Rebuilding Crime Prevention Through Environmental Design: Strengthening the Links with Crime Science

Chapter 1 Introduction Paul Ekblom and Rachel Armitage
Chapter 12 Conclusion Rachel Armitage and Paul Ekblom

Armitage, R. and Ekblom, P. (Eds.) (2019). *Rebuilding Crime Prevention Through Environmental Design: Strengthening the Links with Crime Science*. Milton Park: Taylor and Francis.

People have always protected themselves and their property by modifying their environment, even before the construction of permanent buildings began. Archaeology and history reveal a succession of architectural inventions from thorn hedges, ditches and ramparts to palisades, doors, drawbridges and the like, accompanied by specialised security fittings such as locks and bolts. However, as an explicit movement and field of practice Crime Prevention Through Environmental Design (CPTED) emerged only some four decades ago. CPTED originated as a blend of several sources, mostly North American. These included the community-centric approaches of Jane Jacobs (1961) who had a background in urban studies, local activism and architecture, introducing the concept of 'eyes on the street' and also of social capital; Oscar Newman (1972), the architect and city planner who contributed Defensible Space; C. Ray Jeffery (Jeffery 1971; Jeffery and Zahm 1993) a psychologist with a theoretical bent who actually coined the phrase Crime Prevention Through Environmental Design, who subsequently attempted to broaden the approach in ways which were sadly neglected at the time; and Barry Poyner (Poyner 1983, 2006), a British architect who brought a strong commitment to research and evaluation. CPTED comprises several broad principles: Defensible Space (making places easier to keep people out of), Movement Control (including more traditionally Territoriality – motivating occupants to defend their places), Surveillance, Management, Maintenance and Image, Activity Support (encouraging legitimate activities which restrict the opportunity for crime) and Physical Security. Other variants can be found e.g. in Armitage (2013), Cozens (2014) and Gibson (2016).

Situational Crime Prevention (SCP) focuses, as its name implies, on changing people's offending behaviour not by influencing the predispositions that they bring to crime situations but by changing those situations themselves. SCP arose somewhat later than CPTED. Its origins included wartime Operations Research (Wilkins 1997); Action Research (Lewin 1946); Problem-Oriented approaches (Goldstein 1990); sociology in understanding changing crime patterns via changes in Routine Activities bringing offenders and targets/victims together in the absence of capable guardians (Cohen and Felson 1979); generic cognitive/social psychology and economics with an emphasis on Rational Choice and decision-making (Cornish and Clarke 1986; Clarke 2012); and micro geographical approaches (Crime Pattern Theory – Brantingham et al. 2017). Together these have become known as opportunity approaches, and thus the preventive strategy mainly about opportunity reduction.

We do not offer here an in-depth resume or review of CPTED or SCP: that has been supplied elsewhere from perspectives of research (e.g. Armitage 2013; Cozens and Love 2015) and practice (e.g. Cozens 2014). But we do have some pertinent observations about the evolution of these parallel tracks of environmental crime prevention that have never quite converged – so far.

CPTED and SCP have both, in their different ways, remained outliers from mainstream approaches to crime and security. Apart from the original injection of ideas and the occasional significant review, evaluation or research study CPTED has kept somewhat distinct from academic input and discipline, resembling a 'school' of architecture pursuing a slowly-evolving manifesto that accretes new ideas without fully assimilating them (Ekblom 2011a; Armitage and Monchuk 2018). Or rather, several schools since we now have Second-Generation CPTED with an emphasis on social cohesion, community connectivity, community culture, and threshold capacity (Saville and Cleveland 2003a,b) and even three candidates for Third-Generation: Thorpe and Gamman (2013) focusing on multiple drivers of environmental design; Gibson (2016) on conceptual clarity and alignment with sustainability; and SafeGrowth on safe, sustainable urban space (www.safegrowth.org/blog/green-answers-for-crime-3rd-gen-cpted). And the term 'CPTED' in some regions, especially North America, has gained currency as a substitute word for any kind of territorially-based civil-world crime prevention, which unfortunately dilutes the concept or muddies the water, whichever metaphor you prefer.
The originators of SCP chose deliberately to cut themselves free of conventional criminology and policymaking, with their emphasis on offender motivation and its societal causes, and the functioning of law enforcement and the criminal justice system. These interventions addressed the 'civil' world of products such as cars, procedures such as cash transactions, surveillance and of course the design, construction and management of places.
Neither of the two approaches has paid much attention to consistency of terms and concepts or attempted to integrate their respective theoretical bases beyond a kind of 'lumping-together' (Ekblom 2011a,b; Gibson 2016;). In each case this has been in the name of simplicity, but it is a false simplicity which ultimately serves to confuse and ultimately to deny practitioners tools for thinking, communication, knowledge management and collaboration that are subtle enough to handle the messy complexity of everyday crime prevention (Ekblom 2006). Nor have CPTED and SCP exchanged ideas and practices except sporadically and rather uneasily.

