was no certainty as to the type of hydrocarbon fuelling each individual fire.

About five hours into the firefighting, just as it appeared that the fire was under control, the first escalation took place. Multiple explosions resulted in a large fireball being shot into the air. Subsequently, fires developed at three main hotspots at the west end, centre and east end of the pump house. Fire-fighting efforts continued round-the-clock. By the morning of the next day, a single spot of fire remained.

While efforts were underway to isolate the pipelines thought to be fuelling the remaining spot of fire, a second escalation took place, again with multiple explosions and fireballs. The fires reignited at the same three main hotspots. Despite the setback, our firefighters were resolute and battled the fires relentlessly. The fires were fully extinguished by the evening of the second day.

STRATEGIES THAT WORKED FOR SCDF

This incident posed several key challenges to us. First is the accessibility issue as it occurred on an offshore island. It affects prompt responses from our personnel and resources and the subsequent deployments to the incident site, unlike managing an incident within the mainland. Second, the complexity of the fire and safety of responders became an important key considerations in the overall strategy. As the fire escalated, possible downstream complications such as island evacuation and effects of the fire on the environment and sea traffic channels necessitated the involvement of other government agencies. Six strategies pertinent to the management of the incident are identified and discussed below.

(1) Whole-of-Government Approach to Disaster Management

The sudden escalation of the fire that threatened to spread to the entire pump house and the surrounding areas prompted the declaration of Operations Civil Emergency (see box story, 'Operations Civil Emergency') by the SCDF Commander. The activation of the Ops CE on 28th September 2011, at 1830 hrs saw the deployment of multi-agencies at the incident site. The Singapore Police Force (SPF), Police Coast Guard (PCG), Maritime and Port Authority of Singapore (MPA), National Environment Agency (NEA) and the Singapore Armed Forces (SAF) were mobilised to the SCDF Tactical Command Post at the incident site to support the IM in planning and coordinating the overall response to the incident. At Pasir Panjang Ferry Terminal, SPF established security cordons, managed the traffic flow to ensure the smooth response of emergency vehicles and assisted Shell Bukom in the evacuation of workers. PCG, with the assistance of MPA, cordoned the waters around Pulau Bukom and managed the marine traffic to facilitate ongoing operations. MPA monitored the possibility of pollution at sea and prepared to mitigate any hydrocarbons runoff from Pulau Bukom. NEA advised on pollution control issues and provided weather information and risk assessment on hazardous chemicals stored on the island. SAF put on standby a helicopter for aerial reconnaissance and fast crafts for movement of resources between mainland and Pulau Bukom.

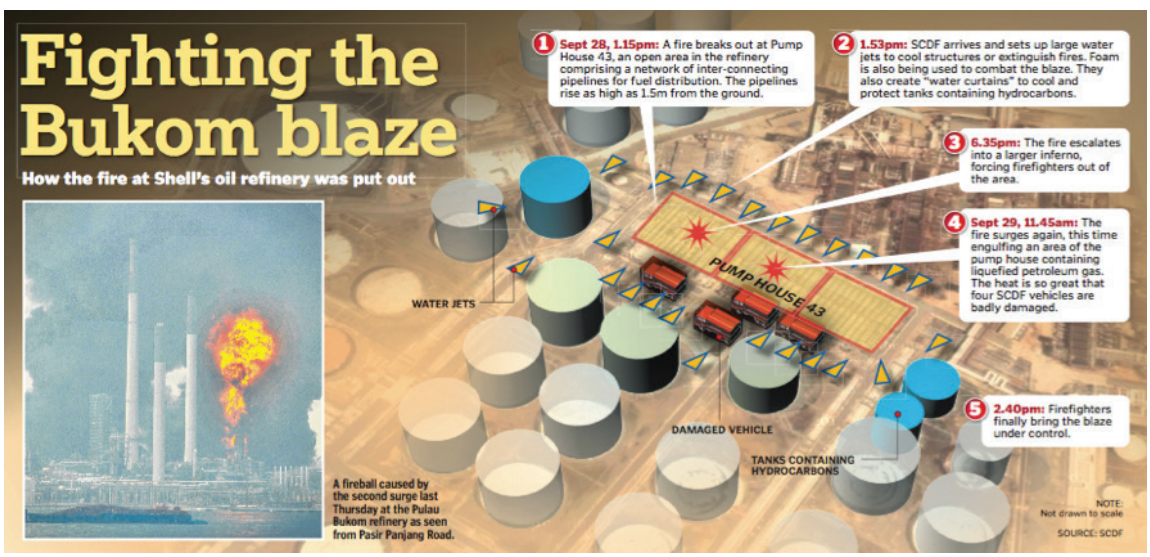
OPERATIONS CIVIL EMERGENCY

Since 1997, SCDF has been the designated Incident Manager (IM) for Civil Emergencies (CE). As no single agency has all the resources to handle major contingencies alone, the IM not only has to organise and direct the response of rescue forces, but also lead, coordinate and integrate inter-agency plans from a Whole-of-Government approach to swiftly tackle any major disaster.

SCDF's contingency planning for CE is dominated by Singapore's urban landscape and the range of possible incidents: structural fires, collapsed buildings, transport incidents on land, sea and air, industrial accidents, release of toxic industrial chemicals and terrorist attacks using chemical, biological and radiological agents. Every category of CE has a corresponding plan that sets out a plausible scenario and defines the roles and responsibilities of every agency involved in the response. This forms the basis for an effective and coordinated multi-agency incident management system, under the framework of Operations Civil Emergency, to have the expertise and resources of other government and quasi-government agencies on tap in a major disaster. Personnel from the various agencies, brought together as Joint Planning Staff during Operations Civil Emergency, are responsible for providing specialist advice to the IM and coordinating their respective ground deployment resources at the incident site.

(2) A Multi-Pronged Fire-Fighting Strategy

SCDF received the call for assistance from Shell at 1815 hrs and arrived on the island within 35 minutes. Due to the large area of operation and the complexity of the fire that had developed at different parts of the pump house, SCDF adopted a multi-pronged response strategy together with Shell's in-house Company Emergency Response Team (CERT). The immediate priorities were to isolate the fuel supply to the affected pipelines, contain the fire within the pump house and protect the surrounding risks. The vast area of operation at the pump house was sectorised into three sectors for better management of the entire site. Shell's CERT was assigned to the western sector while SCDF personnel managed the middle and eastern sectors of the pump house.



An illustration on the main highlights of the fire-fighting operations. ***Source: The Straits Times© Singapore Press Holdings Ltd. Permission required for reproduction.***

At the western sector where the fire had started and parts of the middle where liquid pool fires had developed, foam was extensively applied using foam monitors. Firefighters also gained access via the metal walkways above the pit to extinguish deep-seated fires within the pump house with handheld foam branches. While the application of foam brought the fire under control, full extinguishment could not be achieved as the pressurised fuels from the ruptured pipelines were continuously breaking through the foam layer. In addition, the flanges on fire were burning at heights well above what the foam layer could cover.

The isolation of the fuel supply to the affected pipelines was no easy task as the network of pipelines was complicated and many of the valves were already damaged by the fire. Spading, i.e. the insertion of a metal plate into the middle of a flange, had to be done manually at the outlets of the storage tanks to ensure that the fuel supply was completely cut. Water was also injected into the bottom of the storage tanks to lift the fuel above the height of the outlet valves. To ensure complete isolation of fuel supply, the plant was progressively shutdown.

In close proximity to the pump house were storage tanks containing hydrocarbons, pipe tracks, a substation and a hydrocracker unit that required protection from the intense radiant heat from the burning pump house. The water jets that were consistently maintained to protect these structures were effective in shielding them from the heat even during the fire escalation.

Following the first fire escalation at the middle of the pump house at about 1825 hrs, it was discovered that LPG and other gaseous hydrocarbons were fuelling the flange fires in the middle and eastern sectors. Instead of continuing with foam application which would not be effective against fires fuelled by pressurised flammable gases, the decision was made to control the fires at the middle and eastern sectors with water jets while isolation of the fuel supply was underway. The change in strategy was made with the consideration that the water in the middle and eastern sectors of the pump house would not backflow to the western sector (and reduce the effectiveness of the foam layer there) due to the internal drainage system of the pump house and the additional pumps that SCDF and Shell had setup to drain the contents within the pump house. At the western sector however, the application of foam was to continue as it was effective in controlling the fire.

By the time the fire was fully extinguished, more than 140,000 litres of foam was expended. During the fire, a reserve supply of foam was maintained to ensure that sufficient foam would be available in the event that any of the storage tanks caught fire.

(3) Safety of Responders as Top Priority

On both occasions when the fire escalated and threatened to spiral out of control, with life safety as top priority, a deliberate decision was made for all responders to withdraw from the risk area and regroup at the rehabilitation area. Due to the immediate danger to life during the first fire escalation, the order was given for all responders to evacuate without pulling back the fire engines nearer the pump house as there was insufficient time to decouple all the hoses that were connected to the fire engines. As a result, the tyres of four fire engines melted under the intense heat when the fire escalated and the vehicles were subsequently damaged.

As part of the swift responders' evacuation procedure, all key Commanders within each sector were constantly connected on the radio network to coordinate and account for all their respective personnel prior to evacuation. A final head count was conducted once all evacuated personnel were safely housed at the rehabilitation area. When the explosions were over, a reconnaissance team comprising commanders from SCDF and Shell CERT returned to the pump house to expeditiously assess the situation before developing the next course of action. Firefighters were then reorganised for the prolonged operation and re-deployed back to the pump house to continue the mitigation efforts.

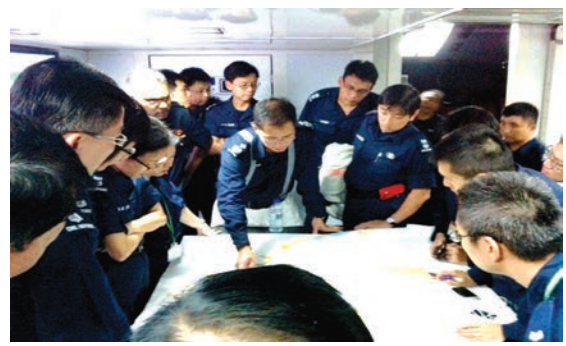
Notwithstanding the precarious nature of the week-long operation, except for six Shell firefighters who sustained minor injuries (e.g. heat exhaustion, strained muscles and minor burn injury), the fire did not claim any lives. This was primarily attributed to the good emphasis on personnel safety and the adoption of prompt and proper responders' evacuation procedure.

"Notwithstanding the precarious nature of the week-long operation, except for six Shell firefighters who sustained minor injuries (e.g. heat exhaustion, strained muscles and minor burn injury), the fire did not claim any lives."

(4) Onsite Command as Key to Effective Incident Management

Onsite incident command and control is one of the key principles in SCDF's concept of operations. The activation of resources which is based on the Task Force Concept ensures that resources are deployed promptly and adequately to the incident site to mitigate the operation. The level of command presence at the incident site is also calibrated to the nature and size of the incident. In this instance, both the Fire Station Commander and the Division Commander were mobilised to assume command during the initial phase of the operation. As the incident escalated, Commissioner of the SCDF assumed overall command and management of the incident when Operations Civil Emergency was declared.

The early presence of the two SCDF Commanders at the various stages of operations was a pivotal factor in the overall success of the operations. Key strategic decisions were executed promptly. Reinforcement of personnel and additional fire-fighting appliances were requested in a timely manner and effectively managed. The presence of senior SCDF Commanders at the incident site also enabled the swift decision of activating Operations Civil Emergency, in order that specialist advice and assets of government agencies could be mobilised and made readily available to the Incident Manager. The establishment of an onsite command post on Pulau Bukom (established at Shell's indoor badminton court at the eastern part of the island, about 1.5 km from the fire ground) provided a critical platform for the Ground Commander to plan, coordinate and execute the operational plans timely and effectively. Following the activation of Operations Civil Emergency, the Tactical Headquarters was deployed at Pasir Panjang Ferry Terminal (mainland) to manage the incident and coordinate the multi-agency response.



SCDF and Commanders key staff officers discussing key strategies at the SCDF on-site Tactical Command Post. ***Source: SCDF***

(5) Emergency Preparedness through Contingency Planning and Exercises

Through contingency planning and exercises over the years, operational response systems and procedures were jointly developed and validated with Shell. In fact, both SCDF and Shell had a joint fire exercise on Pulau Bukom in the beginning of 2011 based on an oil tank fire scenario. Hence, transition of command and control, coordination between SCDF firefighters and Shell CERT, sea transport arrangements and logistical support worked well during the incident and this enabled both SCDF and Shell to focus their efforts on mitigating the fire.

Despite the challenge of accessibility to the offshore island, fire-fighting resources and logistical supplies were smoothly transported to Pulau Bukom. At the outset of the incident, ferries, fast craft and barges contracted by Shell were swiftly put on standby at Pasir Panjang Ferry Terminal to transport SCDF responders and

appliances from mainland Singapore to Pulau Bukom. Over at the Pulau Bukom Ferry Terminal, vehicles from Shell were readily available to ferry SCDF responders to the incident site.

As the initial crew of SCDF responders had travelled to Pulau Bukom by fast craft, they reached the off-shore island before the arrival of their appliances, which were transported by a relatively slower barge. As every second counts, Shell provided a truck known as the Civil Defence Truck that is equipped with fire-fighting equipment for the initial crew of SCDF responders to use upon their arrival at the incident site.

Another noteworthy aspect of contingency planning is the Emergency Mutual Aid Scheme – a self-help framework established by the companies of the Oil, Petrochemical, Chemical and Storage Terminal Industries in Singapore – that indeed proved its usefulness in this incident. This framework advocates mutual assistance among the participating companies to provide resources, for example foam, fire-fighting equipment and portable pumps, to the premises of an affected participating company in the event of a major fire. During this incident, the Emergency Mutual Aid Scheme was activated by Shell after the first fire escalation. Foam and fire-fighting equipment from fellow participating companies arrived within three hours of activation at Pulau Bukom to assist Shell in mitigating the fire.

"Another noteworthy aspect of contingency planning is the Emergency Mutual Aid Scheme – a self-help framework established by the companies of the Oil, Petrochemical, Chemical and Storage Terminal Industries in Singapore – that indeed proved its usefulness in this incident."

(6) Close Engagement with Company Emergency Response Team (CERT) and Management

Throughout the entire operation, SCDF worked closely with the management team from Shell as well as its CERT and Emergency Operations Committee (EOC). This enabled both SCDF and Shell to share crucial information relating to the mitigation of the fire and discuss strategies at appropriate intervals during the operation.

At the heart of the operation site, SCDF constantly worked as a synergistic team with Shell CERT and conducted regular onsite updates and briefings. Although SCDF was the Incident Manager within the established command and control structure, the strategy for mitigating the fires at the various sectors were discussed and mapped out in collaboration with Shell's CERT prior to any deployment. This enabled both parties to have a common understanding of the actions that were being taken. The SCDF Incident Commander also met with Shell Bukom General Manager and EOC daily at 1000 hours for updates and assessment of the latest situation.

A barge ferrying SCDF emergency responders and fire-fighting resources from Singapore mainland to Pulau Bukom. ***Source: The Straits Times © Singapore Press Holdings Ltd. Permission required for reproduction.***

Regular briefings and discussions on the on-going fire-fighting operation were held between SCDF Commanders and Shell Bukom Emergency Operation Committee. ***Source: SCDF***

CONCLUSION

After the fire, the pump house was significantly damaged and the refinery ceased operations temporarily. Investigations found that safety lapses during maintenance works on a pipeline to remove petroleum products had caused the fire. With a continual focus on workplace safety, higher industry safety standards and advancement in fire protection systems, there should be few of such incidents like the Shell Pulau Bukom fire incident in 2011. This incident has underscored the importance of contingency planning, emergency preparedness through exercises and a coordinated approach to disaster management and joint operations involving the Incident Manager, CERT and government agencies. It is also imperative that emergency responders like the SCDF continue to train, adapt, improve and be well prepared to respond to new challenging encounters. While the incident management system and Whole-of-Government response framework have proven to be effective in the Shell Pulau Bukom fire incident, the industries and authorities must continue to work closely together to ensure the robustness of joint response to any emergency situation.

"This incident has underscored the importance of contingency planning, emergency preparedness through exercises and a coordinated approach to disaster management and joint operations involving the Incident Manager, CERT and government agencies."

ENDNOTES

[1] A Civil Emergency (CE) is defined as a sudden onset of incident involving a massive number of casualties and/or damage to property on a large scale. Such a situation is likely to pose grave implications for Singapore at the national, diplomatic or political fronts, and managing the consequences will require a multi-agency response.

[2] After the fire was extinguished, SCDF remained on standby at site due to the presence of high concentrations of flammable vapours. During the standby, SCDF assisted Shell in maintaining a layer of foam over the pump house as a protective measure. SCDF handed over the management of the site to Shell on 2nd October and progressively scaled down its standby force on the island. SCDF fully withdrew from Pulau Bukom on 5th October.

[3] Pump House 43 (PH43), is the largest pump house in Shell Bukom. It performes blending of a variety of products to serve both domestic and regional markets, each of which required different blends. It is the only one of its kind in Shell, in terms of its significantly higher complexity and volume of products compared to pump houses in other refineries which serves their domestic markets. PH43 was designed as a large pit measuring 150m by 50m. It has undergone several modifications since its inception. This included an overhaul of redundant pipes and fittings, installation of leak detection and fire detection facilities, upgrades of fixed fire-fighting facilities and pipe drainage system. In 2010, Shell added two more pipelines through PH43, in order to augment its ethylene cracker complex operations.

EDITOR'S NOTES

Colonel (COL) Ling Young Ern is the Commander for the 4th SCDF Division which covers the far north and western parts of Singapore. COL Ling was previously Commander for the 3rd SCDF Division. He has held various command and staff appointments including ROTA Commander of Sengkang Fire Station, Staff Officer (HazMat Resource), Senior Staff Officer (Industrial Risk Analysis), Officer Commanding of Jurong Island Fire Station and Head Operations of 1st Division. Between 2008 and 2010, he was seconded to the Ministry of Home Affairs (MHA) to co-ordinate the national preparedness efforts in contingency planning and capability development for peacetime crises and terrorism incidents. In 2013, COL Ling led a 14-man team that participated in the ASEAN Regional Forum Disaster Relief Exercise in Thailand, and an 8-man team that participated in the ASEAN Regional Disaster Emergency Response Simulation Exercise in Vietnam.

