

## Impact case study (REF3)

<b>Institution:</b> University of Leicester		
<b>Unit of Assessment:</b> 20 Social Work and Social Policy		
<b>Title of case study:</b> Crime linkage: building better policy, practice and law through interdisciplinary research		
<b>Period when the underpinning research was undertaken:</b> 2012–2019		
<b>Details of staff conducting the underpinning research from the submitting unit:</b>		
<b>Name(s):</b>	<b>Role(s) (e.g. job title):</b>	<b>Period(s) employed by submitting HEI:</b>
Dr Matthew Tonkin	Associate Professor of Criminology	15/09/2016 – Present
Prof Ray Bull	Professor of Forensic Psychology	01/02/2004 – 30/09/2012
<b>Period when the claimed impact occurred:</b> 2017–2020		
<b>Is this case study continued from a case study submitted in 2014?</b> N		
<b>1. Summary of the impact</b>		
<p>Most crime is committed by a minority of serial offenders. The analysis of criminal behaviour using crime linkage can identify repeat perpetrators and increase the likelihood of resolving multiple crimes at once, streamlining police investigations. Tonkin and Bull's research into crime linkage has changed policy, practice, and the law in the UK, New Zealand, Belgium, and Sweden. The research has enhanced crime linkage practice at multiple stages, from data collection and storage to the application of crime linkage techniques during ongoing police investigations. Ultimately, enhanced crime linkage ensures that the public are better protected from victimisation and enables greater access to justice for victims.</p>		
<b>2. Underpinning research</b>		
<p>Most crime is committed by a minority of prolific, serial offenders (for example, Falk et al (2014) estimates that over 60% of crime is committed by just 1% of offenders). These serial offenders impose considerable financial and human costs on society in the UK alone this is estimated to be £18.1 billion/year. A key law enforcement strategy for tackling serial offending is crime linkage, which involves searching for crimes that are similar in terms of offender crime scene behaviour. Linking crimes in this way enhances the quantity and quality of evidence available to prosecute offenders and helps police investigations to work in a more cost-effective and streamlined way.</p> <p>Tonkin, Bull, and colleagues have worked with law enforcement agencies in the UK, New Zealand, Belgium, Sweden, Finland, the Netherlands, Norway, Canada, and South Africa to investigate how the behavioural sciences can be used to enhance the police's ability to use crime linkage effectively.</p> <p>Focusing on crime linkage across a range of crime types—including sexual offences, burglary, car theft, and robbery [R1-6]—their research has:</p> <ol style="list-style-type: none"> <li>1. Demonstrated that crime linkage is a viable investigative technique;</li> <li>2. Created new methods for recording/coding behavioural crime scene information;</li> <li>3. Identified specific types of offender behaviour that are most useful for crime linkage;</li> <li>4. Demonstrated how crime analysts can quantify the level of behavioural similarity between multiple crimes;</li> <li>5. Developed novel, accurate and robust statistical techniques that can be used by the police to make crime linkage predictions during investigations and produced recommendations on how to use them.</li> </ol>		

An example of this work is the Leverhulme Trust-funded [G1] Crime Linkage International Network (C-LINK: [R7]), established in 2013, of which Tonkin is a founding member. C-LINK has academic and practitioner representatives from 12 countries, spread across 4 continents. As part of C-LINK, Tonkin led the collection and analysis of data relating to 3,364 sexual offences committed in 5 countries. This dataset is the largest and most diverse and most relevant to policing practise ever collected to investigate crime linkage. The analyses led by Tonkin developed statistical algorithms/formulae that were able to identify linked sexual crimes with a high degree of accuracy [R1, R2], thereby demonstrating that crime linkage has the potential to work reliably and accurately with sexual offences and justifying the use of this technique by international police agencies.

C-LINK research addressed long-standing limitations within the literature that have been recognised (but unaddressed) by researchers for over 15 years. These limitations have also been recognised by police practitioners and cited in the courts as a fundamental limitation of existing research (see HM Advocate vs. Young, 2013). C-LINK addressed these limitations by testing crime linkage with a dataset containing solved, unsolved, serial and one-off crimes. This was important because prior work had only tested crime linkage using solved, serial offences, which does not reflect the real-world scenario in which crime linkage is conducted.

The C-LINK research represents the most comprehensive test of crime linkage to date, and the best available evidence base with which to guide crime linkage practitioners who work with sexual offences.

### 3. References to the research

[R1] **Tonkin, M.**, Pakkanen, T., Sirén, J., Bennell, C., Woodhams, J., Burrell, A. ... & Santtila, P. (2017). Using offender crime scene behavior to link stranger sexual assaults: A comparison of three statistical approaches. *Journal of Criminal Justice*, 50, 19-28. doi: 10.1016/j.jcrimjus.2017.04.002.