But things have started to move in the latter field, which has begun to emerge from its self-imposed isolation and transform into Crime Science (e.g. Wortley et al. forthcoming). This is an applied academic discipline which seeks to understand the immediate causes and contexts of criminal events in order to decrease their occurrence and harm. It emphasises the *interaction* between situational and offender-related factors and is not afraid of complex theorising where necessary to reflect and successfully influence for the better a complex world, and draws on the content and methods of a range of disciplines from biology to physics and computer science.

A third comer on the scene is general field of *design*, with leading lights including the Design Against Crime Research Centre, University of the Arts London, and the Designing Out Crime Research Centre, University of Technology Sydney. The wider understanding and practice on

design that these institutions and others bring, with emphasis on 'user-friendly/abuser-unfriendly', user-centred and co-design approaches, social innovation and the concept of reframing problems rather than simply taking the brief as the client poses it, has begun to generate interesting and challenging new ways of looking at improving security without adverse side effects such as fortification, inconvenience or profligate use of energy e.g. to floodlight areas for surveillance purposes.
This collection arises from our several interests in all the above fields and joint work on a range of projects and consultancies. One of us (Armitage) has a two-decade involvement in empirical research and evaluation on CPTED practice and policy (e.g. Armitage 2006, Armitage and Monchuk 2011, Armitage 2013, 2017); the other (Ekblom) has a somewhat longer involvement in SCP and Crime Science with an emphasis on theory, conceptualisation and systematisation of scientific and practice knowledge in crime prevention in general and CPTED in particular (see respectively Ekblom 2011b and http://5isframework.wordpress.com; and Ekblom 2011a and http://reconstructcpted.wordpress.com), and a decade of consorting with designers of products, places and social innovation (e.g. Ekblom 2012). But in common is our commitment to being constructively critical friends of environmental crime prevention; and in particular to the ever-closer union of CPTED and SCP.

Although we welcome the fertile ferment of the Third-Generation contenders, we do not feel confident enough ourselves at this time to propose a Fourth-Generation label. Rather, we wish to add new thinking from a diversity of disciplines – both centre field and outliers. Then we hope to undertake, and promote, further collaborations that move CPTED towards a properly evidence-based, theory-informed, conceptually sound and practically feasible field of intervention that is fit to hold its own in close embrace with Crime Science and an approach to architecture and planning that addresses the multiple drivers of complex societies around the world.

In line with this aspiration the chapters in this volume represent leading-edge thinking and research and straddle the divide between CPTED and SCP/Crime Science.

The rest of the book begins with two empirical chapters having both theoretical and practical implications. Michelle Rogerson and Ken Pease use data from a large national area-based regeneration programme to explore the dynamics of people's decision to move home and how this relates to local crime patterns. On the one hand crime could precipitate residential mobility; on the other, high residential turnover may place obstacles to the implementation of formal and informal crime prevention efforts. Rachel Armitage and Chris Joyce illustrate the benefits of collaboration between an academic and a serving police officer. They attempt, through interviews with prolific burglars focused on images of homes, to obtain their views on the risk and protective factors of housing design and occupancy. Some of the familiar CPTED principles are supported, but others are not, indicating the importance of taking the offender's perspective. There follows a chapter by Danielle M. Reynald and Mateja Mihinjac which is empirical but with a strong theoretical theme centred on the concept of guardianship, a more sophisticated treatment of which promises to further integrate the currently loosely-linked approaches of CPTED and Situational Crime Prevention (SCP).

Moving further into the conceptual domain – yet ultimately with implications for how both research and practice are developed, conducted and communicated – Paul Ekblom's ontological chapter builds on his previous work in documenting the limitations of CPTED and better connecting the fundamental ideas in its first- and second-generation variants to those of crime science, architecture and design. In this, he draws on the ideas of ecology.
One of the aims of Ekblom's chapter is to develop sharper environmental concepts to support computational and mathematical approaches to CPTED and SCP. These approaches form the focus of the next two chapters. Daniel Birks and Joseph Clare review the field of 'synthetic societies' using agent-based modelling, where researchers create artificial environments *in silico* and populate them with simplified autonomous software agents which move about the environment following a particular agenda and interacting with one another. The patterns of actions and events that emerge enable exploration of causal interactions between individual behaviour, environmental context in complex systems; and predict and understand aggregate area outcomes such as crime rates and patterns.
Agent-based modeling enables systematic manipulation of environmental properties and features in ways that would never be practically feasible or ethically allowable, but which informs both CPTED theory, practice and policy choices. Hervé Borrion, Octavian Ciprian Bordeanu and Sonia Toubaline use mathematical simulation experiments to focus intensively on vehicle and knife attacks by terrorists, seeking to identify optimal configurations of armed response vehicles and CPTED measures in a range of operational contexts including whether or not offenders conduct hostile reconnaissance. Displacement of offending emerges as a significant issue: whilst challenging to model, doing so potentially yields significant improvements in security strategies.