COL Anwar Abdullah is the Director of Operations in SCDF. He holds a Master of Science in Risk Crisis and Disaster Management. His previous appointments held include Commander of the 2nd Civil Defence Division and Chief Instructor at the Civil Defence Academy. He was involved in major rescue and fire fighting operations, both locally and overseas, including the Nicoll Highway collapse incident in Singapore in 2004, andone of the worst bush fire operations affecting New South Wales and Canberra in Australia. For his efforts, COL Anwar was awarded with the Canberra State Emergency Medal. As part of SCDF's overseas humanitarian assistance, he led an SCDF team to assist in the post-earthquake search and rescue operations on the island of Nias, Indonesia in April 2005 and in Yogyakarta in Central Java in August 2006. Regionally, COL Anwar was involved in the ASEAN Committee on Disaster Management (ACDM). He played a significant role in the formulation, discussion and negotiation of the first ever ASEAN Agreement on Disaster Management and Emergency Response (AADMER) that was signed by the ASEAN Foreign Minister on 26 July 2005 in Vientienne Lao PDR. Presently, he represents SCDF in the United Nation International Search and Rescue Advisory Group (INSARAG) and United Nations Disaster Assessment and Coordination (UNDAC) Advisory Board. He is also the Executive Director of the National Fire and Civil Emergency Preparedness Council (NFEC), a national body responsible to promote fire prevention and civil emergency preparedness to make Singapore a safe and secure nation. He has presented papers at the international forums and conferences.

A STUDY OF HOMICIDE TRENDS IN SINGAPORE FROM 1955 TO 2011

By Tai Wei Shyong and Tang Gek Hsien

INTRODUCTION

Levels of violence within a society tell us much about its history and social development. In criminology, societal violence is commonly studied by looking at homicide trends – mostly at how the prevalence and nature of homicide has changed over a significant period of time (see for example, Eisner, 2008).

Homicide rates are also the most commonly compared crime between countries. This is so for a few reasons. First, the definition of homicide tends to remain fairly constant over time and is generally similar even among countries which have very different approaches to penal laws. Second, homicides are generally well documented and reporting rates are likely to be high, and homicide rates can be derived from a number of different sources, which enhances reliability. Third, studies focusing on homicides have become a distinct concentration within the field of criminology (Pridemore, 2002), which provides a rich array of theoretical perspectives to draw on.

At 0.21 per 100,000 population in 2012, representing just 11 murders for the year, Singapore's homicide rate is among the lowest in the world today. The rate in the US is about 5 per 100,000 population, UK's is 1.2, and Malaysia's is 2.6[1] . Comparing across cities, Hong Kong's is 0.24, Tokyo's is 1 and New York City's is 6.3.

This paper attempts to describe Singapore's homicide trends from the mid-1950s to 2011, and to offer some tentative explanations about how and why the nature of homicide has changed. It is divided into three main sections. The first deals with data sources. The next section describes trends in homicide, and presents some specific characteristics of offending in terms of demographics and modus operandi. We then consider four macro-level approaches to explaining homicide trends thought to be most relevant to Singapore's case, and end by presenting some tentative explanations for the changes over time.

DATA SOURCES

We obtained historical data on homicide numbers from a number of different sources. First, the United Nations Surveys of Crime Trends and Operations of Criminal Justice Systems – we downloaded homicide and population data from the United Nations Office on Drugs and Crime Website[2] for the years 1970 to 2011 (except for 2001 and 2002, for which no data is available). This UN data originates from the Singapore Police Force. We calculated homicide rates from 1970 to 1994 using the raw numbers of homicides ("Intentional homicides, completed") reported, and the population data provided in each survey. After 1995, responding states provided the homicide rates.

The second source is the World Health Organisation (WHO) Mortality Database. This data originates from the Singapore Ministry of Health. We downloaded data for the years 1963 to 2006 from the WHO website[3], and calculated the homicide rates by dividing the homicide numbers by population data given.

The third source is a study entitled *Post-Mortem Survey of Homicides in Singapore* (1955-1964) (Ting and Tan, 1969), which presents homicide rates for those years based on post-mortem records. Methodological issues are not well

addressed in this survey, but nevertheless, the rates presented are regarded as being of some research value since post-mortem data generally presents an accurate record of homicide events.

We also obtained data directly from the Singapore Police Force – specifically, the age of homicide offenders and victims from 2005 to 2011. This set of data is highly reliable as it is compiled in the course of police investigations. In addition, we used 188 case records of homicides[4] committed from 1980 to 2009, reported in published law reports, to research the characteristics of homicide offences during this period. The data contained in these reports are also highly reliable, as they are the subject of judicial proceedings. However, the law reports data are not comprehensive, as not all homicide cases are reported. However, this data source is thought to be fairly representative of the total universe, given that it is a random sample of cases.

CHANGES IN HOMICIDE RATES

Figure 1 shows the homicide rates for Singapore from 1955 to 2011 based on the three data sources from the United Nations, World Health Organisation and Singapore's post-mortem records.

Differential rates are to be expected (Marshall and Block, 2004). The post-mortem rates and the WHO rates overlap for the years 1963 and 1964. The WHO rate is significantly lower than the post-mortem rate (0.72 versus 2.5 for 1963; 1.0 versus 4.2 for 1964). Comparing the WHO and UN data, there is a significant difference in rates for the early 1970s, which begins to narrow from the second half of that decade. For the period 1970 to 2006, the Pearson co-efficient for the two data sets is 0.89.

Several reasons may account for the differences: (a) definitional differences; (b) different data sources (UN data represents homicides reported to the police, whereas the WHO data originates from health authorities); (c) scope of coverage (WHO data covers residents, whereas UN data covers both residents and non-residents).

Combining indicators can be a means of overcoming missing data and also improving the

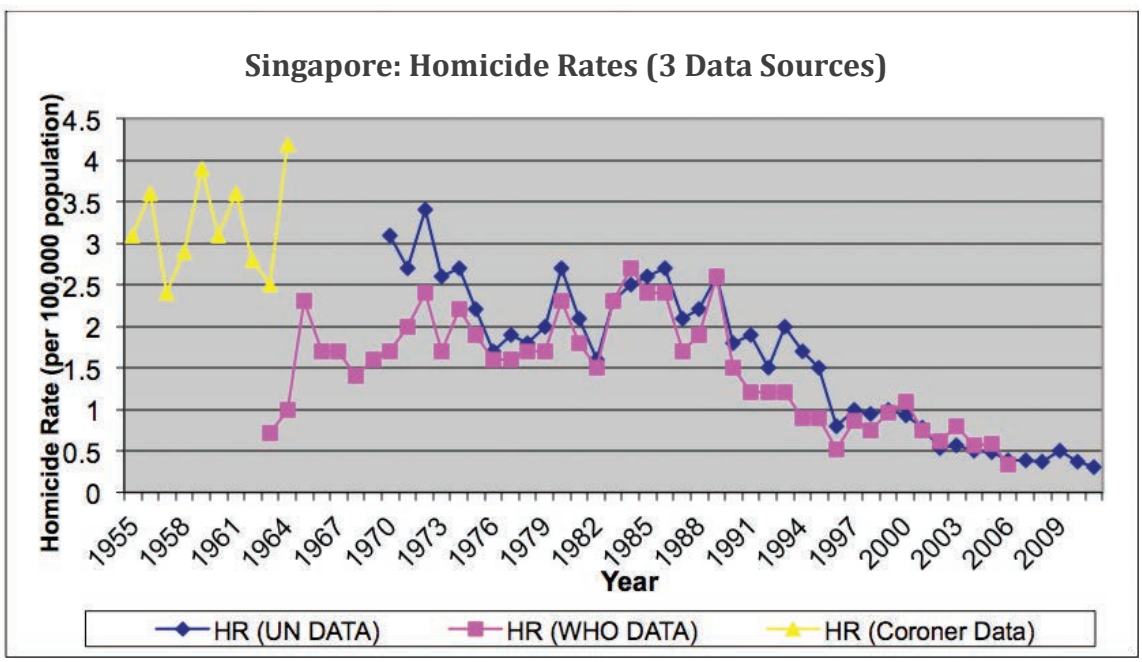


Figure 1. Singapore's Homicide Rates from 1955 to 2011

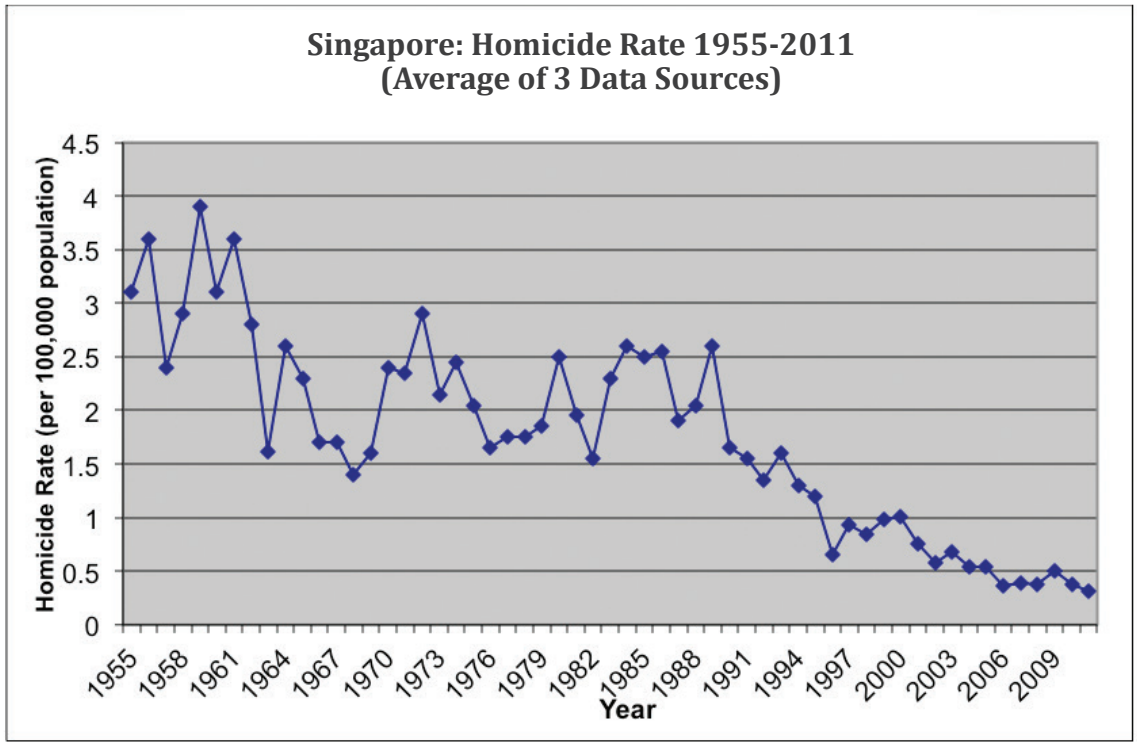


Figure 2. Average homicide rates in Singapore from 1955 to 2011, using data from UN, WHO and post-mortem records

validity of the data (Marshall and Block, 2004). Figure 2 shows homicide rates for Singapore for 1955 to 2011, derived by averaging the rates where more than one data point is available for any given year.

An overall declining trend is evident. Within this decline, three distinct phases can be identified: (a) an uneven decline from 1955 to the early 1970s; (b) a period from the early 1970s to around 1990 where the rates fluctuate around two; (c) a relatively steady decline from 1990 until the low point of 0.21 in 2011.

Robbery Rates

To investigate if the homicide data can be generalised to other crimes, we obtained robbery rates from the UN Surveys, and also in recent years, from the Singapore Police Force. Figures 3 and 4 compare homicide and robbery rates from 1970 to 2011.

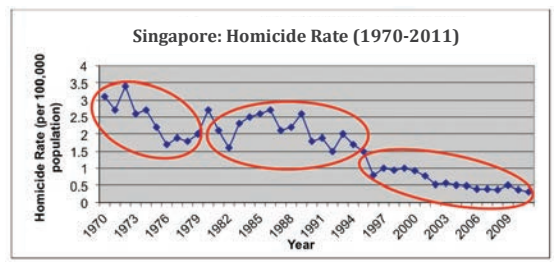


Figure 3. Declining trend in homicide rates in Singapore from 1970 to 2011

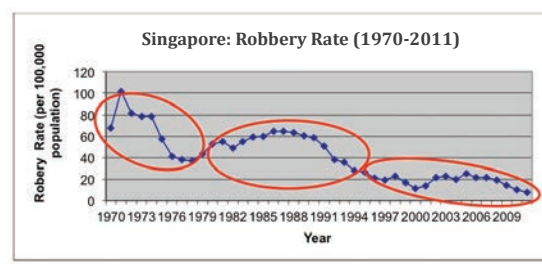


Figure 4. Declining trend in robbery rates in Singapore from 1970 to 2011

As both graphs show, similar distinct phases within an overall decline are again visible, although if we use the UN data only, the initial period of decline appears to stretch until the mid-1970s.

PROFILE OF OFFENDERS AND VICTIMS – AGE AND GENDER

Age

The propensity of an individual to commit crimes varies with age. Age-crime curves are commonly used to analyse how offending patterns evolve as the age of a cohort or an entire population increases. From age-crime curves, we can determine the age at which the proportion of persons arrested for any particular offence is highest, and the prevalence rates at different ages for different categories of crime. Studies conducted in other countries have shown that there is a peak in the prevalence rates of crime for younger adults aged 16-20, after which the rate decreases with age (Farrington, 1986). Particularly for violent crimes such as murder, the peak age of offending is young and the prevalence rates declines sharply as age increases.

"For violent crimes such as murder, the peak age of offending is young and the prevalence rates declines sharply as age increases."

Adopting the methodology used to plot age-crime curves in other case studies and using data obtained from the Singapore Police Force, we normalised the prevalence rates of offenders and victims with the base population in each age band. We used an amalgamated approach in our analysis by combining the entire data set of seven years from 2005 to 2011 instead of studying the data for each year separately. Using this approach, we were able to analyse a larger sample size, given that the number of offenders and victims in Singapore is small compared to other countries. This captures the snapshot profile of offenders and victims during these seven years, assuming offending patterns and victimisation rates remain the same throughout the period of analysis.

The offender age-crime curve for murder in Figure 5 shows that the peak age of offending is between 16 to 24 years and the prevalence rate declines sharply after this peak age. This trend is largely similar to that observed elsewhere.

Like the relation between criminal offending and age, it is observed across societies that victimisation is generally higher at young age and

Offender Age-Crime Curve for Murder (per 100,000 population)

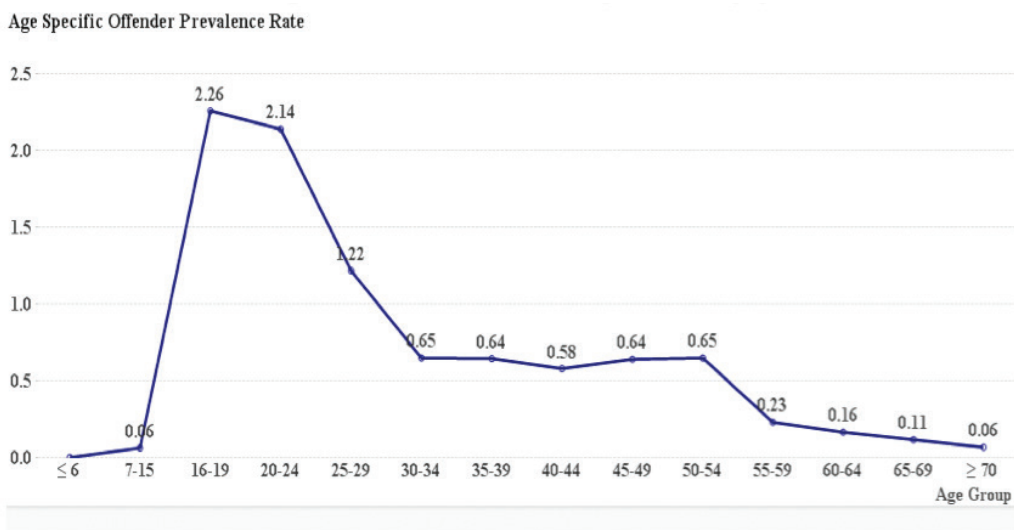


Figure 5. Age-crime curve for murder offenders in Singapore from 2005 to 2011

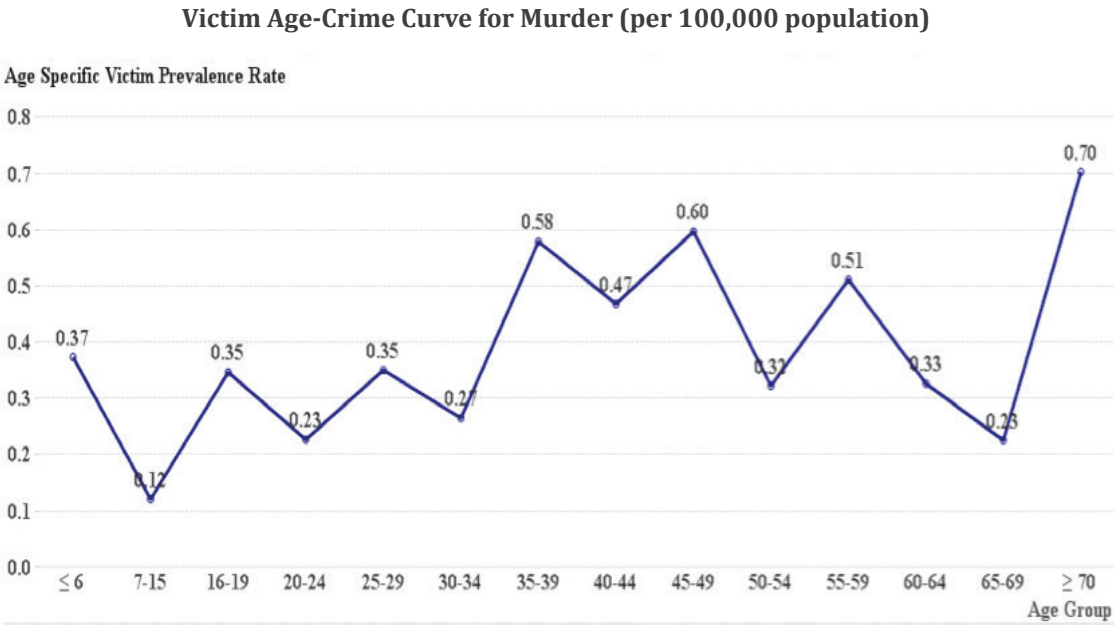


Figure 6. Age-crime curve for victims of murder in Singapore from 2005 to 2011

lower at old age. However, this also depends on the type of crime, and the prevalence of certain typologies. For murder, our victimisation rates are well spread out across different ages, and very low across all ages. As Figure 6 shows, the rates remain largely stable with no significant peak or sharp decline with age. The highest rate of 0.70 victims per 100,000 population occurs at 70 years old and above. However, this rate is not significantly higher compared to the rates at other ages.