[R2] Woodhams, J., **Tonkin, M.**, Burrell, A., Imre, H., Winter, J. M., Lam, E. K. M. ... Santtila, P. (2019). Linking serial sex offences: Moving towards an ecologically valid test of the principles of crime linkage. *Legal and Criminological Psychology*, 24, 123-140. doi: 10.1111/lcrp.12144.

[R3] **Tonkin, M.**, Santtila, P., & **Bull, R.** (2012). The linking of burglary crimes using offender behaviour: Testing research cross-nationally and exploring methodology. *Legal and Criminological Psychology*, 17, 276-293. doi: 10.1111/j.2044-8333.2010.02007.x.

[R4] **Tonkin, M.**, Lemeire, J., Santtila, P., & Winter, J. M. (2019). Linking property crime using offender crime scene behaviour: A comparison of methods. *Journal of Investigative Psychology and Offender Profiling*, 16, 75-90. doi: 10.1002/jip.1525.

[R5] **Tonkin, M.**, Woodhams, J., **Bull, R.**, Bond, J. W., & Santtila, P. (2012). A comparison of logistic regression and classification tree analysis for behavioural case linkage. *Journal of Investigative Psychology and Offender Profiling*, 9, 235-258. doi: 10.1002/jip.1367.

[R6] **Tonkin, M.**, & Woodhams, J. (2017). The feasibility of using crime scene behaviour to detect versatile serial offenders: An empirical test of behavioural consistency, distinctiveness and discrimination accuracy. *Legal and Criminological Psychology*, 22, 99-115. doi: 10.1111/lcrp.12085.

[G1] Leverhulme Trust International Network Grant. *Detecting Serial Offenders: C-LINK (Crime Linkage International Network)*.

### 4. Details of the impact

The research of Tonkin, Bull, and C-LINK has changed policies, practices, and the law

internationally through significantly enhancing the police's ability to conduct more effective crime linkage. This has maximised opportunities to detect and prosecute serial offenders and provided victims with greater access to justice. Primary beneficiaries are police crime analysts conducting crime linkage and secondary beneficiaries are police investigators who can use crime linkage to help them solve crime more effectively. Additionally, the financial and human impact of serial offenders is significantly reduced. Ultimately, society benefits from the effective identification and prosecution of criminals.

Importantly, crime linkage also enhances access to justice for victims. It increases the chances of serial offenders being detected and successfully prosecuted for the full range of crimes they have committed (rather than just one or two offences). This ensures that perpetrators are brought to justice for the crime/s a victim has experienced and receive a sentence that is commensurate with their actual offending behaviour.

**Belgium:**

At an impact workshop in September 2017, the C-LINK findings were disseminated to senior officials of the Zeden-Analyse-Moeurs (ZAM) unit. The information presented at this workshop formed an important component of the evidence that led to legislative change in Belgium [E1]. Specifically, the Ministers of Justice, Security, and the Interior and the College of Attorney Generals in Belgium issued a legally binding circular on 27/02/2020 that directed police forces across Belgium to submit all sexual assault case files within 30 days of discovery to the ZAM unit, who have a national remit for conducting crime linkage in Belgium [E2]. As a consequence of this legislative change, the ZAM unit now receives a more comprehensive overview of sexual offending across Belgium [E2]. This benefits ZAM analysts by reducing the risk that they will miss links and benefits the Belgium National Police by enhancing their ability to detect and prosecute serial sexual offenders. This ensures that the Belgian public are better protected from the risk of sexual victimisation [E2]. "As a direct result of the perceived quality and importance of the C-LINK research the ZAM unit has been formally allocated five full-time positions" [E1], formalising the roles of the existing staff in this unit. The unit was also given additional funding to double its staffing. Prior to C-LINK, the Belgian ZAM unit was at risk of closure and had no officially documented working structure. Tonkin's research, therefore, ensured the continued existence and subsequent expansion of the Belgian ZAM unit, meaning that Belgium retained its national crime linkage capabilities for sexual offences.

The C-LINK research also underpins law enforcement training in Belgium. Since 2016, C-LINK research has underpinned training delivered nationally to approximately 300 commissioners and high-ranking officers through 8-12 workshops a year [E1].

**UK:**

The research of Tonkin and C-LINK [R1, R2] has directly influenced national policy regarding the collection and storage of information relating to serial sexual offences and sexual murders across the UK. Prior to C-LINK, the Serious Crime Analysis Section (SCAS) had been considering reducing the amount of information recorded on their databases. The C-LINK research [R1, R2] found that this would potentially undermine crime linkage and recommended against it via engagement with senior SCAS staff. As a result, this recommendation was adopted. This impacted the whole SCAS database (31,962 offences, as of 04/06/2020) and affects what data will be recorded for all future offences. This policy decision ensures that detailed behavioural data remain accessible to SCAS analysts and that the ability to detect serial sexual offenders and murderers across the UK is not compromised.