Massoomeh Hedayati Marzbali, Aldrin Abdullah and Mohammad Javad Maghsoodi Tilaki continue the theme of mathematical modelling, with structural equations based on empirical data in the service of conceptual clarification and practical application e.g. in predicting crime risk on the basis of (clarified) CPTED principles. But they also lead the book in several other directions of interest. First, they present CPTED research in a rarely-encountered Asian context; second, they develop and test a systematic CPTED measurement scale; and third, they assess national Malaysian CPTED guidelines against their own empirical findings.

We then move onto an implementation theme with study in *failures* of CPTED by Ward Adams, Eric S. McCord and Marcus Felson. In a chapter with the challenging title of 'How to ruin CPTED, they argue that good design of environments cannot be counted on as a permanent solution because a newly-built or refurbished place can after commissioning be mismanaged, undergo changes in use which invalidate the current CPTED arrangements, outgrow them through expansion, or are allowed to deteriorate. (All these processes are best-explained by concepts from environmental criminology; empirical examples illustrate the last two.) Consequently, CPTED must be purposively combined with *CPTEM* – crime prevention through environmental management.

Leanne Monchuk next presents findings from her long-term familiarity with the pioneering efforts of the UK's Greater Manchester Police to develop and operate a framework of CPTED service delivery that is of high professional quality yet practically and financially sustainable

– an issue of great importance given the austerity budgeting that the police and other services have had to endure over the last decade and, it would unfortunately seem, in years to come. On a broader issue, the contrast between the delivery arrangements in Greater Manchester and those elsewhere in the UK – including civilian architects versus trained police officers, service funded by developer-paid fees versus free publicly-funded input, and requirement for formal crime impact statements by developers – mean that making general conclusions about the effectiveness and implementation of CPTED is challenging.

The chapter by Marcus Willcocks, Paul Ekblom and Adam Thorpe – all connected with the Design Against Crime Research Centre, University of the Arts London – unsurprisingly takes a more radical designer's view on the proper scope and approach to CPTED. Based around a practical project which sought to improve the security and wider appeal of a district in Oslo, Norway, this describes the evolution of an attempt to blend Ekblom's crime-focused Security Function Framework with designers' wider interest in 'what we want *more* of alongside what we want *less* of' – hence the emergence of the 'Vibrant Secure Function Framework'. The chapter considers whether this approach helps to stimulate design rather than merely document done designs, as has been contended; which of the conventional CPTED principles are supported or challenged in this extended framework; and how far second- or third-generation progressive takes on CPTED can be incorporated.

In their concluding chapter, Rachel Armitage and Paul Ekblom summarise the messages from the aforementioned, look to the changing environment within which CPTED must operate and to which it must adapt, and propose a future programme of development.

References

Websites accessed 9 July 2018.

Armitage, R. (2006) Predicting and Preventing: Developing a Risk Assessment Mechanism for Residential Housing. *Crime Prevention and Community Safety: An International Journal,* 8 (3), p. 137-149.

Armitage, R. (2013). Crime Prevention through Housing Design: Policy and Practice. Basingstoke: Palgrave Macmillan.

Armitage, R. (2017) Crime Prevention through Environmental Design. *In: Environmental Criminology and Crime Analysis.* R. Wortley and M. Townsley (Eds.) Routledge.

Armitage, R, and Monchuk, L (2011) Sustaining the Crime Reduction Impact of Secured by Design: 1999 to 2009. *Security Journal*, 24 (4), p. 320-343.

Armitage, R. and Monchuk, L. (2018). 'What is CPTED? Reconnecting Theory with Application in the Words of Users and abusers.' *Policing: A Journal of Policy and Practice.*

Brantingham, P.J., Brantingham, P.L. and Andresen, M. (2017). 'The geometry of crime and crime pattern theory.' In R. Wortley and M. Townsley (Eds.) *Environmental Criminology and Crime Analysis* (2nd ed.) –115). New York: Routledge.

Clarke, R. (2012). 'Opportunity makes the thief. Really? And so what?' *CrimeScience*, 1: 3.

Cohen, L. and Felson, M. (1979). 'Social change and crime rate changes: A routine activities approach.' *American Sociological Review* 44: 588–608.

Cornish, D. and Clarke, R. (1986). The Reasoning Criminal: Rational Choice Perspectives on Offending. New York: Springer-Verlag.