Figure 7, based on WHO data, shows the victim-age curves for four decades: the 1970s, 1980s, 1990s and 2000s (curves represent the average for that decade). In the 1970s, when homicide rates were higher, there is a clear spike in the ages 15 to 35. For the 1980s, there is a similar spike, although a broader one from ages 15 to 49. For the last two decades, the pronounced spike virtually disappears.

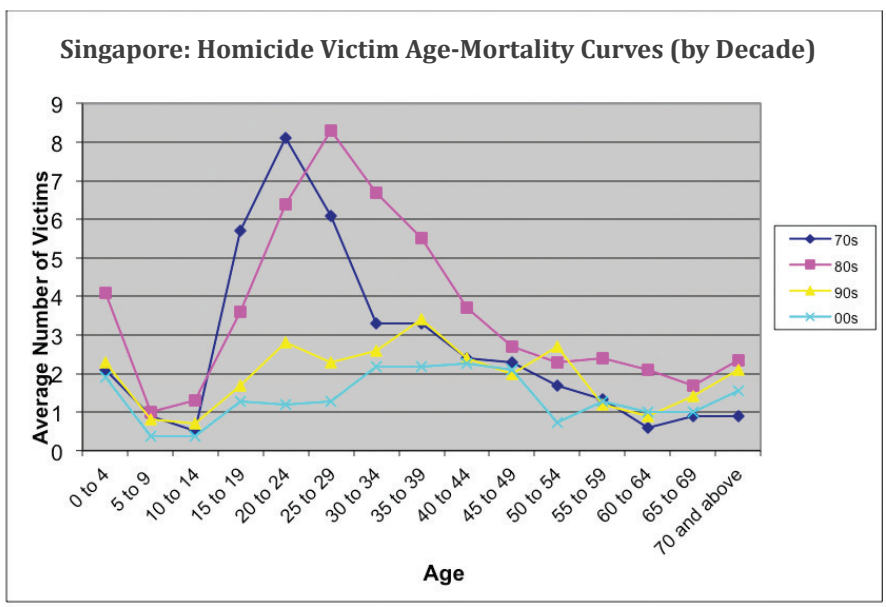


Figure 7. Average homicide victim age in Singapore by decades

Figure 8. Distribution of homicide offenders by gender in Singapore from 1980 to 2009

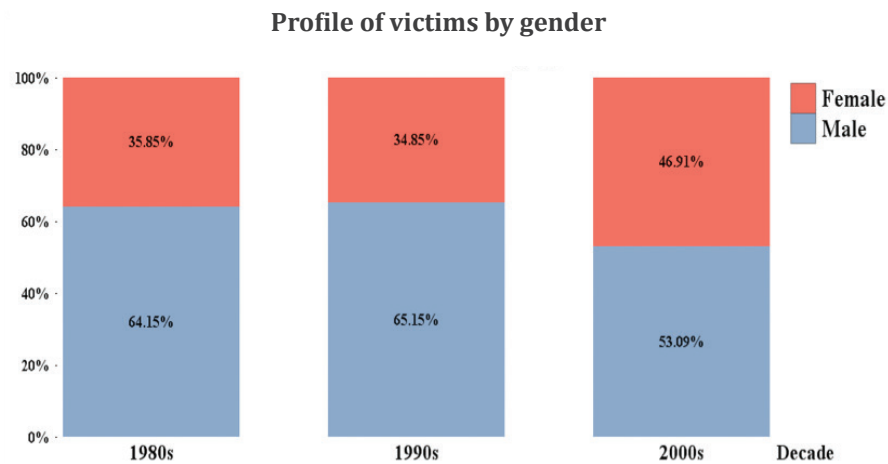


Figure 9. Distribution of victims of homicide by gender in Singapore from 1980 to 2009

Gender

Drawing from reported homicide cases from 1980 to 2009, Figures 8 and 9 map the distribution of offenders and victims by gender. A large majority of offenders are males although there is a slight increase in the proportion of female offenders over the years. The number of female victims also increases and this proportion reaches almost 50% in the 2000s.

To understand the victim-gender distribution in more granularity over time, we used WHO data to calculate the ratio of male to female victims for 1970 to 2010. A ratio of one means that for the year in question, the number of male and female victims of homicide is the same.

Figure 10 shows a general decline in this ratio of male to female victims over the years and this ratio even reached below one in 1996.

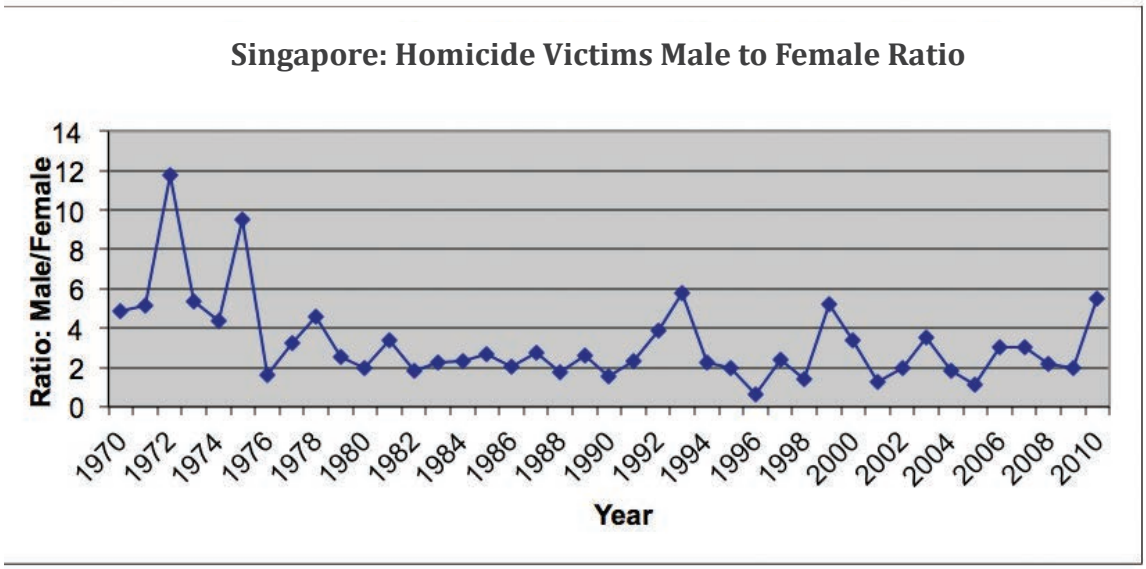


Figure 10. Male to female ratio of homicide victims in Singapore from 1970 to 2010

In terms of offender-victim relationship by gender, while the majority of homicides involve male offenders murdering male victims, there has been an increase in homicides involving female offenders and/or female victims over time.

The data presented above are broadly consistent with Verkko's hypothesis that the higher the rate of homicide, the lower the percentage of female victims (Verkko, 1951)[8]. In terms of victim male-to-female ratios (Figure 10), fluctuations are high in the later years because of the low overall numbers. In 1996, the ratio dips to 0.6, but the number of cases for that year is very low: just 16.

"The data presented above are broadly consistent with Verkko's hypothesis that the higher the rate of homicide, the lower the percentage of female victims."

The overall picture which emerges is a significant decrease in homicide over the period 1955 to 2011, but in distinct phases. Like most violent crimes, the peak offending age is quite young – between 16 to 24. The data

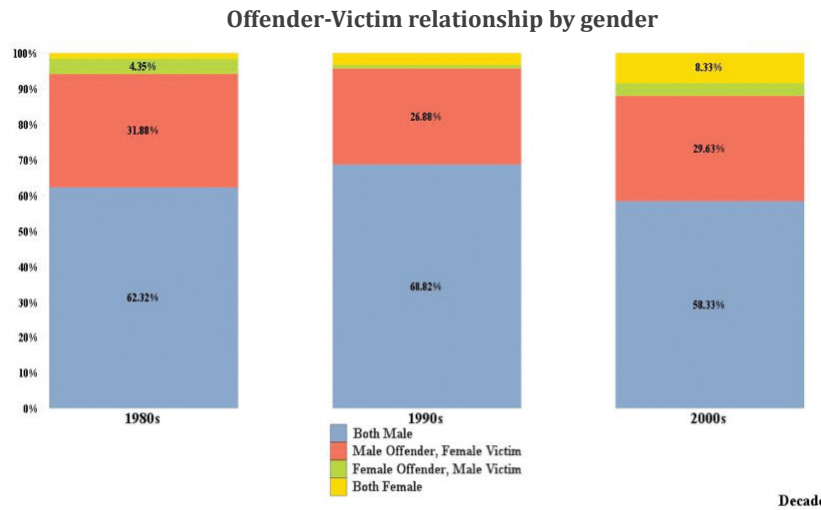


Figure 11. Relationship between offender and victim, by gender, in Singapore, in the 1980s to 2000s

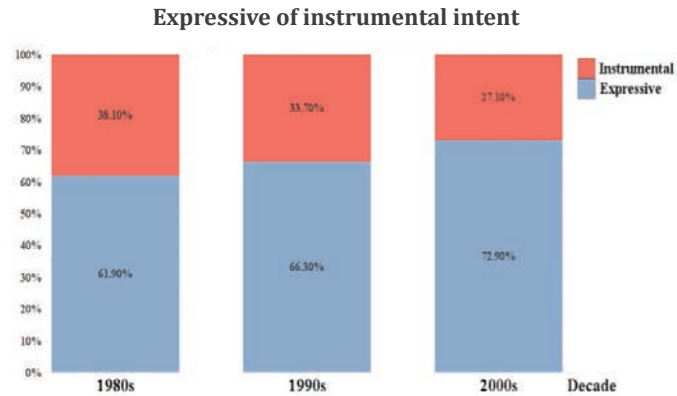


Figure 12. Intent of homicide offenders in Singapore in the 1980s to 2000s

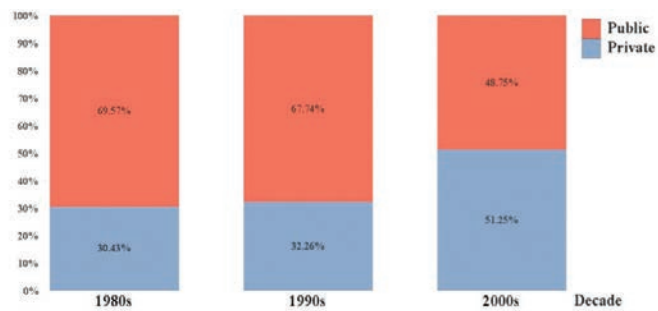


Figure 13. Locations of homicide offences in Singapore in the 1980s to 2000s

suggests that similar to other case studies, much of the decline in homicide over the years can be attributed to a decrease in male-on-male violence involving younger offenders (Johnson, 2006 and Eisner, 2008).

MOTIVE AND MODUS OPERANDI

Expressive and Instrumental Intent

Besides looking at the profile of offenders and victims, we also sought to analyse the intent and modus operandi of homicides in Singapore, based on the case records retrieved from law reports. In terms of intent, we classified murders into two categories: 'Expressive' or 'Instrumental'. 'Expressive' murders are defined as those committed for intrinsic gratification, usually as an expression of emotions such as hate, anger or vengeance, while 'instrumental' murders are defined as those oriented towards a specific goal, such as robbery or obtaining money by threat. Figure 12 shows an increasing proportion of homicides committed with an expressive intent over the decades.

Locations

We also analysed the locations of homicides to test Verkko's hypothesis that most homicides are committed in public places when homicide rates are high. Figure 13 shows that in the earlier decades when homicide rates were high, the proportion of homicides committed in public places were also higher. The trend reversed in the 2000s.

Weapons

Some theorists have postulated that the proliferation of weapons has an impact on homicide rates (Kleck and Hogan, 1999). We thought it useful to investigate this. Singapore has tightened control over gun use since the early 1970s, and throughout the 1980s to today, gun violence is extremely rare. As Figure 14 shows, guns account for barely 1% of homicides in the last three decades. The most commonly used murder weapon in Singapore is a knife. However, there is an increasing trend of homicides where

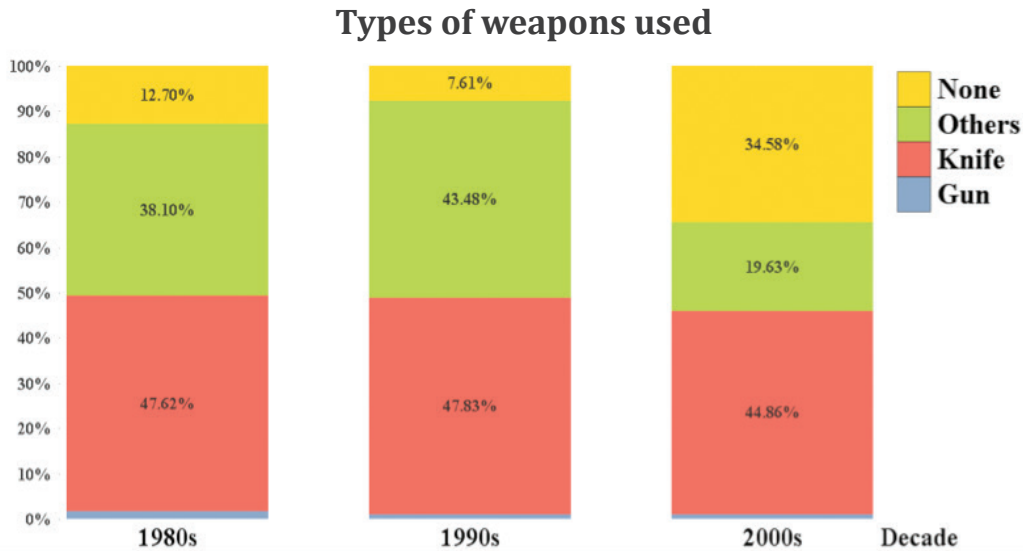


Figure 14. Types of weapons used in homicide offences in Singapore in the 1980s to 2000s

no weapons are used at all. Particularly in the 2000s when the number of homicides was low, the percentage of homicides committed without using weapons had risen significantly compared to the past decades.

EXPLANATIONS FOR DECLINE IN HOMICIDE

Explanations of crime rates operate at different levels and from different perspectives. Four macro-level approaches thought to be most relevant to Singapore's case are considered below.

Institutions of Law and Order

Variations in crime rates can be explained by changes in the workings of institutions of law and order, particularly the criminal justice system, comprising essentially the police, the courts and penal institutions. A rational choice perspective of offending predicts that some potential offenders are deterred by an increase in the likelihood of apprehension, and/or an increase in penalties applicable to the offence.

Following independence in 1965, the government placed a high priority on establishing law and order. Improving the effectiveness of the Singapore Police Force was immediate priority. It initiated a comprehensive anti-corruption strategy in 1960, designed to change the public perception of corruption from a low risk, high reward activity, to a high risk, low reward activity (Quah, 2001). In the early 1970s, salaries of police officers were increased to reduce the temptation to accept bribes. This also retained and attracted higher calibre talent and raised the quality of the force.

In 1981, the Singapore Police Force shifted from a reactive, incident-centred mode of operation to full-scale community policing, based broadly on the Japanese 'Koban' system (Bayley, 1989). Motorised patrolling and emergency response were de-emphasised in favour of intensive community involvement; patrol personnel were made available for community problem solving; policing was enmeshed in a network of independent community organisations.

All these measures made the police much more effective in terms of controlling and solving crime. Today, we have high solution rates for various crimes including murder. This high probability of

"This high probability of apprehension, coupled with the application of the death penalty for murder cases , is likely to have contributed to the decline in homicides."

apprehension, coupled with the application of the death penalty for murder cases, is likely to have contributed to the decline in homicides.

Strain

Strain theory, usually associated with Merton's theory of 'anomie' (Merton, 1938), asserts that under certain conditions, a breakdown in social relations exerts strain on individuals to resort to illegitimate (including criminal) means to achieve their life goals. Cross-national homicide studies most frequently apply this perspective by comparing Gini-Coefficients and/or unemployment levels (Lafree, 1999).

Gini-coefficient data for Singapore from the World Income Inequality Database suggests a gradual increase in income inequality from 1970 to 2000. However, this database uses different sources and hence comparability is poor. Based on reliable and consistently measured data compiled by the Singapore Department of Statistics, income inequality increased steadily for the period 1990 to 2011 from 0.408 to 0.478. However, it was precisely during this period when homicide and robbery rates were declining toward their lowest points. This outcome runs counter to strain theory, which hypothesises a positive relationship between income inequality and homicide rates.

Several reasons may account for these observations. First, levels of affluence have risen tremendously in Singapore since 1970: GDP per capita (at 2005 market prices) was S$7,982 in 1970; in 2011, it was S$56,554. The wealth effects on individuals may have offset the frustration effects caused by relative deprivation. Second, unemployment was fairly low throughout this period. It never went beyond 5% for the entire period, except for 1970 (8.19%) and 1986 (6.48%). So while income inequality was fairly high by developed-nation standards (and even marginally increased), there was no lack of employment and productive opportunities. Third, Singapore's public education has for many years been of an extremely high standard and available up to university level at nominal cost. Meritocracy has always been a highly valued political ideal, and is widely practised in both the public and private sectors. This suggests that inequality of opportunity, the key structural component of Merton's theory (Merton, 1995), is likely to have been low, and social mobility correspondingly high.