In addition, the findings of the C-LINK projects are regularly quoted and referenced by Senior SCAS staff when providing training inputs on the SIO (Senior Investigating Officer) Development Programme, attended by Detective Chief Inspectors across England and Wales. Over the past 2 years, SCAS staff have provided inputs on 25 of these nationally accredited courses [N≈300 staff] [E5].

**New Zealand:**

The research of Tonkin and Bull has led to changes in how burglary data are collected, coded, and stored across New Zealand. In particular, their research underpinned the redesign of New Zealand Police databases, with the new database replicating variables from the coding dictionary of [R3] and informing a reduction in system variables from 400 to 47. This has made crime reporting simpler and more efficient, affecting the 165,273 burglary offences entered into the system since the changes were implemented on 29/04/2018 and impacting all future recording of burglary offences across New Zealand [E4].

Moreover, crime analysts working for New Zealand Police report that Tonkin et al.'s research [R1-R6] has enhanced the practice of police analysts in 6 key ways [E4]: (1) reducing/avoiding bias during crime linkage; (2) widening the scale and scope of crime linkage analysis; (3) ensuring more comprehensive crime linkage analysis; (4) enhancing the influence of crime linkage on police investigations; (5) contributing to the training of New Zealand Police staff; and (6) Supporting the detection and prosecution of serial offenders [E4]. "The research of Dr Tonkin and colleagues has influenced crime linkage analyses in cases involving serial burglary, car theft, arson, sexual offending and robbery. In a number of these cases, this has resulted in successful prosecutions and the recovery of stolen property, thereby provided victims with greater access to justice" [E4].

Specifically, New Zealand Police developed a crime linkage tool based on the research of Tonkin et al. [R1-R6]. The tool has been used to facilitate crime linkage during live investigations for a range of offences, including serial sexual offences, burglaries, robberies, arson offences, and car theft. The resultant analyses have been submitted to the Crown Prosecutor and the Crown Law Office of New Zealand, leading to successful apprehensions and prosecutions of serial offenders and the recovery and return of stolen property [E4].

For example, as described in [E4], application of the tool led to the successful prosecution of a serial sexual offender for 11 rapes committed across three New Zealand cities in 2017. Similarly, analysis based on the tool has led to operational successes with burglary crime, with seven offenders in Napier successfully prosecuted for a total of 20 offences in 2018 and 3 offenders arrested and prosecuted in Hastings, the latter leading to the recovery of \$20,000 of stolen property that was subsequently returned to victims. In 2019, the tool was applied to a series of car theft offences in Napier, leading to a new suspect being identified (who was unknown to investigating officers at the time) who was ultimately convicted of 11 offences and sentenced to 18-months imprisonment. Additionally, the research [R1-R6] has been used in training delivered to a range of police staff, including members of the New Zealand Police Executive, the Analytical Service Group of the National Intelligence Centre and intelligence analysts, police investigators and managers from half of New Zealand Police districts [E4].

#### **Sweden:**

The research of Tonkin et al. [R1, R2] has stimulated significant new investment in crime linkage within Sweden and led to the provision of new analytical services/investigative methods. After 14 years without national crime linkage capabilities, the Swedish Police Authority made the decision to reinstate the Violent Crime Linkage Analysis System in order to facilitate crime linkage of sexual offences and homicides. As explained by officers leading the Investigative Analysis and Offender Profiling Group in Sweden [E3], the C-LINK research disseminated by Tonkin et al. at the 2018 annual conference of the European Association of Psychology and Law (EAPL) "was an important part of this decision". This led to creation of a new national unit of crime analysts, currently in the process of recruiting and training new staff.

#### **5. Sources to corroborate the impact**

[E1] Written impact testimony, the Zeden-Analyse-Moeurs (ZAM) unit, Belgian Federal Police.

[E2] Legal documents from Belgium (COL.04/2020) issued by the Minister of Justice, Minister of Security and the Interior, and the College of Attorney Generals in Belgium.

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[E3] Written impact testimony by Detective Superintendents within the Investigative Analysis and Offender Profiling Group, National Operations Department, Swedish Police Authority.

[E4] Written impact testimony, Intelligence Analyst and Senior Research Advisor, New Zealand Police.

[E5] Written impact testimony, Senior Analyst, Serious Crime Analysis Section, National Crime Agency.