Cozens, P. (2014). Think Crime!: Using Evidence, Theory and Crime Prevention Through Environmental Design (CPTED) for Planning Safer Cities. Dubai: Praxis Education.

Cozens, P. and Love, T. (2015). 'A review and current status of Crime Prevention through Environmental Design (CPTED).' *Journal of Planning Literature* 1-20 DOI: 10.1177/0885412215595440.

Ekblom, P (2006). 'Good practice? Invest in a Framework!' *Network News,* Spring 2006. Chester: National Community Safety Network.

Ekblom, P. (2011a). 'Deconstructing CPTED… and Reconstructing it for practice, knowledge management and research', thematic issue of *European Journal on Criminal Policy and Research* on *Updating Crime Prevention Through Environmental Design*, 17:7-28.

Ekblom, P. (2011b). Crime Prevention, Security and Community Safety Using the 5Is Framework. Basingstoke: Palgrave Macmillan.

Ekblom, P. (2012). 'Happy returns: ideas brought back from situational crime prevention's exploration of design against crime.' In G. Farrell and N. Tilley (eds) *The Reasoning Criminologist: Essays in Honour of Ronald V. Clarke,* 163–198. Crime Science series. Cullompton: Willan.

Gibson, V. (2016). Gibson, Victoria (2016) *Third Generation CPTED? Rethinking the Basis for Crime Prevention Strategies.*Doctoral thesis, Northumbria University.

Goldstein, H. (1990). *Problem-Oriented Policing*. New York: McGraw-Hill.

Jacobs, J. (1961). *The death and life of great American cities*. New York: Random House.

Jeffery, C. R. (1971). *Crime prevention through environmental design*. Beverly Hills: Sage Publications. Revised 1977.

Jeffery, C. R. and Zahm, D. (1993). 'Crime Prevention Through Environmental Design, Opportunity Theory, and Rational Choice Models.' In R. Clarke and M. Felson (Eds) *From Routine Activity and Rational Choice: Advances in Criminological Theory* 5 323–350.

Lewin, K. (1946). 'Action research and minority problems.' *Journal of Social Issues* 2: 34– 46.

Newman, O. (1972). Defensible Space: Crime Prevention through Urban Design. New York: Macmillan.

Poyner, B. (1983). Designing against Crime: Beyond Defensible Space. London: Butterworths.

Poyner, B. (2006). *Crime Free Housing in the 21st Century.* London: Jill Dando Institute of Crime Science.

Saville, G. and Cleveland, G. (2003a). 'An introduction to 2nd Generation CPTED: Part 1.' *CPTED Perspectives* 6(1): 7–9.

Saville, G. and Cleveland, G. (2003b). 'An introduction to 2nd Generation CPTED: Part 2.' *CPTED Perspectives* 6(2): 4–8.

Thorpe, Adam, and Gamman, L. (2013). 'Walking with Park: Exploring the 'reframing' and integration of CPTED principles in neighbourhood regeneration in Seoul, South Korea.' *Crime Prevention and Community Safety* 15: 207–222.

Wilkins, L. (1997). 'Wartime operational research in Britain and situational crime prevention.' In: G. Newman, R. Clarke, and S. Shoham, (eds.) *Rational Choice and Situational Crime Prevention: Theoretical Foundations*. Aldershot: Dartmouth.

Wortley, R., Sidebottom, A., Tilley, N. and Laycock, G. (forthcoming). *The Handbook of Crime Science*. London: Routledge.

Chapter 12: Conclusion
Rachel Armitage and Paul Ekblom

Concluding a book with such diverse content is always difficult. To condense and summarise ten unique chapters risks omitting a crucial finding or failing to grasp a key deduction, but just in case anyone skips straight to the conclusion, here's an attempt to do just that. If you have come straight in at Chapter 12, you've missed some outstanding contributions from international authors, each taking a fresh and often critical look at CPTED – go back and start at Chapter 1, you won't be disappointed!

It would have been simple to edit a book to demonstrate the effectiveness of CPTED as a crime reduction measure. We could have approached several 'established' academics to talk about the history, implementation and success of this approach. But who wants simplicity? Our goal in commencing this book was to send in the bulldozers to demolish what we know and to start to re-build, drawing on both academic and practitioner experiences from across the world, and scrutinising, not just efficacy, but definition, scope, delivery and measurement of impact. There are common themes, but these have emerged from the rubble – they were not predefined, nor were they anticipated. Yet a diverse range of international authors have independently concluded that in our quest to embed this undoubtedly great concept into planning systems, we've passed the finishing post before adequately warming up. Thus, we've managed to firmly set crime prevention on the agenda of many different agencies responsible for the design, build and management of the built environment (cue pat on back), but in keeping our eyes firmly fixed on the finishing line, we have failed to notice the crowds telling us it was a 'false start'.