Culture

Many theorists attempt to explain variations in homicide rates in terms of cultural or sub-cultural norms, values or beliefs that may promote, or at least condone violence (Pridemore, 2002).

Two related approaches can be considered to fall loosely within the rubric of 'culture'. The first is based on Norbert Elias' idea of a 'civilising process' in Europe over the past three centuries, which gave rise over time to stricter standards of personal behaviour, including the non-acceptability of interpersonal violence (Eisner, 2008).

Eisner has a second theoretical perspective, based on the ideas of Weber (Eisner, 2008). He argues that the major shifts in levels of interpersonal criminal violence across Europe over the past 160 years can be associated with broad changes in shared cultural models of what constitutes a desirable and good "conduct of life" (Eisner, 2008:290).

How do these perspectives apply to Singapore's falling homicide rates?

Singapore achieved independence in 1965, amidst extensive industrial strife and communal violence. Poverty was widespread and education levels were low. Upon independence, the government embarked on an intensive nation building enterprise, which left almost no aspect of social and economic life untouched. Two early imperatives are worth mentioning. First was the need to create a trained and disciplined workforce to attract foreign investment, thereby securing economic growth. One key strategy employed to achieve this was to invest heavily in public education. A second more immediate goal was to restructure Singapore's employment and industrial relations regulatory frameworks.

Rational and consensus-seeking collective bargaining was emphasised, but at the same time, changes to the law were made to provide for mandatory and dispositive dispute resolution processes. Open conflict was made very much a last resort.

The second imperative was to raise living standards, particularly the quality of housing. In the early 1950s, some 75% of the population lived in very crowded tenements and neighbourhoods, usually segregated by ethnic group (LePoer, 1991). Modern, high-rise housing estates and new towns were soon built, in which the residents of the city's crowded Chinatown slums and Malay villages were relocated. When this was done, the different ethnic groups were intentionally intermingled. While cultural diversity was encouraged at a general level, Singapore's leaders recognised the need to foster community integration among the different groups. There has been no let up in efforts to ensure community harmony to this day. For example, in 2006, the government launched the 'Community Engagement Programme' specifically to 'strengthen the understanding between people of different races and religions'.

Two further general observations are worth making. First, the Singapore government has taken effective steps to reduce anti-social behaviour. Vandalism is tightly regulated. Other anti-social behaviour, such as spitting in public and littering, are also the subject of criminal sanctions.

Second, the government has actively aimed to raise standards of civility. In 1979 then-Prime Minister Lee Kuan Yew, in an attempt to build a 'cultivated society', launched the annual 'Courtesy Campaign' (Lee, 2002). The first campaign slogan, 'Make Courtesy Our Way of Life', encouraged civil servants to be polite to the public. Since then, the campaigns have targeted issues such as poor neighbourliness, irritable bus and taxi drivers, and inconsiderate mobile phone users. In 1996, incumbent Prime Minister Goh Chok Tong reinforced Singapore's attempt to 'civilise' society by launching the pilot Singapore Kindness Movement, which aimed to encourage young Singaporeans to do a good deed every day.

Demographics

Given that offender-age effects are pronounced in homicide offences, it is conceivable that demographic changes contributed to changes

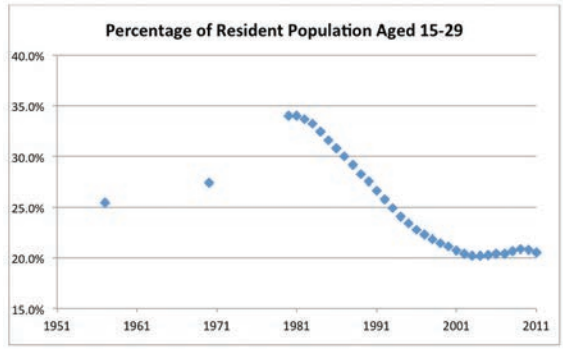


Figure 15. Change in size of 15-29 age group in Singapore from 1951 to 2011

in homicide patterns. Figure 15 shows how the proportion of Singapore's resident population between 15 and 29 years of age changed from 1957 to 2011.

Unfortunately, data was not available to the writers for most of the years before 1980, and the graph shows only two data points for this period: 1957 and 1970. It appears that the percentage of people in this age group increased up to around 1980, which is consistent with a large number of post war baby-boomers. It is quite clear that from 1980 onwards, the percentage of Singapore residents in the age group declined quite sharply until about 2001, when it stabilised at around the 20% mark. The data shown is for both males and females, but we know that there were similar numbers of males and females in the 15 to 29 age range per cohort from the 1970s onwards.

CONCLUSION

Macro-level declines in crime are caused by changes in individual-level pathologies towards offending. It is hypothesised that the four factors described above (effectiveness of policing and criminal justice institutions, economic factors, culture and demographics) generally operate

across different time dimensions. Changes in the content of penal laws and the behaviour of law and order institutions can take effect relatively quickly, because they affect the rational decision making process in a direct and acute way. Similarly, denial of access to weapons and changes to gun control laws can have rapid effects.

Economic effects tend to operate over the short to medium term: a time-lag is likely between a change in economic conditions and the actual effects on individual pathologies. Cultural and demographic effects are arguably seen only over the long term, perhaps even only across generations, as norms, values and belief systems permeate through slow-acting mechanisms such as parenting systems and informal social controls.

The decline in homicide rates up to the 1970s is hypothesised to be predominantly due to a high level of priority for an orderly society, manifested in significant increases in the effectiveness of law and order institutions in suppressing crime, creating deterrent incentives among the population, and incarcerating offenders. These changes would have had a relatively rapid effect on crime. While it has been noted that the immediate effect of introducing the community policing system in the 1980s on crime rates was not dramatic (Bayley, 1989), it arguably had a deeper consequence of building a stronger and more proactive community attitude towards crime control, which paid dividends in the longer term. Gradually, a culture of respect and trust of law enforcement was built up within communities. This is supported by the general increase in the police solutions rate for all crimes starting from the 1980s.

Consistent with Verkko's hypothesis, the proportion of homicides committed by males, and in public places, has decreased over the decades. In the later years, homicides have been increasingly expressive in nature and tended to be committed in private places such as residences, rather than instrumental in nature, or committed by groups in public areas.

In terms of the age structure of our population, the proportion of younger males aged 15 to 29 increased until some time between 1970 and 1980, after which it declined sharply. This is not consistent with the shape of the homicide rate curve, which shows an intermittent decline from 1955 onwards, with rates being fairly stable between the mid-1970s and 1990.

Research by Gartner and Parker (1990) suggests that the cultural context and the character of homicide influence the impact of age structure on homicide rates. Specifically, they propose (at p. 366) that:

> '...where violent conflicts between males or unrelated adults are more common, where firearms are more readily available and facilitate violent property crimes, and where cultural prohibitions of violence are weaker, changes in the proportions of young males in the population will most likely produce changes in the homicide rate. It follows that where family homicides and the killing of women and children constitute a larger proportion of the total homicide rate, where firearms are strictly regulated and less available for use in the commission of other crimes, and where formal and informal control systems more strictly limit interpersonal violence, changes in the proportion of young males will have weaker effects on the homicide rate.'

In Singapore's case, homicide rates remained quite flat throughout the 1980s, even though the population of males between 15 and 29 years of age was declining rapidly. This suggests that demographic effects had a limited effect on homicide rates per se during that period, and that other social, cultural and economic effects were more dominant.

In the 1990s, when homicide rates start to decline again after a period of stability from the late 1970s to 1980s, demographic, cultural and wealth effects would have had time to come into play. Furthermore, by this time, a strong emphasis on consensus rather than conflict, a drive for

increased civility, and the development of strong informal control systems in communities are set against high levels of education and widespread economic opportunities. These conditions support a significant decline in all types of violence and crime, but would arguably be particularly relevant to both instrumental and gratuitous forms of violence in public between young males, as their patterns of interaction and standards of behaviour are altered.

In recent years, there have been instances of group violence between male gangs which have led to deaths. While our homicide rates are low, it is not possible to eradicate violence altogether, and a certain residual level of violence will remain. It is important from a policy perspective not to assume that historical homicide rates will not rise again, if there are changes in our social structures and norms. Instances of violence should be evaluated periodically to determine if the current legal and enforcement frameworks can be more targeted and hence more effective.

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Understanding our homicide trends sheds light on the historical development of patterns of violence in Singapore. Starting from quite a high point, homicide rates have declined over the past five decades to very low level, possibly the lowest in the world for a city of Singapore's size. The causal factors behind this decline can inform our views on how patterns of violence will evolve in the future, and assist in crafting policies and laws in this arena.

ENDNOTES

[1] Rates were reported in UNODC Global Study on Homicide 2011.

[2] http://www.unodc.org/unodc/en/data-and-analysis/United-Nations-Surveys-on-Crime-Trends-and-the-Operations-of-Criminal-Justice-Systems.html

[3] http://www.who.int/healthinfo/mort/tables/en/index.html

[4] Verdict passed as murders or culpable homicides not amounting to murder.

[5] http://www.lawnet.com.sg/lnrweb/c/portal/layout?p_l_id=1

[6] Prevalence rate is the number of offenders in an age group divided by the population size of the age group in each year. Weighted average of the yearly age specific offender prevalence rates is then computed to allocate more weight to years with larger population size of that age group.

[7] Studies in Germany and US showed that the victimisation rates for younger people are generally higher than for older people. [U.S Department of Justice, Statistics Special Report Jul 2007, and Görgen, 2010.]

[8] Veli Verkko was a Finnish criminologist who had done pioneering comparative statistical analysis of lethal violence in Finland and a number of other countries. Using long-term historical data, Verkko found that in societies with low levels of homicides, the proportion of female victims is usually large. In violent societies, in contrast, the majority of victims are usually men. This relationship seems to hold in many different societies over time and as levels of homicide changes, and it appears to hold cross-sectionally.

[9] The death penalty was mandatory for all forms of murder as defined in the Singapore Penal Code until amendments were made to the law in 2012.

[10] Available at: http://www.wider.unu.edu/research/Database/en_GB/database/

[11] Source: Singapore Department of Statistics.

[12] Data source: Looi, Kee Hiau and Hian, Teck Hoon (2005) "Trade, capital accumulation and structural unemployment: an empirical study of the Singapore economy", Journal of Development Economics 77:125-152:128-129.

[13] "Singapore United" Website: http://www.singaporeunited.sg/cep/index.php/web/About-CEP/What-is-CEP

[14] The data points for 1957 and 1970 are from Saw, 2007. The rest of the data points from 1980 to 2011 are from the Singapore Department of Statistics.

[15] In 1970, there were 1,033 resident males for every 1,000 females, and this ratio declined steadily in the decades after. In 2006, there were 989 males for every 1,000 females (Saw, 2007).

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EDITOR'S NOTES

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DIFFERENTIATING GENUINE AND FALSE RAPE ALLEGATIONS:

A MODEL TO AID RAPE INVESTIGATIONS

By Laura Hunt[1] and Ray Bull[2]

INTRODUCTION

Rape is a heinous crime with serious emotional and physical consequences (Thornhill & Palmer, 2000). According to official Home Office figures the number of rapes recorded by the police in England and Wales in 2006/2007 was 13,780 (Jansson, Povey, & Kaiza, 2007). However, rape is one of the most under-reported crimes; for example the 2001 British Crime Survey (Walby & Allen, 2004) found that only 15% of rapes came to the attention of the police. Therefore, 'official' figures (e.g. reported to and recorded by the police) are likely to be a gross underestimate.

The definition of a 'false allegation' is vital to discussing this topic and plays an important role in determining the number of allegations that are classified as false (Rumney, 2006). As yet, no definitive definition has been acknowledged and few studies have systematically and reliably examined the actual rate of false allegations (Aitken, 1993).

In one of the first studies on false allegations of rape, Maclean (1979) examined 34 alleged rape victims over a 6-year period, however due to the classification system used a high false allegation rate of 29% was reported. Maclean found false allegations took longer to come to the attention of the police and that false complainants presented fewer injuries and were found to have more social, medical and economic problems. However, no statistical analyses were conducted due to the small sample size. Therefore no firm conclusions can be drawn from this early study.

In an early Danish study, Theilade and Thomsen (1986) presented limited data on 15 false rape and attempted rape allegations which they claimed were 'without any doubt . . . false' (p. 17). However, they failed to define 'false allegation', or say how they determined an allegation to be false. No comparison sample of genuine allegations was used and only descriptive statistics were presented. The researchers concluded that 'all of the women had great personal problems' (p. 19), although no evidence was offered to support this claim. Their findings indicated that the average age of false complainants was 24.9 years and also that these complainants' educational backgrounds were low and the majority were unemployed.

To assist investigators in determining whether a case was genuine or false a detailed checklist of 57 items was proposed by McDowell (1992). This was based on a comparison between 1000 cases that were classed as genuine and a 'like number' (p.29) of false allegations. However, McDowell failed to define 'false allegation' and thus failed to clarify how cases were determined to be false or were verified as genuine. McDowell suggested that strong indicators of a false allegation include injuries involving cuts that are less deep at the start, writing on the body and someone other than the victim reporting the incident. However, no detail was provided as to how this checklist was compiled, except to say that discriminant analysis was used. No statistical results were presented and some of the items on the checklist are so uncommon in genuine and false rape cases (for example writing on the body) that their practical use is limited.

In a slightly stronger study, Kanin (1994) examined 45 false reports in which the complainant had subsequently admitted that no rape had occurred. Analysis showed that the

majority of false complainants were white, from a lower socioeconomic background, modestly educated and their mean age was 22. Regarding the alleged sexual acts, not one false complainant mentioned oral or anal sex, however these were present in 25% of genuine cases. Kanin acknowledged that due to the nature of the sample and the particularly high rate of false allegations (41%), the findings may not be generalisable to other populations.

One of the first studies to directly compare the behaviours reported in genuine allegations with those reported infabricated allegations was conducted by Rainbow (1996). This study, however, lacked ecological validity as the sample of false allegations was written by female participants recruited for the purpose. Despite its limitations this study did offer some interesting findings, including that significantly more mock false complainants claimed they physically resisted their attacker. Rainbow also found that simulated accounts contained less inquisitive language. Using the same information from the same 'mock' sample as had Rainbow, Marshall and Alison (2006) conducted more detailed analysis by comparing this with 142 genuine allegations. They found that violent behaviours were more likely to be reported in the 'mock' false complaints whereas pseudo-intimate behaviours were less likely to be reported.

Woodhams and Grant (2004) compared 22 'maintained as true' rape allegations with 22 'withdrawn as false' rape allegations when examining linguistic structures in such rape allegations. They found that 'maintained as true' allegations contained significantly more offender utterances than those 'withdrawn as false'.

Feist (2007) compared 55 rape cases that had been verified as 'no crime' according to Home Office Counting Rules (2002) with 593 'crimed' rape cases. These rules state that an incident may be 'no crimed' when 'following the report of an incident which has subsequently been recorded as a crime, credible evidence comes to light which determines that no crime has been committed' (p. 7). Cases where the victim was not injured, where there were allegedly multiple offenders, and where the victim was unemployed or a student were more likely to be deemed false allegations.

The current study compared a sample of 'genuine' rape allegations (i.e. where a person had been convicted) with 'confirmed false' allegations. The sample size was greater than in many of the previous research studies and the data collected were obtained directly from victim statements.

METHOD

Design and Procedure

Data were taken from 80 rape allegations that were classified as false and from 160 allegations of rape that were classified as genuine (n ¼ 240).

"Determining that an allegation is genuine or false is a difficult task; the risk of a genuine victim subsequently claiming that an allegation was false cannot be eliminated, nor can the possibility that a person has been convicted of a rape that did not actually occur."

Determining that an allegation is genuine or false is a difficult task; the risk of a genuine victim subsequently claiming that an allegation was false cannot be eliminated, nor can the possibility that a person has been convicted of a rape that did not actually occur. However, in the present study measures were put in place to minimise the risk of such occurrences:

A case was classified as a false allegation if:

(1) the victim had made a retraction statement in which she admitted that the allegation was fabricated, or
(2) the victim had been charged with wasting police time or perverting the course of justice.

Cases where the allegation was made due to confusion on the part of the victim were excluded, as were cases where it emerged that the encounter was actually consensual. An

allegation was classified as genuine if a person had been convicted of the offence.

Each case in both samples involved only one female victim to eliminate the complications of multiple victim cases. Multiple offender cases however were not excluded due to the previous finding that false complainants more often allege being assaulted by multiple offenders (Feist, 2007; McDowell & Hibler, 1987). Additionally, as male-male rape may involve different sex acts from male-female rape, such cases were not included. In all cases the relationship between the offender and the victim was as a stranger.

All false allegations that had been submitted to SCAS (see below) and which fitted the inclusion criteria were included in this study. The genuine allegations were randomly selected from the SCAS database by a SCAS staff member. They were matched to the false allegations by year of offence in order to prevent problems associated with changes in counting rules and changes in the definition of 'rape'.

Materials

SCAS is a unique unit in the United Kingdom with a national remit to collect cases of stranger rape, murder, and abduction (including attempts) from all United Kingdom police forces for analytical purposes. All information contained within the case papers is coded and entered onto the Violent Crime Linkage Analysis System (ViCLAS) by a team of highly trained staff who utilise strict quality control measures to input all offence details which are taken primarily from the victim statement and/or interview with the police detailing the alleged offence.

The sample of genuine allegations had already been entered onto the ViCLAS database, therefore the required data for this sample were secondary data that were extracted and sanitized in accordance with SCAS policy.

The false allegations were entered onto a copy of the ViCLAS database by the first author, again based on the information contained within the 'victim' statement/ interview (As a SCAS employee, the first author is experienced at entering cases onto ViCLAS and the associated quality control procedures).

Ethical Issues

The information had already been collected by SCAS for the purposes of crime analysis; therefore as the research drew upon data in an existing data source the consent of the individual complainants was not sought. Under current data protection laws all raw data were anonymised to protect the identity and confidentiality of complainants and each case was only identifiable by a number. For each case the data were dichotomously coded (i.e. 0 = absent, 1 ¼ present).

Analysis

Initially frequencies of behaviours among the two sets of cases were compared and significant effects were identified by conducting chi square analysis on each categorical variable. Where a statistically significant effect was found, the odds ratio was then calculated to explore the importance of the behaviour. The resultant significance levels and odds ratios were then used to inform which variables should feed into the logistic regression model.

In addition, a further 12 cases were requested from SCAS, four of which were false and eight of which were genuine. Using the logistic regression model produced the researcher examined these 12 cases and (blindly) classified them as genuine or false. This served as a test of how robust the findings from the main analyses were and served to validate the model.

Dealing with Missing Values

One of the main problems with using data from police files is that some information is incomplete or missing; therefore it was sometimes difficult to ascertain whether something did not happen or simply was not asked about by the interviewer or mentioned by the victim.

The presence of high proportions of missing data causes serious problems in logistic regression, as if a case has a single variable missing then that case will be excluded from the entire analysis. To overcome this issue, behaviours not reported in the victim statement were assumed not to

Variable	Frequency(%)		Calculated value	Level of significance	Odds ratio
	False	Genuine			
Victim white ethnicity	86.3	73.8	4.84	.028*	2.23
Victim unemployed	75.0	61.3	4.48	.034*	1.90
Victim alcohol/drugs	50	63.8	4.17	.041*	0.57
AS outdoors	77.5	63.8	4.66	.031*	1.96
Darkness	70.0	81.9	4.32	.037	0.52
Theft	8.8	36.9	21.16	<.001***	0.16
Con approach	41.3	57.5	5.64	.018*	0.52
Surprise approach	60.0	40.6	8.04	.005**	2.20
Victim injured	23.8	45.0	10.23	.001**	0.38
Violence displayed	32.5	46.3	4.15	.042*	0.56
Kiss/cuddle/fondle	37.5	66.3	17.95	<.001***	0.31
Cunnilingus	1.3	14.7	9.03	.003**	0.08
Digital penetration	21.0	42.0	4.74	.029*	0.48
Anal penetration	7.5	31.3	16.82	<.001***	0.18
Vict masturbate offender	1.3	11.9	7.88	.005**	0.09
Fellatio	11.3	34.4	14.59	<.001***	0.24
No resistance	17.5	34.4	7.41	.006**	0.41
Verbal resistance	17.5	90.6	127.55	<.001***	0.02
Physical resistance	60.0	73.1	4.28	.039*	0.55
One or more precautions	47.5	67.5	8.95	.003**	2.30
Weapon involved	16.3	43.1	17.13	<.001***	0.26
Verbal – victim reporting	10.0	24.4	7.00	.008**	0.35
Verbal – safe departure	2.5	16.3	9.78	.002**	0.13
Verbal – legal/police	2.5	12.5	6.41	.011*	0.18
Verbal – sex acts requested	11.3	55.0	42.39	<.001***	0.10
Verbal – vict participation	1.3	10.0	6.20	.013*	0.11
Verbal – threats	18.8	53.8	26.81	<.001***	0.20
Verbal – reassurance	8.8	27.5	11.20	.001**	0.25
Verbal – curiosity with vict	15.0	32.5	8.35	.004**	0.37
Verbal – self-disclosure	16.3	46.9	21.54	<.001***	0.22
Verbal – ingratiating beh.	3.8	25.0	16.38	.001**	0.12
Verbal – apologies	2.5	16.9	10.37	.004**	0.13
Verbal – prolonged	1.3	8.1	4.59	.032*	0.14
Verbal – psnl knowledge	3.8	13.8	5.72	.017*	0.24
Verbal – victim enjoyment	6.3	16.9	5.21	.022*	0.33
Verbal – no speech	21.3	1.3	29.26	<.001***	21.28
<10 offender utterances	75.0	20.0	68.25	<.001***	13.44
10 + offender utterances	18.8	75.6	70.26	<.001***	0.08
1st told other	83.8	68.8	6.20	.013*	2.34
Victim reported	70	25.6	43.61	<.001***	6.76
Other reported	23.8	68	17.26	<.001***	0.29
Unknown who reported	6.3	22.5	9.94	<.01**	4.36
Reported to police same day	53.8	85.0	27.48	<.001***	4.88
Reported 1 + days later	43.8	9.4	38.21	<.001***	0.13

Table 1. Summary of frequency, chi-square and odds ratio analysis for statistically significant effects (n = 240).

Note: $*p < 0.05$; $**p < 0.01$; $***p < 0.001$.

have happened. For some variables (e.g. number of utterances) it was not appropriate to code dichotomously (e.g. if it was not clear from the case papers how many utterances the offender actually made then it was not appropriate to code as either 'less than 10 utterances' or '10 or more utterances'). For these variables a 'dummy variable' was created for 'unknown'. Dealing with missing data in this way resulted in no cases being dropped from the analysis.

RESULTS

Data were collected for a total of 62 categorical variables (contained within the ViCLAS database), plus age, for each of the 240 cases.

The 44 (out of 62) statistically significant effects from the chi squares and odds ratios are shown in Table 1. An odds ratio larger than one means that group one has a larger proportion than group two, an odds ratio smaller than one means that group two has a larger proportion than group one. (The 18 variables for which no significant effects were found were: multiple offenders, vehicle involved, initial contact outdoors, burglary, abduction, blitz approach, items brought to scene, foreign object insertion, sound precautions, victim restrained, first telling police and the following verbal themes: victim sexual practices, comparison with partner, reference to underwear, abusive language, compliments, justifications, cruelty.)

The mean age of 'genuine' complainants was 26.6 years (ranging from 11 to 87) and that of 'false' complainants was 22.6 years, (ranging from 7 to 55). The distributions of these ages were both significantly non normal. Therefore, a Mann-Whitney U test was used to establish whether there was any difference in the ages of the two samples. This found that false complainants did not differ in age from genuine complainants.

The distributions of the number of sex acts reported in the genuine complaints and in the false complaints were also both significantly non normal. A Mann Whitney showed that significantly more sex acts were reported in genuine cases (Mdn = 3) than were reported in false complaints (Mdn = 1) (U = 4021.00, p =.001, r = -.31).

Similarly, the distributions of the number of precautions reported to have been taken by the offender in genuine cases and in false complaints were also significantly non normal. A Mann-Whitney U test was again performed and it found that significantly more precautions were reported in genuine cases (Mdn = 1) than were reported in false complaints (Mdn = 0) (U = 4927.00, p < .01, r = - .20).

Logistic Regression

Backwards stepwise logistic regression was selected as it begins with the saturated model (with all predictors included) and then removes in an iterative process variables that do not have a substantial effect on the fit of the model.

To limit the variables that were fed into the model, only those that were found (above) to be significant at the p< 0.001 level and those with an odds ratio of greater than 3 or less than 0.33 were input as predictive variables. This resulted in 26 predictor variables which were initially fed into the model. They were then removed in an iterative process with the final model containing five predictor variables and a constant, as detailed in Table 2.

Overall the model correctly classified 220 (91.7%) cases correctly. The false positive rate (classifying a case as genuine when it should have been false) was 7.5% and the false negative rate (classifying a case as false when it should have been genuine) was 8.75%.

Validation of the Model

As a test of the resultant model, an additional 12 cases which had not been included in the original analysis were blindly categorised as false or genuine according to the model, to establish how useful the model would be with other cases. Only two of the 12 cases were inaccurately classified, giving an accuracy rate for genuine cases of 75%, an accuracy rate for false allegations of 100%

Variables included in model	*B (SE)*	95% CI for exp *b*		
		Lower	Exp *b*	Upper
Constant	7.398** (1.73)		84.62	
Theft	-2.39** (0.83)	0.18	0.92	0.46
Verbal resistance	-4.66*** (0.72)	0.00	0.01	0.04
Verbal theme – safe departure	-2.90* (1.16)	0.01	0.06	0.53
Less than 10 offender utterances	2.53*** (0.58)	4.05	12.57	39.02
Victim reported to police	2.96*** (0.66)	5.32	84.62	69.97

Table 2. Logistic regression model.

*Note: R^2 = .68 (Hosmer & Lemeshow); .58 (Cox & Snell); .80 (Nagelkerke). Model x^2 (1) = 207.07, p < .001; *p < .05; **p < .01; ***p 5 .001.*

and an overall accuracy rate of 83%. The false positive rate was zero, and the false negative rate was 25%.

DISCUSSION

Much of the previous research in this area, whilst valuable, has suffered from methodological weakness such as poor definitions of what constitutes a 'false' allegation, small sample sizes, lack of ecological validity and a lack of statistical interpretation from which to draw firm conclusions (Maclean, 1979; McDowell, 1992; Marshall & Alison, 2006; Rainbow, 1996; Theilade & Thomsen, 1986; Woodhams & Grant, 2004). The present study attempted to overcome many of the problems that have hindered previous work and provide a methodologically sounder study.

Forty-four variables were found to demonstrate a significant association (as shown in Table 1), encompassing victimology (including white ethnicity and unemployment), offence demographics (including outdoor assault site and darkness) and offence behaviours (including aspects of the approach, sex acts and verbal themes).

Victimology

A case with a complainant of white ethnicity was found to be 2.2 times more likely to be a false allegation than a case with a complainant not of white ethnicity. Whilst this finding is consistent with Kanin (1994), that study was American and the ethnic composition of the population from which that sample was drawn was not reported. Odds ratios also showed that a case with an unemployed complainant was 1.9 times more likely to be false than a case with an employed complainant. This is also consistent with the findings of previous research (Feist, 2007; Kelly, Lovett, & Regan, 2005; Maclean, 1979; Theilade & Thomsen, 1986).

False complainants less commonly reported being under the influence of alcohol or drugs at the time of the alleged incident which is not consistent with McDowell's (1992) checklist; the current study found that only 50% of false complainants reported being under the influence of drugs or alcohol at the time of the offence, compared to almost 64% of the genuine victims. It was also considered that genuine victims may have concealed the fact that they have been drinking alcohol for fear that they may be viewed as less credible if intoxicated (Temkin, 1997).

Offence Demographics

Analysis showed that false complainants were more likely to allege that the assault site was outdoors and genuine complaints more commonly alleged that the initial contact was made during the hours of darkness. None of the previous studies have discussed offence demographics such as offence location or time.

Offence Behaviours

One of the most significant findings was that a case involving theft was 6.2 times more likely to be genuine than a case without theft, and this was one of the predictive variables that was

included in the final logistic regression model. False complainants were more likely to allege a 'surprise' approach (such as the offender sneaking up and grabbing them), whereas a genuine victim was more likely to report a 'con' approach (such as the offender engaging them in conversation), this is possibly because false complaints wish to be perceived as being overpowered and unable to get away from the alleged offender. These variables have not been considered in previous research.

In the present study genuine victims were more likely to report violence and present with injuries than false complainants which supports Maclean (1979) who reported that false complaints presented with fewer injuries than genuine victims. McDowell and Hibler (1987) reported that serious injuries were rare, yet found that self inflicted injuries were sometimes apparent. Almost 24% of the false complainants in the present study did report some injuries; whilst it is possible that these were self-inflicted, they could also be unrelated injuries.

Similarity to Feist (2007), genuine complainants reported more sexual acts occurring within the offence (median of 3 compared to a median of 1 in false allegations). A wider range of sexual acts were also found across all genuine offences and all sex acts were found to be significantly more common in genuine allegations. This is consistent with previous findings, specifically in relation to anal and oral intercourse (Kanin, 1994; McDowell & Hibler, 1987; Parker & Brown, 2000). However, previous research has generally limited the examination of sexual acts to vaginal, anal and oral sex, yet the current study found that kissing/cuddling/fondling, digital penetration and the victim masturbating the offender were also significant.

In the present study, both genuine and false complaints were likely to allege physical resistance. This finding is in contrast to those of Rainbow (1996) and McDowell and Hibler (1987), who found that false complaints were more likely to report physical resistance than genuine victims. However, a case with verbal resistance was 50 times more likely to be genuine than a case with no verbal resistance. Rainbow (1996) and McDowell and Hibler (1987) did not mention verbal resistance in their studies.

Whilst genuine victims were more likely to report the offender taking one or more precautions, the specific types of precautions (e.g. binding, gagging, blindfolding) were not statistically significant. This suggests that it is not the type of precaution that is important, but the fact that a precaution has or has not been mentioned. A case where any precaution was mentioned was 2.3 times more likely to be genuine than a case where no precautions were mentioned. Cases where a weapon was alleged to have been involved were 3.8 times more likely to be genuine than a case where no weapon was involved. (The involvement of precautions or of a weapon has not been considered in the previous research.)

Offenders were reported to speak significantly more in genuine allegations than in false allegations. The only verbal theme that was found to be more common in the false sample was 'no speech'. Generally, false allegations appear to contain either no or minimal offender speech. This is possibly because false allegers do not think about this in advance of the allegation as they are preoccupied with the sexual acts and behaviour. Woodhams and Grant (2004) looked specifically at alleged rapists' speech in genuine and false allegations; generally they found that more offender utterances were reported in genuine cases than in false cases, as was found in the present study. However, when they controlled for statement length this difference disappeared; in the present study statement length was not recorded in the database, therefore this could not be considered. Rainbow (1996) found that simulated accounts contained less inquisitive language than genuine accounts (although this was not defined).

Complainant Reporting Behaviour

The post-offence behaviour of the complainant was examined to establish whom she first told, who reported it to the police and how long it took to come to police attention.

False and genuine complainants were most likely to first tell someone other than the police (84% and 69%, respectively). For genuine victims this is consistent with the findings of Jordan (2001) who reported that 87.5% initially told someone other than the police. However, in the present study a case where this has occurred is 2.3 times more likely to be a false allegation than when this has not occurred.

The majority of false complainants reported the incident to the police themselves, whereas in the majority of genuine cases someone other than the victim reported the incident. The odds ratios showed that a case where the victim reported the incident was 6.8 times more likely to be false than when this did not occur. Similarly, a case where someone other than the victim reported the incident was 3.4 times more likely to be genuine than when this did not occur. In genuine cases often the victim would approach or be found by a member of the public, who upon being told what had happened would immediately make the call to the police on the victim's behalf.

False cases more commonly took longer than 24 hours to come to the attention of the police, whereas genuine cases were more commonly reported the same day, this is consistent with previous research (Jordan, 2001; Kelly et al., 2005; Lea, Lanvers, & Shaw, 2003; Maclean, 1979). A case that was reported to the police within 24 hours was 4.9 times more likely to be genuine than a case where this did not occur. Similarly, a case where the incident was reported more than 24 hours later was 7.7 times more likely to be false than a case where this did not occur.

The Model

The final logistic model included five variables (theft, verbal resistance, verbal theme – safe departure, less than ten offender utterances and victim reported to the police) plus a constant. This model was considered to achieve an acceptable goodness of fit to the data and was able to successfully categorise 91.7% of the sample. The model was validated using an additional 12 cases and was able to correctly classify 83% of these.

Limitations of the Current Study

This study has improved upon the previous research that has been conducted concerning false and genuine allegations of rape. Whilst attempts were made to overcome the major methodological weaknesses of previous studies, this study was not without its weaknesses.

To the possibility that cases in the present sample were not misclassified only (i) convicted cases and (ii) those with a retraction statement/where the complainant had been charged were used. Whilst there is obviously still a risk that a case may have been misclassified, this risk has been minimised as much as possible and it appears to be at a level that research of this nature cannot go beyond.

Only using genuine cases with a convicted offender may however, affect the data. It is known that less than 10% of reported rapes result in a conviction (Lea et al., 2003), therefore, convicted cases are a small subsample of all reported rapes. It was decided that this classification is less likely to include false allegations in the genuine allegation sample.

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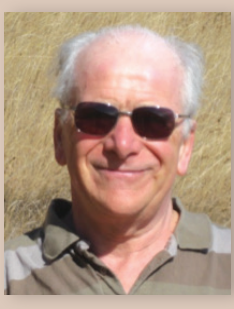
EDITOR'S NOTES



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The article was written by Ms Laura Hunt, supervised by Professor Ray Bull. It was based on Ms Hunt's research project for the Master of Science in Applied Forensic Psychology at the University of Leicester.

CAPTURING EYEWITNESS TESTIMONY USING THE SELF-ADMINISTERED INTERVIEW

By Lorraine Hope and Fiona Gabbert

INVESTIGATIVE CONTEXT

Consider the turmoil in the aftermath of a terrorist attack or, indeed, any other major incident in a crowded public area such as a city centre or large sports stadium. For emergency responders, including the police, the immediate priority will be to assist injured victims, secure the scene against further attacks and preserve any available evidence. Once this has been achieved, focus will revert sharply to the identification and recovery of evidence to pursue the investigation and, ultimately, prosecution of the guilty. Incidents involving numerous witnesses pose a serious investigative challenge. Any of the witnesses in the vicinity may hold potentially vital information about the incident, including descriptions of the perpetrators, i.e. information that could provide both critical leads for the investigation or compelling evidence in a trial. However, investigators may not have the resources in terms of time, expertise or personnel to conduct interviews with numerous witnesses shortly after an incident. All too often witnesses simply leave the scene and, while officers may record their contact details, follow-up enquiries can take months by which time the witness may no longer be able to provide a detailed account of the incident (see Hope, Gabbert & Fisher, 2011).

"Incidents involving numerous witnesses pose a serious investigative challenge. Any of the witnesses in the vicinity may hold potentially vital information about the incident, including descriptions of the perpetrators, i.e. information that could provide both critical leads for the investigation or compelling evidence in a trial."

A high profile incident in a busy city location may generate hundreds of witnesses. Loss of information from witnesses can also occur at far more mundane, albeit equally tragic, incidents. Relatively common incidents, such as a knife-fight outside a nightclub, a violent assault on a train platform or a fatal car accident, produce many cooperative witnesses. On arrival at the scene of such incidents, given limited resources, officers are unlikely to be able to capitalise on multiple witnesses and will instead typically attempt to identify a smaller number of key witnesses. As outlined in Hope et al. (2011), there are (at least) two significant problems with this strategy. First, officers arriving at a chaotic or disorganised scene may experience some difficulty in identifying key witnesses. Indeed, discriminating between witnesses may be based on false or otherwise inaccurate predictors of reliability such as how vocal someone is. In reality, officers need to discriminate efficiently between informative and uninformative witnesses and determine which witnesses to interview as a priority and who to contact at a later date. Second, limiting the focus of the investigation to only a small number of apparently informative witnesses at such an early stage is problematic in that the selected witnesses may not be able to provide complete or reliable accounts. When this becomes evident, officers will usually re-visit the original witness lists but, in the process, time will have passed and important evidentiary information may have been lost. Failing to identify useful witnesses or only becoming aware of the need to interview additional witnesses after a delay of several days, weeks or even months is likely to hamper or even stall the investigation. Worse still, the quality of evidence for subsequent legal proceedings is likely to be significantly impaired.