In CPTED we have a brilliant concept, who wouldn't want to grab the baton and run? But what we also have is a lack of precision of definition and scope and thus a limited ability to plan and design appropriate and if necessary innovative action, accurately measure impact and implementation, and steadily and systematically accumulate practical and theoretical knowledge - and as Kurt Lewin famously said (Marrow, 1969), there's nothing so practical as a good theory. We also have an approach that has quietly slipped into its own comfort zone, and we would argue that we have been complicit in keeping it there. Advocates of CPTED have been too busy convincing the many necessary parties that this pro-active, multi-disciplinary approach has value, that we've avoided discussion of the 'tricky bits'.

This book does not suggest a return to the starting blocks, more a press of the pause button to take some time to "*chip away at the intellectual as opposed to the practical*" (Ekblom Chapter 5) and to risk taking several steps backwards to ensure that what we are advocating has sophistication and precision and can hold its own intellectually amongst disciplines such as crime science and architecture. This may mean that it takes longer to cut the opening ribbon but at least what we reveal can take its worthy place alongside (as opposed to beneath) those disciplines that it draws upon.

As a recap for those who have read the book in full, and a pointer for those who want direction to the most suitable parts, below is a summary of the content and, crucially, conclusions, raised in each of the 10 chapters.

In Chapter 2, Rogerson and Pease took a fresh look at the factors that can impact upon crime risk – in this instance, residential turnover. They identified a cause and effect relationship, with the experience of crime and anti-social behaviour influencing the decision to move away from a neighbourhood – this mobility in turn impacting on crime risk through reduced guardianship and surveillance and the readily available opportunities presented by, for example, empty properties and goods packed into easily accessible boxes. Many principles of CPTED require the active involvement of human actors – guardianship and surveillance require neighbours to know who should and who should not be in a given area, they require the confidence and knowledge to challenge 'strangers', and this is inherently less likely when resident turnover is high. Rogerson and Pease referred to this as a "*spiralling problem*". Data analysed as part of the New Deal for Communities programme (1998-2008) confirmed this challenge, residents stating that crime plays a key role in influencing their decision to move, their decision to move further away, and their decision, once moved, not to return. This presents a challenge for CPTED – how do we ensure that the social processes required to successfully implement principles such as surveillance and guardianship are not impacted by high resident turnover? It also raises the question as to why estate and letting agents aren't more fully engaged in the implementation and management of CPTED – their influence having a potentially significant impact upon the delivery, and perhaps expansion, of this approach.

Continuing the theme of extension and expansion, in Chapter 3, Armitage and Joyce questioned the existing principles of CPTED – their origins, their precision and the nature by which they have been ratified. They argued (very much like Ekblom in Chapter 5) that we need to redefine CPTED's components using a bottom up approach. Like Ekblom, they also recognised that offender decisions are unique to their own interpretation of the environment and that we cannot presume a static and unchanging response – for nine of the 16 images shown, burglars presented a statistically significant common response. For the remaining nine images the responses were not comparable. Based upon in-depth interviews with twenty-two incarcerated burglars, Armitage and Joyce re-considered CPTED's principles – should they each hold the same importance? Should we weight their influence on crime? Should some be removed and others included? Reference to the principle of surveillance was made on 132 occasions, yet the concept of defensible space was mentioned just 11 times. Given cuts to public sector budgets and an emphasis upon deregulation within the planning system, should the scant resources and guidance that exist be targeted at prioritising those principles that offenders cite as more impactful?

Regularity and frequency aside, Armitage and Joyce also questioned the accuracy of certain principles – management and maintenance and defensible space not always influencing offenders as existing theory might suggest. Do we revisit these principles and reconsider their efficacy and relevance? Additional principles were also presented – including 'familiarity', 'occupancy' and 'emotional attachment' – each influencing offender decision making to a greater extent than certain prevailing principles. Familiarity refers to the extent to which offenders felt able to judge or predict a property's features. Responses such as: "*It's strange isn't it"; "Is it three or four storey"? "It could be separate flats"; "You don't know what you are going into or what the layout is like"; "You just can't tell",* were regularly given in relation to certain images, with the lack of certainty or familiarity deterring these offenders. Occupancy, whilst traditionally often merged with surveillance, was regularly

referenced in its own right. This did not relate to the risk of being seen (by occupants), but rather to the desire to avoid confrontation, to prevent the risk of an aggravated as opposed to a straight burglary charge, and to maximise certainty regarding the burglary event and outcome. Emotional attachment was another factor that clearly influenced decision-making, burglars avoiding properties that reminded them of where they live, where they grew up or where a family member lives or lived – a clear if yet unexplored potential factor in influencing offender perceptions of target attractiveness.