KEY THREATS TO WITNESS MEMORY

The quality of eyewitness accounts is time-critical. Unfortunately, significant delays between witnessing an incident and being formally interviewed by police are commonplace. In any witnessing situation, memory is prone to decay and this 'forgetting' will occur naturally and within hours of the incident. Delay systematically reduces the amount of information that can be recalled over time such that completeness of eyewitness evidence decreases as the delay between witnessing an incident and recall increases. With delay, memory becomes more 'gist-like', so while witnesses may still be able to provide a general account, potentially vital evidentiary details may be irretrievably lost (Fisher, 1996; Goldsmith, Koriat, & Pansky, 2005).

A further unfortunate aspect of a delay is that it necessarily increases the opportunity that witnesses will be exposed to erroneous or misleading information between witnessing the event and providing the police with an account of the incident. The negative effect of misleading post event information on the accuracy of witness accounts is well documented (Ayers & Reder, 1998; Frenda, Nichols & Loftus, 2011). Common sources of contaminating information are co-witnesses, friends, family members, local or national media, Facebook or other internet sources (Gabbert, Memon & Allan 2011; Hope, Ost, Gabbert, Healey & Lenton, 2008). Telling and re-telling the story to friends and family can also introduce unwitting errors, exaggerations and confabulations. This 'misinformation effect' usually results in individuals erroneously reporting information obtained from other sources as something they have seen themselves. Typically, witnesses who become vulnerable to this effect are unaware that their original memories have been distorted and are unable to distinguish between their original memory and the information encountered from other sources.

A final concern relates to the skill, training and experience of the police interviewer. At worst, poor interviewing practice may lead to the witness giving an account which itself is actually a distortion of the truth or, at the very least, gives rise to the creation of a record of the account which is incomplete and/or inaccurate.

OFFSETTING THREATS TO WITNESS MEMORY

Minimising delay minimises memory decay

Obviously, the sooner a witness has an opportunity to provide his or her account, the less time there is for memory decay to take place. More importantly, research shows that a recall attempt shortly after encoding retards the rate of decay. One possible reason for this is that the act of retrieval can increase the activation level of items of information in memory as well as the associations between those items, thereby strengthening their representation in memory and enhancing the degree to which they are bound with one another to form an integrated episodic memory trace (Anderson, 1983; Ayers & Reder, 1998; Damasio, 1989). Put simply, an early detailed recall attempt can strengthen episodic memory. Perhaps more importantly, retrieving an item from memory also increases the likelihood that it will be recalled again subsequently (Shaw, Bjork & Handal, 1995; Roediger & Karpicke, 2006; see also Hope, Gabbert, Fisher & Jamieson, 2014).

The quality of the initial recall, in terms of the amount and accuracy of information retrieved, is also important for subsequent retrieval attempts. A poor quality account, which might not include many details, is unlikely to benefit a subsequent recall. Accordingly, subsequent retrieval attempts are likely to be facilitated by a good quality initial recall, which optimises the strength of the memory (e.g., Hashtroudi, Johnson, Vnek & Ferguson, 1994; Marsh, Tversky & Hutson, 2005; Suengas & Johnson, 1988; Tversky & Marsh, 2000). This is an important observation in light of common police practice. Witnesses are likely to engage in a rather brief initial interview (to acquire basic investigatory information) at the scene of an incident or shortly afterwards, prior to providing a more detailed statement at some later date. As such current police practice typically fails to capitalise on a

critical opportunity for preserving, protecting and facilitating witness memory. A better initial retrieval attempt would not only provide higher quality information at the outset of the investigation but may also have a beneficial effect on later recall attempts.

Minimising the impact of misleading post-event information

A good memory for an event can protect against exposure to misleading information; when memory is strong, individuals are more likely to identify discrepancies between their own memories and information from other sources. As an initial recall attempt can strengthen episodic memory, witnesses should be less vulnerable to misinformation if they have had an opportunity to engage in a good quality initial recall prior to exposure to misleading post-event information (Memon, Zaragoza, Clifford & Kidd, 2009). Therefore, interviewing witnesses as soon as possible before any potentially misleading post event information has been encountered is also likely to have protective benefits.

"As an initial recall attempt can strengthen episodic memory, witnesses should be less vulnerable to misinformation if they have had an opportunity to engage in a good quality initial recall prior to exposure to misleading post-event information."

Minimising threats associated with the process of eliciting witness statements

The impact of poor interview practice might be reduced by appropriate training, experience and skills development. Alternatively, audio or video recording of the interview may ensure transparency of the process. An alternative solution is to 'cut out the middleman' and allow witnesses to produce their own written statement, in their own words.

THE SELF ADMINISTERED INTERVIEW (SAI©)[1]

Given the threat to witness memory as a function of delay and the well-documented protective and facilitative features of high quality recall attempts, the obvious solution is to (i) reduce the delay between witnessing and interview and (ii) improve the quality of initial reports. However, given the reality of increasingly limited policing resources (time constraints, lack of appropriately trained officers, etc.), calling for more timely high quality interviews with more witnesses is likely to be futile.

To address this unsatisfactory state of affairs, researchers have been working to develop an investigative tool to capture witness evidence in a reliable and sustainable manner. A tool that enables cooperative – and often, highly motivated - witnesses to produce their own high quality accounts without draining police resources would effectively resolve many important issues associated with delay. Such accounts can then be assessed by investigators to determine whether the witness deserves further attention by investigators. Importantly, the witness's account is no longer lost (or in the process of decay) while pragmatic operational decisions are made. Enabling witnesses to provide their own initial account, facilitated by evidence-based retrieval techniques, offers a clear benefit to witnesses, investigators and the subsequent legal process. Furthermore, preserving witness evidence and protecting it from contamination associated with sources external to the investigation (such as ill-informed news reports or Twitter chatter) or internal to the investigation (such as poorly trained interviewers) benefits the subsequent legal process and enhances the quality of evidence available to the Court.

In the current article we trace the development of a tool designed specifically to assist investigators in such circumstances: the Self Administered Interview (SAI©; for an extended overview, see Hope et al., 2011). The SAI© draws on the principle that the sooner a witness can provide a detailed account, the more detailed and accurate the information

provided is likely to be. Delay and exposure to misleading post-event information undermine this principle and constitute particular threats to witness memory – yet both are a common feature of witness experience. The SAI© has been designed to be usable as a generic tool for reporting different types of crimes and takes the form of a booklet suitable for completion either by hand or electronically. The tool draws on core components of the Cognitive Interview ('CI'), which is the current 'best practice' investigative interview protocol designed for use with cooperative witnesses. The CI is an interviewing protocol firmly rooted in empirical principles of social dynamics, memory retrieval and cognition, and communication (Fisher & Geiselman, 1992; for reviews, see Fisher, 2010; Memon, Meissner, & Fraser, 2010). It comprises a number of key memory and cognition principles which support both quality and quantity of retrieval, including facilitating the witness's ability to retrieve the event from memory (e.g., by reinstating the encoding context, encouraging multiple and varied retrieval, and asking witness-compatible questions), promoting high accuracy responses (by discouraging guessing, and not asking leading questions), and not overloading the witness's limited capacity to process information. These components have been adapted for a self-administered format, in the form of the SAI©, by giving careful written instructions, encouraging witnesses to ask themselves open-ended questions and guiding them in techniques which facilitate recall, such as mental reinstatement of context and multiple and varied retrieval.

The SAI© comprises seven sections containing information and instructions designed to facilitate both recall and reporting of memories for a witnessed event. The generic nature of the format, instructions and cues permit the reporting of details of any witnessed criminal incident (see Hope, Gabbert & Fisher, 2011).

LABORATORY TESTS OF THE SAI©

Laboratory tests have demonstrated that the SAI© recall tool elicits significantly more

Figure 1: Completing the SAI©

information (with high accuracy rates) than a simple request for information with no retrieval support (Gabbert, Hope, & Fisher, 2009). Furthermore, the initial completion of an SAI© increases the amount of information provided by witnesses in a delayed investigative interview. Subsequent research shows that witnesses who complete an SAI© are more resistant to misleading information encountered after an incident (Gabbert, Hope, Fisher & Jamieson, 2012). These results indicate that the SAI© not only facilitates memory retrieval but also protects against forgetting.

Accounting for this beneficial SAI© effect is relatively straightforward. In comparison to a basic request for information at the scene of an incident, the SAI© extracts a more complete and detailed account of the witnessed event shortly after encoding and, presumably, before much forgetting has taken place. As retrieving an item from memory increases the likelihood of recalling it subsequently, at least part of the SAI© advantage is derived from generating a detailed memory representation soon after encoding. Thus, not only does the SAI© elicit a more detailed account, but in doing so, it also strengthens, preserves, and protects the memory trace of the witnessed event.

The current version of the SAI© has been tested in the laboratory with community-based adults, including younger (teenager) and older (65+ years) individuals, with different levels of education and life experience.

Findings confirming enhanced reporting of witnessed information via the SAI© have been replicated independently in several laboratories internationally (see, for example, Gawrylowics, Memon, & Scoboria, 2013).

TAKING THE SAI© TO THE STREET

A key goal of the laboratory-based research was to design and refine a practical tool based on sound psychological science that would make a significant contribution to the quality of evidence elicited from witnesses. However, while laboratory simulations provide a controlled environment for proof of concept testing, no interviewing tool or technique can be adequately tested in such a sterile context. Many real crimes and incidents are likely to be arousing, confusing and unexpected. In many cases, witnessing conditions will fall far short of the optimal conditions typically experienced in laboratory tests. For this reason, it was imperative to subject the SAI© to evaluation in forensic settings before recommending it for use by investigators.

Force evaluations of the SAI© commenced in early 2009 and the evaluation of the tool by police forces was endorsed in England and Wales by the Association of Chief Police Officers (ACPO) Investigative Interviewing research committee under the auspices of the National Policing Improvements Agency (NPIA). Several UK and European police forces, including a large metropolitan force in the UK, have established protocols for using the tool in live investigations. All forces currently using the SAI©, either as part of an evaluative trial period or where the SAI© has been adopted as part of force procedure, agree that established interviewing strategy should proceed as usual and that the key purpose of the SAI© is to collect as much information as possible from witnesses at the scene of an incident or shortly thereafter both to preserve witness memory and to elicit time-critical information quickly in a reliable manner (for sample operational case studies and extended discussion of these issues, see Hope, Gabbert & Fisher, 2011).

ADVANTAGES OF SAI© STATEMENTS: ECONOMIC AND FORENSIC PERSPECTIVES

The SAI© offers considerable potential for achieving a number of goals at a time of economic constraint. It affords an effective method of capturing the record of a witness's memory as soon as possible after the relevant events, without the need to rely on the availability of police staff to engage in the time-consuming process of taking a statement. At the same time it reduces the risk of the contamination of memory and testimony – either by the social environment (co-witness, media, social networks) or poor police interviewing practice. Additionally, written statements taken from a witness by a police investigator run the risk of transcription error. If there is no audio or video recording of the interview process, errors may be attributed to witness inconsistency rather than an unintended error in the transcription process. The risk of inaccuracy in recording the nuances of a witness's account is liable to be aggravated where the investigator taking the statement employs paraphrasing with language unfamiliar to the witness. Such statements may result in an emerging statement narrative which is selective in its emphasis and does less than justice to the witness's intended narrative. By 'cutting out the middleman' and allowing witnesses to prepare their account themselves, in their own words, soon after the event, the SAI© may well eliminate that risk. With the use of an SAI© there is less likely to be inconsistency between evidence and the prior statement in the body of the SAI© for another reason. It is conceivable that statements written out by witnesses themselves may facilitate better recall of the event when re-read than a statement compiled by someone else from a narrative recounted to them.

CAVEATS – AND CONTEXTS

Obviously, the SAI© is not suitable for all witnesses or all investigative contexts. Certainly, unmotivated, non-compliant or otherwise hostile witnesses are unlikely to engage with the process of completing the SAI©. Moreover, the incidence of witnesses who experience problems

with literacy or lack confidence in written expression and, for that or other reasons, may be reluctant to engage with the SAI© is not to be underestimated.

Similarly, the needs of witnesses for whom English is a second or limited language may need to be considered. However, the SAI© has already been translated into a number of different languages enabling witnesses to respond in their first language where appropriate translations are available. Practitioners have also noted that encouraging foreign language speakers to report their account in an SAI© may, in fact, be extremely beneficial during an investigation as access to interview interpreters can be limited, may involve significant delays and risks distortion of the witness's account by the interpreter. As noted in Hope et al. (2011) witnesses who require emotional support when providing their accounts may find it difficult to work independently when recalling a traumatic or upsetting experience – although this is an empirical question. However, victims of particular crimes might actually benefit from recording a written account particularly where the crime against them involves trauma or humiliation, as these victims may struggle to vocalise in the early stages of an investigation. Generating a written account may also have some therapeutic value. Anecdotal evidence obtained from police practitioners suggests that victims of rape and serious sexual assault sometimes request to write down their initial account of events. Clearly, further research is needed to explore the methods used to elicit witness and victim accounts in such circumstances.

In wider forensic contexts, completing an SAI© may log a particular instance of behaviour (such as domestic abuse). Similarly, an SAI© might be used to record detailed accounts of incidents in countries where, due to an unstable political or security climate, crimes are unlikely to be adequately investigated until some future date (e.g. genocide or other war crimes). Further research is needed to develop tailored versions of the SAI© for use in such contexts.

In addition to the contexts outlined above, identifying alternative and reliable methods of eliciting accounts from these witnesses is important in many other settings. The SAI© provides a useful framework for procuring such accounts in a number of reporting contexts. Recent work by the research team has led to the development of the Self-Administered Witness – Interview Tool (SAW-IT™), a tool specifically designed to assist accident and incident reporting in occupational settings, particularly in high risk industry sectors such as construction, mining, oil and gas exploration and heavy industry.

CONCLUSION

Premised on robust psychological principles, the SAI© is an effective and efficient investigative tool that preserves and protects witness memory, elicits detailed accounts with high accuracy rates, and facilitates performance on a subsequent interview. An extended programme of rigorous laboratory studies, and successful evaluations in the field, have led to increasing use of the SAI© by investigative practitioners in policing and other investigatory contexts.

ENDNOTES

[1] The SAI© carries a copyright statement to protect the tool from unauthorised or alternative use beyond that specified by the authors. The title of the tool (SAI©) necessarily incorporates the copyright symbol (©) to assert and maintain the identity of the original empirically-tested tool [as described in Gabbert, F., Hope, L. & Fisher, R. P. (2009). Protecting Eyewitness Evidence: Examining the Efficacy of a Self-Administered Interview Tool. Law & Human Behavior, 33, 298-307].

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FACIAL SIGNS OF IMMINENT AGGRESSION:

A PRELIMINARY REPORT

By David Matsumoto and Hyisung C. Hwang

ARE SPECIFIC SIGNS OF ANGER UNIVERSALLY ASSOCIATED WITH ACTS OF SUBSEQUENT VIOLENT BEHAVIOUR?

Being able to identify the signs of imminent aggression may be important in keeping safe those in harm's way. Facial expressions of emotion offer a potential marker for such signs because emotions are rapid information-processing systems that prepare the body for action (Tooby & Cosmides, 2008). They are immediate, unconscious, involuntary, and transient reactions that occur as a result of an appraisal of an event that has implications for the welfare of the organism and potentially require immediate response (Ellsworth & Scherer, 2003; Lazarus, 1991). When elicited, emotions prime behaviours by initiating unique, organised, and coordinated physiological signatures and mental structures (e.g. fleeing in fear, fighting in anger; see Levenson, 1999, 2003); they aid in bonding memories and cognitions (Bower, 1981; Forgas & Bower, 1987); and they are a major source of motivation and action by providing the impulse for behaviour (Frijda, Kuipers, & ter Schure, 1989; Tomkins, 1962, 1963). Facial expressions are part of this coordinated response package, one that is readily available to observers.

We examined the possibility that specific variants of angry facial expressions of emotion are reliably associated with acts of immediate, subsequent violent behaviour. That signs of anger may be seen prior to acts of aggression or assault makes sense if anger primes the body to aggress, and facial expressions are part of the anger response package. But no study has documented that facial expressions of anger are associated with immediate and imminent aggression in the same situation. Given that shootings and physical violence often occur in a matter of seconds, the existence of such signs has important theoretical and practical implications.

The purpose of this study was to conduct a preliminary investigation to identify exactly which type of angry expression may be reliably associated with imminent aggression and to obtain cross-cultural evidence for this linkage. In this study, law enforcement officers (LEOs) who had experienced physical assault were presented with an array of angry expressions and were asked to select the faces they saw immediately prior to the attack. The LEOs were from what we considered to be two very different cultures. We hypothesised that there would be high agreement in the faces they selected as the signs of imminent aggression and in the relative agreement of their selections across cultures.

"The purpose of this study was to conduct a preliminary investigation to identify exactly which type of angry expression may be reliably associated with imminent aggression and to obtain cross-cultural evidence for this linkage."

METHOD

Observers

Observers were 242 LEOs from the U.S. (N = 58, $M_{years\ of\ service}$ = 19.55, M_{age} = 44.26, 88% male) and South Korea (N = 184, $M_{years\ of\ service}$ = 10.63, M_{age} = 37.22, 89% male). The samples differed in number of years of service and mean age, but these variables were not associated with the findings. All participants were recruited during training events and participated in groups. The Americans came from two jurisdictions

while the South Koreans were recruited in Seoul. All officers included in this study answered 'yes' to the following screening questions: (1) have you ever been threatened with a physical assault; (2) have you ever been actually assaulted; (3) did you see the face of the attacker; (4) do you remember it. Only participants who answered 'yes' to all of these screening questions were included in this study.

STIMULI

A Caucasian professional actor posed the expressions used as stimuli. The expressions were generated by first asking the actor to produce faces that had been seen in previous videos involving assaults, attacks, and assassination attempts. Two target expressions each for a premeditated assault and a loss of control assault were produced by asking the actor to move specific muscles on his face that corresponded to the known expressions observed in the videos. The premeditated assault faces included the following muscles: corrugator supercilii, depressor supercilii; levator palpebrae superioris; orbicularis oculi, pars palpebralis; with or without orbicularis oris and mentalis. One of the loss of control expressions included corrugator supercilii, depressor supercilii; levator palpebrae superioris; orbicularis oculi, pars palpebralis; orbicularis oris; and jaw drop. The other loss of control expression included corrugator supercilii, depressor supercilii; levator palpebrae superioris; orbicularis oculi, pars palpebralis; levator labii superioris alaquae nasi; risorius with platysma, with or without levator labii superioris, depressor labii inferioris; orbicularis oris, and jaw clench.

Distractor expressions were also produced by requesting the actor to portray as many different kinds of anger as he knew. Each of the distractors depicted a different variant of the angry expression; that is, all expressions included at least some of the muscles that are involved in the full-face prototype. The expressions differed in the amount and intensity of those muscles and in the presence or absence of zygomatic major (the smiling muscle).

This initial effort resulted in a preliminary creation of 16 expressions. Pilot testing with a separate group of American LEOs prior to the current study indicated that four of the expressions were almost never selected in the procedures described below; thus they were dropped, resulting in the final stimulus set involving 12 expressions, which were placed in a random array and numbered. The target expressions for loss of control assault were Photos 2 and 6; for premeditated assault they were Photos 3 and 4.

PROCEDURES

After answering the initial screening questions, all observers were given the following instructions:

> 'Physical assaults may be **premeditated** or they can occur when a person was not intending to attack but **lost control** and then attacked. We are going to ask you to identify any facial expressions you remember seeing before either a premeditated assault, or a loss of impulse control assault. It is **VERY** important that you rely only on your memory. If none of the pictures fit your memory then check "I remember the faces but it was none of the photos you showed.'

The officers were then shown the array and were asked to select by number any they remembered resembling the face they saw before a premeditated assault. Officers were allowed to select up to three photos. They were also allowed to check a box to indicate that they remembered the expression on the face prior to the assaults but that it was not depicted in the array. (This response was selected approximately 1% of the time.) They then repeated those procedures for a loss of control assault. After completing the selections, the officers provided basic demographic data including jurisdiction, years in the law enforcement or security profession, age and sex.

	Study 1	
Loss of Control	**South Korea LEOs**	**U.S. LEOs**
Photo1	4%	0.00%
Photo2 (Target)	**70%**	**31.03%**
Photo3	7%	8.62%
Photo4	14%	8.62%
Photo5	7%	10.34%
Photo6 (Target)	**66%**	**37.93%**
Photo7	3%	0.00%
Photo8	**36%**	**22.41%**
Photo9	5%	12.07%
Photo10	13%	1.72%
Photo11	**55%**	**32.76%**
Photo12	2%	5.17%
Premeditated Assault		
Photo1	**19.78%**	0.00%
Photo2	6.04%	13.79%
Photo3 (Target)	**37.36%**	**20.69%**
Photo4 (Target)	**57.69%**	**27.59%**
Photo5	**47.80%**	**29.31%**
Photo6	7.14%	13.79%
Photo7	13.19%	10.34%
Photo8	13.19%	17.24%
Photo9	**27.47%**	**24.14%**
Photo10	14.84%	3.45%
Photo11	15.38%	12.07%
Photo12	12.64%	**25.86%**

Table 1: Percentage of observers selecting each photograph, separately for both types of assault. (Boldfaced cells are significantly greater than chance.)

RESULTS

We recoded the responses into dichotomous (selected vs. not selected) choices for each of the 12 expressions, separately for premeditated assault and loss of control, and computed the percentage of officers selecting each expression for both types of attacks (Table 1).

We then tested whether the proportion of observers in each country that selected each expression was significantly greater than chance, separately for the two types of attacks. Chance was set at 1/8. Even though the 12 choices suggested chance = 1/12, we set chance at 1/8 because four of the expressions were similar enough to each other that we considered that there were 8 different expressions. Also, setting chance at 1/8 allowed for a more conservative test of selection compared to chance at 1/12.

For the premeditated assault expression, as predicted, the proportions of South Korean and

American LEOs selecting the two target expressions (Photos 3 and 4) were significantly greater than chance. But a significant proportion of both also selected Photos 5 and 9. Photo 5 was similar to the two target Photos 3 and 4 but included a relatively strong lip corner tightening and lower lip raise, which is often used when a person is attempting to control his or her anger. Photo 9 was also similar to the two target photos but included almost no brow lowering, which typically signifies focus or concentration. A significantly greater than chance proportion of South Korean LEOs also selected Photo 1, which included a smile, and a greater than chance proportion of American LEOs selected Photo 12, which included only a tensing of the lips.

For the loss of control expression, as predicted, the proportions of South Korean and American LEOs selecting the target Photos 2 and 6 were significantly greater than chance. A significant proportion of both also selected Photos 8 and 11. Photo 8 was similar to the target Photo 6 but included a lip corner tightening and lower lip raise which, as mentioned above, is often used when a person is attempting to control his or her anger. Photo 11 was also similar to target Photo 6 but did not include a strong upper eyelid raise, which would indicate intense rage.

Although the consistency between the American and South Korean LEOs in the expressions selected above chance levels was evidence for cross-cultural agreement, we further examined the relative agreement between the two countries by computing Pearson correlations across the observed proportions of observers in both countries selecting each expression, separately for premeditated assault and loss of control (expression was the unit of analysis). Both were significant, $r(12) = .61$, $p < .05$, and $r(12) = .94$, $p < .001$, respectively. We also recomputed these correlations using Spearman rank order and obtained the same results. Thus there was cross-cultural agreement in the relative degree to which each expression was selected as an exemplar of premeditated assault and loss of control; the absolute levels of only a few, however, rose to levels greater than chance.

"There was cross-cultural agreement in the relative degree to which each expression was selected as an exemplar of premeditated assault and loss of control; the absolute levels of only a few, however, rose to levels greater than chance."

DISCUSSION

These findings provided initial evidence for a possible reliable and potentially cross-cultural link between specific facial expressions of emotion and subsequent, immediate behaviour. These findings lead to interesting theoretical questions concerning the relationship between expression and behaviour. Darwin (1872) claimed, in his principle of serviceable habits, that facial expressions are the residual actions of more complete, whole body responses that prepare individuals for action by priming the body to act. Anger is expressed by furrowing the brow and tightening the lips with teeth displayed because these actions are part of an attack response. Disgust is expressed with an open mouth, nose wrinkle and tongue protrusion as part of a vomiting response. But specific variants of emotions, depicted in different expressions, may prime different types of behaviours related to the same family of emotion. Thus, a different anger expression variant may be associated with verbal aggression or aggressive thoughts. This notion is consonant with the idea that different variants of full-face, prototypical emotional expressions are displayed depending on different appraisals related to the situation or context (Scherer & Ellgring, 2007). Future research may explore the link between the specific appraisals associated with different types of assaults and the specific variants of the emotional expressions linked to them.

These findings also have practical implications. Identification of the facial signs that immediately precede aggression of any type allows the field to develop ways of training individuals in harm's way to recognise them quickly, thus allowing for evasive or defensive action to occur, perhaps preventing the violence or aggression. Moreover, the fact that observers

in two very different cultures identified the same facial signs to imminent aggression suggests that these signs are universal. If so, training the ability to detect these signs has applicability to individuals in harm's way around the world in many different cultures. Future research documenting the specific variants of anger and other emotions that are associated with acts of hostility in terrorist or other ideologically based groups (e.g., contempt and disgust; see Matsumoto, Hwang, & Frank, 2012, 2013) would lead to the production of similar warning systems and training tools.

POSSIBLE FUTURE STUDIES

One limitation of the study was that it was possible that the observers selected the faces on the basis of stereotypes of imminent assault, believing what it should look like, not what it actually looked like. Data from individuals without the experience of assault should address this issue. If those with little or no experience select the same faces, it would imply that these selections are not based on experience but on stereotypes.

Another limitation of the study was that the findings were not as clear-cut. Although LEOs in both cultures identified the target expressions as intended, they also identified some distractor expressions at statistically significant rates. Future studies will need to replicate the findings on the target expressions and examine whether the non-target faces that were significant in this study continue to be recognised by other samples as well.

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EDITOR'S NOTES

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MAJOR INCIDENT LEADERSHIP:

A PERSPECTIVE FROM THE EMERGENCY SERVICES

By Jeffery Chin, Majeed Khader and Jansen Ang

INTRODUCTION

Incident commanders from the emergency services are entrusted with important responsibilities during major incidents. Under challenging conditions, they are required to identify critical causes (Mumford & Van Doorn, 2001), make decisions on operational goals and generate mitigation solutions. Their conceptualisations of incidents are often vital in determining the effectiveness of subsequent collective actions (Zaccaro, Rittman & Marks, 2001).

In light of the arduous demands on incident commanders, a comprehensive understanding of leadership requirements under such testing conditions is essential to inform selection and developmental interventions. This in turn serves to enhance the response of the emergency services during major incidents. It is also especially pertinent, given the infrequent occurrences of major incidents that allow commanders real-life opportunities to build competence (Sarna, 2002).

A survey of the literature shows that empirical research on major incident leadership in the emergency services is relatively limited (Flin, 1996; Wright, Alison & Crego, 2008; Hannah, Uhl-Bien, Avolio & Cavarretta, 2009).

The present study thus aims to contribute to the limited research in this important domain. Specifically, it seeks to examine the views of emergency services personnel on important leadership abilities and knowledge required of incident commanders at the tactical level, including the views of both leaders and followers. In the process, it aims to develop a multi-faceted thematic model of abilities and knowledge required for major incident leadership.

ON MAJOR INCIDENT LEADERSHIP

While there is no standard definition of major incidents (Flin, 1996), the environments of major incidents are characterised by much uncertainty, complexity, time pressure, stress and information overload (Alison & Crego, 2008; Flin, 1996). Such events pose significant threat to lives and infrastructure, disrupt routines of organisations and communities, and demand significant mobilisation and coordination of multi-agency public safety resources (Flin, 1996, Sarna, 2002). Instances of major incidents include terrorist incidents, man-made and natural disasters.

Commanders of such incidents may initially face problems identifying the critical causes (Amabile, 1997) and acquiring accurate and diagnostically relevant information. They are often faced with many rapidly unfolding problems and at times, have to generate solutions to novel problems within short periods of time (Mumford, Zaccaro, Harding, Jacobs & Fleishman, 2000). In addition, incident commanders and their teams work under intense public and media scrutiny (Cronin & Reicher, 2006) and are held accountable to various stakeholders for their actions (van den Heuvel, Alison & Crego, 2010).

PERFORMANCE REQUIREMENTS OF INCIDENT COMMANDERS

Flin and Slaven (1994) examined selection, training and assessment procedures of several major organisations whose staff assume command positions in major emergencies. They reported that common abilities required of incident commanders include the ability to lead, delegate, work in teams, conduct situation assessments, make decisions under stress, plan and execute plans, manage stress and

communicate well. Crichton and colleagues reported similar competencies from their study that examined command abilities of incident managers of oil installations (Crichton, Lauche & Flin, 2005).

Specific to leadership in the fire service, Davis (2002) also highlighted in a case study, several key abilities required of fire commanders. They included the ability to obtain accurate information, conduct risk assessments, delegate, establish and maintain strong communication links, be cognizant of political pressures and external liabilities, and stress management.

Khoo and colleagues conducted a qualitative analysis of interview transcripts of 49 senior leaders from the Ministry of Home Affairs (MHA), Singapore. The participants were earlier interviewed on their views of crisis leadership capabilities required of leaders in emergency response agencies at the tactical level of command (Khoo, Soh, Khader & Ang, 2008). They reported 6 general themes that characterised abilities and knowledge of effective crisis leaders, namely- situation awareness, crisis decision-making, crisis communication, task management, team management and operational knowledge.

"Khoo and colleagues reported 6 general themes that characterised abilities and knowledge of effective crisis leaders, namely, situation awareness, crisis decision-making, crisis communication, task management, team management and operational knowledge."

CAPABILITIES APPROACH TO LEADERSHIP

It is observed that earlier research efforts have mostly been conducted under the auspices of 'incident command' and appear to be relatively 'detached' from traditional leadership research, despite the conceptual similarities between incident command and leadership (Arbuthnot, 2002).

The research literature on organisational leadership can plausibly be applied in the discussion of leadership abilities/knowledge required for major incident management, in view of the similarities in operating context. Mumford and colleagues described organisational leadership contexts to be fraught with ill-defined problems, with leaders regularly facing challenges with problem identification and acquiring accurate information to facilitate problem-solving efforts (Mumford et al., 2000). Ineffective leadership has severe consequences, as leaders' interpretations of problems form the basis for subsequent collective actions (Jacobs & Jacques, 1987). Within this context, solutions are developed in consultation with and implemented through their peers/followers (Mumford et al., 2000). Next, abilities/knowledge required for effective organisational leadership has been described to be multi-faceted. Mumford et al. (2000), proposed a multi-faceted model of leadership focused on leaders' characteristics and abilities. Three leadership elements, namely creative problem-solving abilities, social judgment abilities and knowledge form the core of this model.

Creative problem-solving abilities include abilities related to problem identification and solution generation, while social judgment abilities are abilities enabling leaders to work with people and manage conflict. Knowledge refers to domain-specific knowledge about the tasks, the organisation and its people - such knowledge plays a central role in organisational leadership as it provides the basis for leaders' effective application of their abilities (Mumford et al, 2000).

In light of previous research on critical/major incident leadership, it is plausible that requisite major incident leadership abilities/knowledge is multi-faceted and is broadly similar in structure to that proposed by Mumford et al., (2000). Specifically, it is evident from previous research that incident commanders require both cognitive/task-related and interpersonal/ team-related abilities for effective performance

during major incidents. Hence, it is likely that a thematic model for major incident leadership abilities will comprise both elements, with operational knowledge occupying a central role in enabling leaders to apply both abilities during major incidents.

IMPORTANT LEADERSHIP ABILITIES AND KNOWLEDGE

While previous leadership research have stressed the social/interpersonal aspects of leadership (e.g. Halverson, Murphy & Riggio, 2004; Pillai, 1996), the importance of cognitive/task-related aspects of leadership is increasingly being recognised in recent research (e.g. Mumford et al, 2000; Mumford et al. 2007). It has been proposed that the importance of leaders' cognitive/task-related abilities would especially be salient in contexts characterised by uncertainty, complexity and where a possible range of problem solutions exists (Mumford et al., 2007) - conditions similar to major incidents. As limited research exists in the area of major incident leadership, the present study will examine abilities/knowledge perceived to be particularly important for effective major incident leadership.

AIM OF THIS STUDY

The following research questions will be examined in the present study:

- What is the thematic structure of major incident leadership abilities and knowledge at the tactical level of command from the perspective of the emergency services?
- Which abilities/knowledge will be perceived to be particularly important for effective major incident leadership at the tactical level?

METHOD

Data for the study was obtained from an existing 33-item questionnaire dataset from the Home Team Behavioural Sciences Centre (HTBSC), Singapore. The participant sample was 1425, with 770 (54.0%) police officers from the Singapore Police Force and 655 (46.0%) rescue officers from the Singapore Civil Defence Force. 84.0% of the participants were male. Participants' length of service ranged from less than 2 years to more than 30 years, with 69.5% of the participants possessing a minimum of 5 years of service. 22.3% of the participants were senior-ranked officers and 68.6% of the participants were engaged in frontline operations at the time of participation. Participants rated on a 5-point Likert scale on the degree of their agreement (where 1 = disagree and 5 = agree) with statements on the importance of each ability/knowledge to effective major incident leadership.

RESULTS

Given the exploratory nature of the study, Smallest Space Analysis (SSA) (Lingoes, 1973), a non-metric, multi-dimensional scaling procedure was used to analyse the underlying thematic structure of the data. SSA is an appropriate means of analysis as it places more emphasis on the conceptual relationships between each and every variable (Alison, et al., 2007), providing richer information instead of focusing on absolute values or super-ordinate factors common of conventional techniques [e.g. factor analysis (FA)]. The analysis was carried out using the Guttman-Lingoes SSA-1 programme and the measure of association used was Pearson's product moment correlation, given the interval nature of the data.

A three-dimensional solution with a coefficient of alienation of 0.18 in 59 iterations was obtained, indicating that the solution plot offered a good representation of the correlation matrix. A visual inspection of the SSA plot reveals that the 33 leadership abilities and knowledge can be demarcated into four distinct themes, namely task abilities, monitoring abilities, interpersonal abilities and operational knowledge.

"A visual inspection of the SSA plot reveals that the 33 leadership abilities and knowledge can be demarcated into four distinct themes, namely task abilities, monitoring abilities, interpersonal abilities and operational knowledge."