In Chapter 4, Reynald and Mihinjac presented a comprehensive overview of the theoretical development of CPTED and where it fits with Routine Activity Approach, Rational Choice Theory and Situational Crime Prevention. Building on some of the issues raised in Chapter 2, their focus was on guardianship – breaking this down to explore the availability of guardians, the level of surveillance/monitoring and the willingness/ability of those guardians to intervene should the necessity arise. Reynald and Mihinjac discussed the CPTED principles of territoriality, surveillance and management and maintenance and the extent to which guardianship plays a key role in the implementation of each of these. The chapter raised some valuable arguments regarding definition, measurement and implementation of CPTED. In terms of definition, are we actually delivering CPTED in the manner to which it was intended? Take the following definition from Crowe (2000, p.35): "*CPTED draws not only on physical and urban design, but also on contemporary thinking in behavioural and social science, law enforcement and community organisation."* This sounds admirable, but is CPTED really drawing upon each of these disciplines? Is it continuing to adapt to contemporary thinking or has its development stalled? Measurement of capable guardianship must draw upon those three elements of availability of guardians, ability of those guardians to monitor and likelihood or willingness of available guardians to intervene. Likewise, strategies to enhance or promote guardianship must not be limited to surveillance. CPTED strategies must consider how to increase the availability of guardians at different times of the day and night and promote the willingness or desire to intervene should the requirement present itself. Secured by Design guidance (Secured by Design New Homes, 2016, p.21) does encourage developers to include a mix of dwelling types – aimed at young couples, families, elderly residents, to increase the availability of residents throughout the day and night. Yet, however laudable this may be in principle, we have yet to see a development that can evidence this mix of residents, or a tool for measuring such availability. Ensuring that the 'concept' becomes a 'reality' is key to progressing CPTED's development.

In Chapter 5, Ekblom challenged us to move away from our comfort zone of what we know and understand. The chapter was not for the faint hearted, but we hope you weren't put off by the apparent complexity, what this chapter argued for is a 'sharpening up' of CPTED, a complex subject that has undoubtedly been oversimplified to ease use and interpretation by practitioners tasked with its implementation. The challenge here is the trade off between simplicity and use. Is it worse to have a highly sophisticated version of CPTED that is not utilised by practitioners, or to continue with a version that lacks precision that is recognised and implemented on the ground? Ekblom argued that the latter may appear more fortuitous in the short term, but does this clinging to comfort limit development or refinement? Do we need to knock CPTED down to build it back up again? Or do we continue with the unstable foundations and leaking roof? Ekblom raised some difficult questions with his presentation of ontological primitives – working bottom up and using ecology as a basis, he presents what

could be (should we feel brave enough) a framework that connects with crime science, architecture and social science, as opposed to the current 'no man's land' of imprecision. It was refreshing to see consideration for the challenges of computational measurement and how the current lack of precision would impact upon this. Ekblom also reminded the reader of the, often less considered, Situational Action Theory and the much more inclusive Conjunction of Criminal Opportunities Framework, both allowing greater depth of consideration for the finer details of offender and environmental factors. Ekblom reminded us that: *"We cannot treat 'the environment' as a kind of common Newtonian platform of space and time that is perceived, and interacted with, by all individuals in an identical way".* He also reminded us that CPTED has paid little attention to the nature of people who commit, prevent, promote or suffer crime. We have to distinguish between individuals and their individual interpretation of the environment.

In Chapter 6, Birks and Clare presented a much needed opportunity, through Agent Based Modelling (ABM), to enhance the understanding and estimation of the impact of key components of CPTED upon crime patterns, and to break those components down into the behaviours that we would expect/anticipate individuals to display as a means of demonstrating the presence of that component. The two are equally important in advancing the measurement of the impact of the individual elements of CPTED. In short, their computational approach overcomes the logistical issues of systematically manipulating a 'real-world' crime-environment interaction to the degree that would be required to assess 'generalisable causal inference'. The scale that can be achieved, coupled with the ability to manipulate interactions, allows ABM to construct a 'crime-environment laboratory' that can explore the impact of these concepts without the logistical and ethical constraints of the real world. Birks and Clare identified two examples of how ABM could be used to clarify existing limitations in the measurement of CPTED impact. The first addressed the 'road structure' debate – the extent to which connectivity inhibits or enhances crime risk and how this could be clarified using ABM. The second identified generative explanations of CPTED principles – can ABM be used to clarify the mechanisms by which these components impact on crime? The chapter raised many questions, but what it proposed could mark a transformative advancement in our ability to clarify and improve precision in defining and measuring the impact of CPTED on crime.