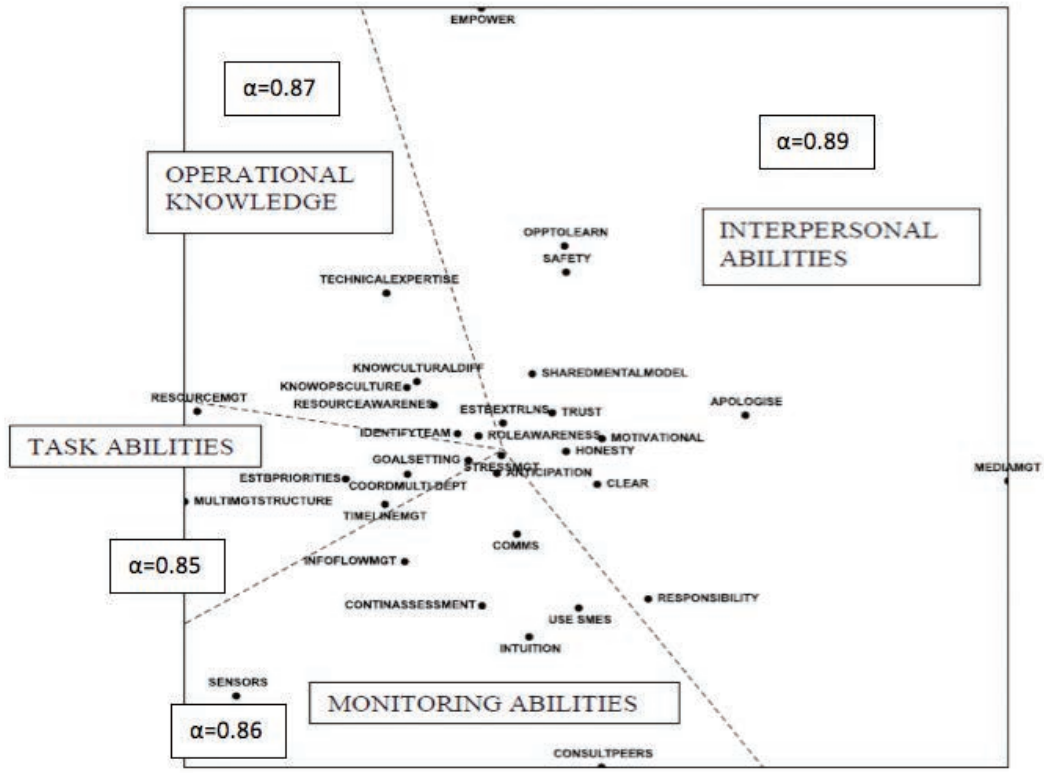

Figure 1. A 2x3 projection of a three-dimensional SSA based on ratings of importance of 33 leadership abilities/knowledge across 1425 participants from the police and rescue service. (Guttman-Lingoes' coefficient of alienation of 0.18 in 59 iterations)

The internal reliability of each region was analysed using Cronbach's alpha coefficients. From Figure 1, it is evident that all four thematic regions have high reliabilities, suggesting that the partitioning appropriately represents the themes (Canter & Fritzon, 1998).

From Figure 1, it can be observed that the regions can be broadly differentiated into task management-related and interpersonal/team-management abilities.

The super-ordinate thematic region for task management-related abilities can be further demarcated into two contiguous regions: task and monitoring abilities. As indicated by the adjacent location of both regions to each other, while items in both regions are broadly thematically similar (i.e. related to management of tasks), a subtle conceptual distinction between the regions can be identified.

The thematic region for *task abilities* comprises items that describe abilities required for managing the 'stable' aspects of major incidents. They include items such as the ability to establish and manage timelines, manage resources, establish multi-management structures and coordinate multi-departmental efforts.

On the other hand, the thematic region for monitoring abilities consist of items that describe specific abilities required for managing the 'dynamic' aspects of major incidents; so that situation awareness can be maintained as incidents unfold. Items include the ability to continually assess situations, anticipate potential problems and consult with peers and subject matter experts to maintain a 'big picture' perspective.

Items in the *interpersonal theme* include communication-related abilities such as being clear and precise with information provision, use of motivational narratives to encourage followers

and being open and honest. Also included in the interpersonal theme are team management-related abilities such as developing shared mental models, fostering trust and ensuring the safety of team members.

The theme for *operational knowledge* is located between the themes for task and interpersonal abilities. Items subsumed under operational knowledge include knowledge-related items that enable leaders to perform their task and team-related responsibilities. They include awareness of one's role and responsibilities, possession of technical expertise and knowledge of operational cultures of stakeholders/partners.

IMPORTANT LEADERSHIP ABILITIES/ KNOWLEDGE

As the data was not normally distributed, a 4x1 Friedman's ANOVA test was used to analyse for differences in the scores of facets. There was a statistical difference between the mean ranks of participants' ratings between the facets, $\chi^2(3) = 49.46$, $p < .001$. Post-hoc analysis with Wilcoxon Signed-Rank Tests was conducted with the application of a Bonferroni correction, resulting in a significant level set at $p < 0.008$. There were significant differences between operational knowledge and task abilities ($z = -5.31$, $p < .001$, $r = -0.10$) and operational knowledge and monitoring abilities ($z = -4.80$, $p < .001$, $r = -0.09$). There were also significant differences between interpersonal abilities and task abilities ($z = -5.21$, $p < .001$, $r = -0.10$) and interpersonal and monitoring abilities ($z = -4.46$, $p < .001$, $r = -0.08$). No statistically significant differences were found between operational knowledge and interpersonal abilities ($z = -0.59$, $p > .05$, $r = -0.01$) and between task and monitoring abilities ($z = -1.21$, $p > .05$, $r = -0.02$).

In summary, the results indicated that participants tended to perceive operational knowledge and interpersonal abilities to be more important compared to task and monitoring abilities for effective leadership at a tactical level during major incidents.

DISCUSSION

The four-faceted thematic model contributes to the limited research in major incident leadership by offering a set of key themes that defines abilities and knowledge required of incident commanders. This finding is consistent with the core of the abilities-based organisational leadership model described by Mumford et al. (2000), indicating that traditional leadership research can be applied to further the understanding of leadership during major incidents. In addition, the method of analysis allowed for the identification of the relationships of both the themes and individual abilities/ knowledge to each other. This empirical model can be useful in guiding future research and also in the consideration of selection, assessment and developmental interventions.

A distinction between task (encompassing both task and monitoring abilities) and interpersonal abilities is also evident from the solution plot. This finding complements prevailing leadership discourse (Fleishman et al., 1991) that describes leadership to be largely comprised of both task and relationship behaviours as it highlights task and interpersonal-related abilities required to enable leaders' performance of task and relationship behaviours.

It is interesting to note that the super-ordinate region for task management related abilities can be further demarcated into 2 contiguous regions, specifically task and monitoring abilities. This plausibly reflects the unique demands of major incident management, whereby task abilities are required to manage 'stable' aspects of major incidents (e.g. manage timelines, resources, establish multi-management structures) while specific monitoring abilities are required for the management the 'dynamic' aspects (e.g. continually assess of situation, anticipate potential problems), so that situation awareness can be maintained as the incidents unfold.

The alignment of the regions of the four-faceted model and participants' ratings reveals another interesting finding. Specifically, in terms of regional alignment, the region for operational

knowledge is located between the regions for task and interpersonal abilities. It suggests that operational knowledge (e.g. the possession of technical knowledge, the understanding of stakeholders' operational cultures) underpins the capability to perform task-related abilities (e.g. goal-setting, resource management) and interpersonal-related abilities (e.g. ensure safety of team, promoting trust amongst team members). In addition, findings derived from the mean ratings of participants for each region further support the importance for tactical-level commanders to possess operational knowledge in the context of major incidents. Both findings are consistent with the assertion by Mumford et al. (2000) of the vital role of knowledge in enabling effective performance of leadership abilities. Knowledge, particularly case-based/ experiential knowledge, has been implicated in influencing how leaders identify, frame problems and develop solutions during crises (Mumford et al., 2007). The NDM literature also recognises the role of knowledge/expertise in effective decision-making under challenging conditions (Klein, 1998). As researchers (e.g. Mumford et al, 2000) have lamented about the role of knowledge receiving insufficient attention in leadership research, the present findings provide support for the need to attend to the role of knowledge in subsequent leadership research.

CONCLUSION

The present study set out to examine abilities and knowledge required for effective leadership during major incidents at a tactical level of command from the perspective of the emergency services. To this end, a four-faceted thematic model of leadership abilities and knowledge was developed. Both operational knowledge and interpersonal abilities were perceived to be particularly important by practitioners. In addition, while conceptualisations of abilities and knowledge required for major incident leadership were found to be broadly consistent across organisational contexts and hierarchical levels, differences in ratings were also identified, indicating differences in expectations of leaders in both groups. Effective leadership is postulated to be especially crucial during non-routine events such as major incidents (Zaccaro & Klimoski, 2001). It is hoped that findings from the present study can help further the understanding of major incident leadership by adding to the limited empirical research in this important domain.

ENDNOTES

[1] The terms, critical incident and major incident, in addition to the term crisis, are often interchangeably used to describe similar situations in the research literature (e.g. Flin, 1996). For brevity, the terms will be used interchangeably in the present paper unless otherwise stated.

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EDITOR'S NOTES

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BOOK REVIEW

CONTEMPORARY DRUG POLICY: NEW DIRECTIONS IN CRITICAL CRIMINOLOGY

Author: Henry H. Brownstein
128pp. Published by Routledge, 20 March 2013

By Timothy Leng

'Reality is a social construction' - this phrase in Henry H. Brownstein's book, *Contemporary Drug Policy: New Directions in Critical Criminology*, is crucial in understanding its context. A sociologist at the University of Chicago and former Director of the Drugs and Crime Research Division at the National Institute of Justice in the United States, Brownstein believes that in a world full of subjective competing interests, it is the most powerful interest that prevails, rather than the most scientifically verified. In this book, he argues that established policies and practices designed to address drug-related problems are grounded in theories and beliefs that are not always supported by solid evidence, and often built on unfounded assumptions or theories that lead in directions that are not always productive. Hence, this book is an attempt to deconstruct ideologically-led policies in favour of empirically effective ones. Brownstein qualifies that the book is not meant to provide a direction for policy making, but rather, meant to identify key issues to be considered when making drug policies so as to be as objective as possible. To that end Brownstein focuses on three areas of concern, namely, a) control and regulation, b) management, and c) value, discussing in relation to each area, the associated ideology and criminological theory as well as the resultant policy.

The debate over control and regulation is over public policies that view drugs as a broad social problem of safety and health and are directed at regulating or controlling the problem. Criticisms of this approach anchor around arguments that not enough questions have been asked about the purpose of such an approach. Brownstein cites Rockefeller's Drug Law and Senate Bill 1918 as examples of two different approaches in the US. Rockefeller's Drug Law was passed in 1973 to solve the problem of drugs by increasing the punishments for drug offenders. As the situation continued to worsen instead over the years, an attempt to reform the law was mounted in 2009. The proponents of Senate Bill 1918 questioned whether drugs were indeed a problem by proposing to mitigate the negative aspects of drug use, possession and sales. The Bill was perceived as an attempt at drug legalisation and rejected on fears – not necessarily grounded in scientific proof - that legalisation would make the drug situation worse. This debate leads Brownstein to argue that law enforcement policies of control and regulation should be subjected to the same questions as alternative policies to establish a more effective drug policy.

The debate over management looks at policies that view drugs as a problem but scope it as a health issue to be managed. An example cited by Brownstein is the way the Netherlands has managed to decriminalise cannabis without any significant drawbacks to demonstrate that 'the use or distribution of drugs might not be harmful to people' (p. 39). Managing harm reduction as a public health instead of a criminal justice approach is seen to focus on 'the negative consequences of drug use rather than on eliminating drug use or ensuring abstinence'. This is similar to the management of policies on tobacco and alcohol, where there is a framework in which such substances can be used safely.

The debate over value concerns policies that address the proper place in society for the use of drugs and the people who use them. It warns against building policies upon personal or

religious ideology instead of relying on empirical data or scientific evidence. Brownstein cites the example of Harry Anslinger, the Commissioner of the Federal Bureau of Narcotics (FBN) from 1930 to 1962, who proclaimed marijuana to be an evil drug without any concrete proof other than unverified events involving crime and marijuana. Yet Anslinger's position of power and point of view dictated American drug policy for over 30 years and contributed to the War on Drugs declared by President Richard Nixon in July 1971. Thus, while Brownstein agrees that it is inherently human to label people as either good or bad, the most realistic course of action would be to have an honest discussion about values in drug policy. This is to identify the 'existence of any value-based elements in the application and practice of many established drug policies' that 'cannot be justified in a civil society' (p. 69).

Brownstein uses several case studies of the crack cocaine and methamphetamine problem in America in the late 20th century to argue his case. Hard-line policies such as the arrest of established dealers worsened the situation and led to small-time pushers and manufacturers being replaced by less established dealers prone to violently carving out their territory, and more powerful drug manufacturing syndicates such as the Mexican cartels. The strong precursor controls in America also prompted drug syndicates to move their operations to less traditional drug markets such as Southeast Asia. The cases suggest that poorly formulated policies not only fail, but also induce negative externalities in neighbouring countries. While this observation is inevitably made in hindsight, it does show that many consequences of drug policies are not immediately apparent to policymakers.

"The cases suggest that poorly formulated policies not only fail, but also induce negative externalities in neighbouring countries."

COMMENTS

Brownstein advocates the use of empirical evidence in policy making. However, he does not appear to have considered differences in a country's environment and social values. What works in one country may not work in another since they may have different circumstances in dealing with their local drug problems. Beyond empirical evidence, it is also important to ask – as a society, how tolerant are we of the social problems associated with drug addiction and are we prepared to accept these consequences. The ideological motivations or values which Brownstein downplays are, to some extent, a reflection of the prevailing societal values which a government must seek to represent.

"Beyond empirical evidence, it is also important to ask – as a society, how tolerant are we of the social problems associated with drug addiction and are we prepared to accept these consequences."

In addition, his analysis appears to suggest that countries that criminalise drug use are implementing policies that are not backed up by empirical data. This is not the case for Singapore, which has long relied on empirical data to tackle the drug problem; the recommendations from the Taskforce on Drugs in 2011, for example, are the result of a thorough examination of empirical data and scientific evidence. Based on qualitative and quantitative data from focus group discussions and joint research studies, and analysis of statistical trends on Singapore's drug situation, the Taskforce on Drugs recommended targeted prevention and upstream intervention to counter the rising trend of young abusers. It also recommended enhancements to the rehabilitation and supervision regime to better help ex-abusers reintegrate into society.

Unfortunately, Brownstein also does not explore other models of drug policy, such as where law enforcement co-exists with harm reduction policies. This is the approach taken in Sweden where tough legislation co-exists with facilities for Needle Syringe Exchange Programmes.

For those involved in researching and crafting drug policy, this is a useful book as it sums up the ongoing debates over the various approaches to drug control policies. It is also a reminder that policies must be logical and rational in conception, implementation and communication for it to be effective. It shows a difference between science (evidence) and ideology (values); hidden beneath policies lies a dormant ideological bias in determining its rationale. Brownstein challenges readers, and thus policymakers, to 'engage in an open and honest social discourse and public debate that would increase opportunities for new evidence to be found and evaluated, new ideas to be tested, and new policies to be tried and assessed'. To that end, the book is deliberate in raising more questions than answers in order to highlight the need for more debate and discussion in policy making in general.

"It is also a reminder that policies must be logical and rational in conception, implementation and communication for it to be effective."

EDITOR'S NOTES

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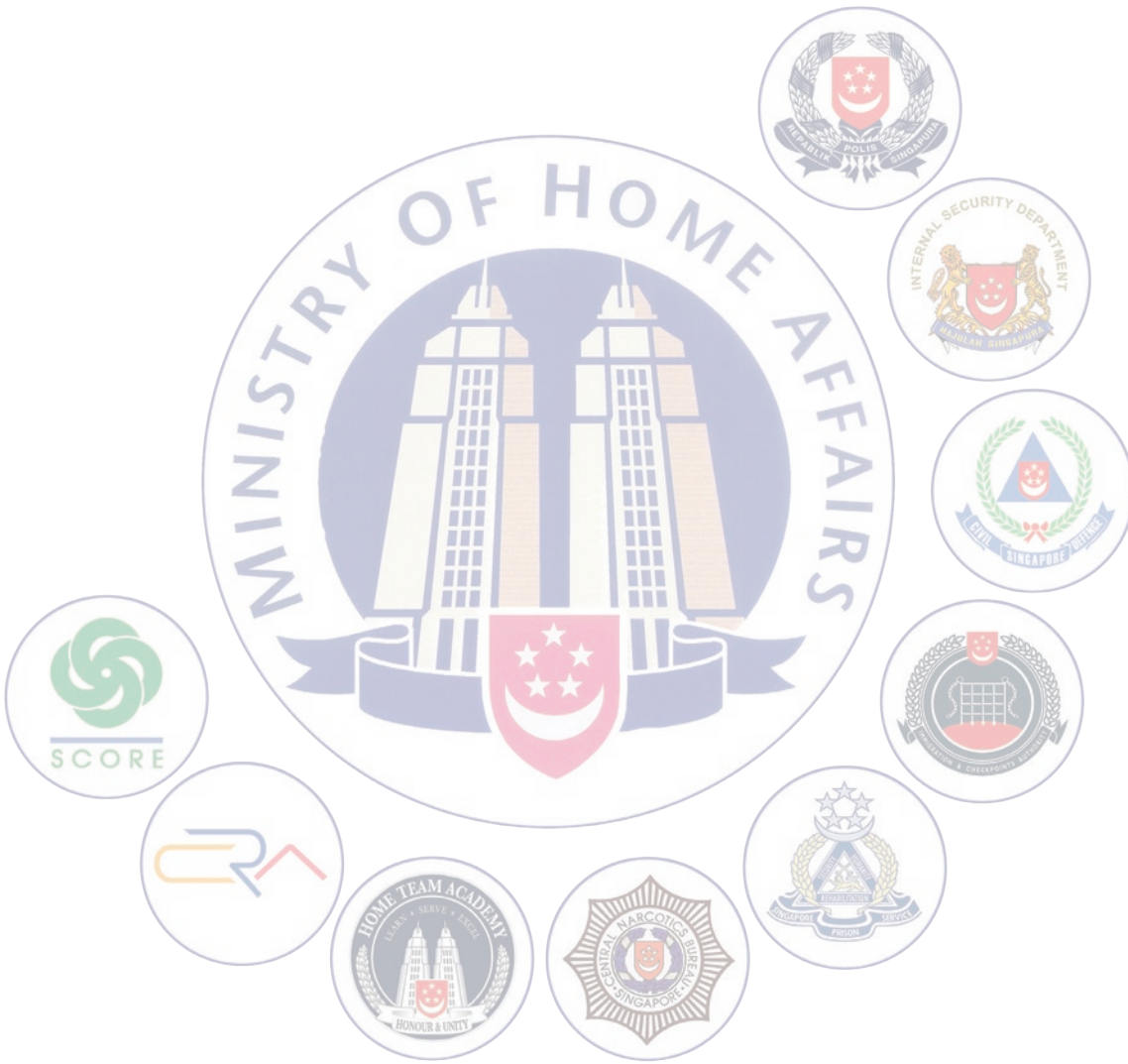
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