In Chapter 7, Borrion and colleagues again discussed new possibilities for improving the allocation of CPTED resources, but in this case the focus was upon terrorist threat. Like Birks and Clare they used computational techniques to ascertain the likely impact of CPTED measures (versus armed response vehicles) on preventing the occurrence and displacement of terrorist attacks using knife and/or vehicle as a weapon. This method could significantly enhance the resource allocation decisions required by those involved in preventing such attacks, and ultimately improve prediction, thus prevention, of such threats. Whilst the chapter focused upon terrorist attacks, its application has relevance to all crime types and in this era of public sector funding cuts, could improve the allocation of resources across a variety of environments.

In Chapter 8, Hedayati and colleagues developed and validated a CPTED model within the setting of Malaysia. This chapter introduced the reader to the existing implementation of CPTED in Malaysia, exploring some of the challenges of this setting and culture. It also

presented a newly developed scale for measuring the implementation and effectiveness of CPTED – based upon the four principles of surveillance, access control, territoriality and management and maintenance. The model is multi-dimensional with 28 factors that enable the user to measure implementation – the extent to which the development meets the principles of CPTED, as well as effectiveness – the impact of each factor upon victimisation. The method builds upon previous risk assessment mechanisms (for example, Armitage, 2006; Van Der Voordt and Van Wegen (1990) and Winchester and Jackson, 1982) but demonstrates its validity within a country and culture that has seen little research on the efficacy of CPTED. Questions remain regarding the precision of CPTED. Surveillance in this instance is broken down into *visibility* and *lighting* and each of those two sub-elements has a set of indicators. Whilst this may enable comparison between studies at that higher-level principle of surveillance, what is being defined as surveillance and how that is being measured often differs greatly. This reminds us that we have a long way to go before we can achieve what Ekblom has called for and what Birks and Clare have demonstrated could be possible.

In Chapter 9, Adams and colleagues raised the issue of implementation, specifically that elusive 'management and maintenance' component of CPTED. Their chapter highlighted the issue of lack of permanence in environmental design in terms of changes in land use and mismanagement of space – both impacting on the long-term success of CPTED and the risk of 'ruining' what might have once been a successful CPTED project. Adams and colleagues also discussed definition, raising the question as to whether management and maintenance should be, as is presently, a principle in its own right, or whether it should be a process that runs through each component. They presented the new acronym Crime Prevention through Environmental Management (CPTEM), a valuable challenge to the existing status quo.

In Chapter 10, Monchuk focused upon the implementation of CPTED, with a specific emphasis upon Greater Manchester Police (GMP) – an innovative and somewhat atypical model of delivery within England and Wales. This historical account outlined the reasoning behind fundamental judgements such as the decision to employ built environment professionals as opposed to police or former police; the decision to charge for the service and, crucially, the ability to embed the requirement for planning applications to be accompanied by a Crime Impact Statement within each local authority Validation Checklist. Again this chapter reminded us that CPTED and its implementation is far from standardised. With such differing models of delivery, even within one country (in this case England), rendering generalisation of effectiveness hugely problematic. As Ward and colleagues highlighted, CPTED is not a static state. Thus we must be wary of generalising without specific assessment of how those interventions have been implemented. Monchuk's reference to CPTED as a 'process' as well as a 'product' was also a timely reminder that its success can be measured in the relationships that it fosters as well as those tangible measures of changes in the environment. These benefits must not be ignored.

Chapter 11 brought the book to a fitting close with a presentation of the Vibrant Secure Function Framework (VSFF) and its application in Oslo, Norway, an attempt to progress CPTED (and its adaptations of second and third generation CPTED) to consider not just what we want less of (crime), but also what we want more of (neighbourhood vibrancy, local confidence, on-street activity) and to consider these requirements simultaneously as

opposed to as a second thought, with the primary ambition being crime reduction. Willcocks and colleagues presented a valuable assessment of the extent to which VSFF aligns with both CPTED and its derivatives – outlining the benefits of this broader approach in which: "…*all the familiar CPTED principles survived the challenge of incorporation within this wider perspective"*. The key message from this chapter was undoubtedly the reminder that any revisions to CPTED and its principles must reflect the potential of a broader approach that places crime prevention alongside pro-social outcomes such as vibrancy, creativity, confidence and usability – each contributing in their own way to a safer and more sustainable environment. As they so fittingly concluded: *"CPTED works best when acting beside, not in front of other real-world context and community-linked priorities".* If we are going to knock CPTED down to rebuild it, we should surely consider the outcomes that we want to achieve and as Willcocks and colleagues powerfully assert, this is not always what we want less of, but rather, what we want more of.

CPTED – looking beyond and ahead

In closing, we want to shift perspective to the bigger picture, or even to 'CPTED – the movie'. CPTED has its own operating environment, or rather environments. These differ locally, regionally and internationally. And they rarely stay the same. Environments may be in a state of *change*, whether from natural events such as earthquakes, or human-initiated actions like roadworks, building construction or demolition. Such changes will, temporarily or permanently, alter properties, features and contents. they may also affect people's roles, and their ability to undertake them, e.g. when proceeding along unfamiliar, temporary pathways, with degraded lighting, encountering unfamiliar people engaging in unexpected behaviour. CPTED should take greater note of such here-and-now changes.

Wider historical changes are also important. The built environment evolves, whether by modification, new land uses, or new construction. New materials and building techniques contribute to this process, including new forms of design such as BIM (Building Information Modelling – the generation of digital representations of physical and functional characteristics of places). The most extreme historical change in 'niche construction' was perhaps when humans underwent the Neolithic Revolution's shift from hunting/gathering to farming. That change ushered in the permanent built environment, with huge consequences for the nature and scope of crime (Felson and Eckert, 2015; Ekblom, 2017).

Today we are undergoing a shift of arguably similar magnitude, in the form of ICT and cyberspace. In effect, with the Internet of Things and wireless connections and networks, not to mention wearable ICT, we are seeing a blurring of the boundaries between the components and contents of the environment, with the internet and with humans moving and acting within that environment. Hyperconnection, the unprecedented linking of individuals and technologies into vast new global social-physical networks: "*opens up more points of presence for attack and exploitation*" (Ablon et al., 2014, p. 34; McGuire, 2007). With removed or reduced physical constraints, hyperconnectivity has generated exponential complexity and unpredictability of vulnerabilities (Collins and Mansell, 2004). Moreover, the dynamic evolving nature of cyber systems is equally important. These change far faster than biological and even material cultures as they comprise highly malleable, recombinable and reproducible code constrained by convention more than physical necessity such as the

strength of wood or reinforced concrete. CPTED itself therefore has to evolve, to face a future where environments are physical, social and cyber: solid walls can be seen through, doors can be opened and lights operated by hacking, and on the other side, holidaymakers can watch over their properties from a tablet on the table at the poolside.

We can further envisage a joining-up between CPTED and planning/architecture/design: again, with CPTED (and the rest of crime prevention) better articulated, it is in a stronger position to engage with, yet preserve its distinctive approach within, these wider fields. Thus a decent ontology for CPTED can be both constraining and liberating in all the right places.

None of this means that we should wave goodbye to CPTED specialists – there is still a distinctive body of knowledge and experience that is peculiar to the field. Rather, that the CPTED concepts and knowledge they apply are properly joined up with these wider disciplines including that of Crime Science as it extends and transcends Situational Crime Prevention, and also with domains of practice, and that the specialists are sufficiently adept to communicate and collaborate with colleagues across the disciplinary boundaries.

We have work to do! We must specifically address the lack of consistency in definition, scope, delivery and measurement. Accepting these limitations is the beginning and we do not intend to critique for critique's sake. It is easy to pose problems but less so to produce solutions: we intend to ensure that this book marks the start of a new phase of improving precision, sophistication and credibility, in a constructive engagement with Crime Science, design and architecture.

References

Ablon, L., Libicki, M. and Golay, A. (2014). *Markets for Cybercrime Tools and Stolen Data*. Santa Monica CA: Rand Corporation.

Armitage, R. (2006) Predicting and Preventing: Developing a Risk Assessment Mechanism for Residential Housing. *Crime Prevention and Community Safety: An International Journal.* 8(3), 137-149.

Collins, B. and Mansell, R. (2004). *Cyber Trust and Crime Prevention: A Synthesis of the State-of-the-Art Science Reviews.* Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/299219/04-1147-cyber-trust-reviews.pdf [Accessed 10 July 2018].

Ekblom, P. (2017). Technology, opportunity, crime and crime prevention – current and evolutionary perspectives. In: B. Leclerc and E. Savona (Eds.) *Crime Prevention in the 21st Century*. New York: Springer.

Felson, M. and Eckert, M. (2015). *Crime and Everyday Life* (5th edition). London: Sage.

Marrow, A. (1969). *The Practical Theorist: The Life and Work of Kurt Lewin*. New York: Basic Books.

McGuire, M. (2007). *Hypercrime: The New Geometry of Harm.* Abingdon: Routledge-Cavendish.

Police Crime Prevention Initiatives Limited (2016) *Secured by Design New Homes – 2016.* London: Police Crime Prevention Initiatives Limited.

Van Der Voordt, T.J.M. and Van Wegen, H.B.R. (1990) Testing Building Plans for Public Safety: Usefulness of the Delft Checklist. *Netherlands Journal of Housing and Environmental Research.* 5(2), 129-154.

Winchester, S. and Jackson, H. (1982) *Residential Burglary: The Limits of Prevention.* Home Office Research Study Number 74. London: Home Office.