



# University of HUDDERSFIELD

## University of Huddersfield Repository

Armitage, Rachel and Pease, Ken

Design and Crime: Proofing Electronic Products and Services against Theft

### Original Citation

Armitage, Rachel and Pease, Ken (2007) Design and Crime: Proofing Electronic Products and Services against Theft. *European Journal on Criminal Policy and Research*, 14 (1). pp. 1-9. ISSN 1572-9869

This version is available at <http://eprints.hud.ac.uk/id/eprint/2554/>

The University Repository is a digital collection of the research output of the University, available on Open Access. Copyright and Moral Rights for the items on this site are retained by the individual author and/or other copyright owners. Users may access full items free of charge; copies of full text items generally can be reproduced, displayed or performed and given to third parties in any format or medium for personal research or study, educational or not-for-profit purposes without prior permission or charge, provided:

- The authors, title and full bibliographic details is credited in any copy;
- A hyperlink and/or URL is included for the original metadata page; and
- The content is not changed in any way.

For more information, including our policy and submission procedure, please contact the Repository Team at: [E.mailbox@hud.ac.uk](mailto:E.mailbox@hud.ac.uk).

<http://eprints.hud.ac.uk/>

## **Crime Proofing Products and Services**

### **Design and Crime: Proofing Electronic Products and Services against Theft\***

Dr. Rachel Armitage and Professor Ken Pease

Correspondence should be addressed to: Dr. Rachel Armitage, Senior Research Fellow, Applied Criminology Centre, University of Huddersfield, Floor 14, Central Services Building, Queensgate, Huddersfield, HD1 3DH. Tel: 01484 473854. E-mail: [r.a.armitage@hud.ac.uk](mailto:r.a.armitage@hud.ac.uk).

#### **ABSTRACT**

This paper introduces the work of Project Marc (an EU funded project to develop Mechanisms for Assessing the Risk of Crime) and discusses both difficulties encountered throughout the project and progress made since the project ended. The authors introduce the papers contained within this special edition and summarise their relevance to crime proofing. The paper discusses progress made within this field in the decade prior to Project Marc and makes recommendations to ensure that the ideas move forward.

Crime proofing, electronic products and services, risk assessment, standards, theft.

\* Dr. Rachel Armitage is a Senior Research Fellow at the Applied Criminology Centre, University of Huddersfield; Prof. Ken Pease is Visiting Professor at Loughborough University.

This special edition of the European Journal of Criminal and Research seeks to introduce the findings of a recent EU funded project to develop Mechanisms for Assessing the Risk of Crime due to products in order to proof them at an EU level (hereafter referred to as Project MARC). This is supplemented by even more recent work informed by the approach adopted by MARC (including the difficulties it encountered). It is hoped thereby to provide a basis of information and theory to assist those working within the field of designing out crime to advance on Project MARC and to benefit from its hard-won results. A companion special issue of the Journal deals with the complementary strand of MARC work, namely the attempt to crime-proof legislation.

The crime proofing strand of Project MARC sought to develop a mechanism to assess the risk of theft of electronic products and to take steps to make that mechanism operational. In practice this meant reviewing existing crime risk assessment mechanisms, consulting with key stakeholders to establish whether the idea of a crime risk assessment mechanism was worth pursuing and if so, what form it should take. Steps were then taken to design a system to operationalise the measurement of risk.

The concept of manipulating the environment as a means of reducing crime is not new. The recognition that the environment can influence behaviour dates back thousands of years, with the formal study of the geography or pattern of socio-economic variables (and the social problems associated with these) commencing largely with the University of Chicago School of Sociology in the 1920s and 1930s (Burgess, 1916, Park *et al*, 1925). Although the geography of social problems such as unemployment, delinquency and deprivation had been researched long before, specific reference to the potential to reduce crime through the design or manipulation of the environment began in the 1960s and 70s with research conducted by authors such as Jacobs (1961), Jeffery (1971) and Newman (1973). Recent research into the impact of environmental design upon crime has further explored the ability of design to influence crime levels (Brantingham and Brantingham, 1981, 1984, 1993, 2000; Poyner, 1983, 2005; Poyner and Webb, 1987), the effectiveness of

practical schemes introduced to implement the principles of designing out crime, for example Secured by Design within the UK (Brown, 1999; Pascoe, 1999; Armitage, 2000) and the differential impact of the individual elements of designing out crime (Brown and Altman, 1983; Newlands, 1983; Greenberg and Rohe, 1984; Cromwell and Olson, 1991; Brown and Bentley, 1993; Bevis and Nutter, 1997; Hillier and Chi-Feng Shu, 1998; Chi-Feng-Shu, 2000; Armitage 2006, 2007).

Similarly, measurement of risk or hazard within criminology is not new.<sup>1</sup> As Wiles *et al* (2003) highlight: “There are at least four criminal justice contexts in which understanding and communicating risk is important” (p.1). The four areas in which risk-assessment within criminology has traditionally focused are: the chance of someone embarking on a criminal career (West and Farrington, 1973; West, 1982; Farrington, 1978, 1986a, 1986b, 1991, 1992, 1995; Homel *et al*, 1999; Youth Justice Board, 2001; the risk of re-offending; the likelihood of a particular offender being responsible for a particular unsolved crime (offender profiling) and finally, the probability of crime victimisation by location and person (Winchester and Jackson, 1982; Coleman, 1986; Groff and LaVigne, 2001, Armitage, 2006, 2007).

The concept of assessing the risk of theft of products (as opposed to the environment) and taking steps to design out that risk, although not entirely new has taken much longer to transfer from research and innovation to practical application, perhaps because of the great primacy of the private sector in designing products. Clarke and Newman (2005) highlight the effectiveness of situational crime reduction in product design, including the use of toughened glasses in British pubs (Design Council, 2002). However, disparity between progress made within other sectors (for example, the built environment and vehicles) and that made within consumer electronic products remains considerable and it is this gap, specifically the need to move research into practice, which the products strand of Project MARC hoped to address.

This volume is designed to introduce the reader to the work conducted under the crime proofing strand of Project MARC. Although this strand was led by

the Jill Dando Institute, it became clear throughout the two-year project that key individuals not directly involved in the project (namely Professor Graham Farrell and his colleagues at Loughborough University and Professor Paul Ekblom and Dr. Lorraine Gamman at Central Saint Martin's College of Art and Design) had a vital role to play in reviewing the project's progress, but of as much importance, in taking these ideas forward. In this volume, Farrell *et al.* note progress and problems with a particular product – the mobile phone. Building upon the work presented by Project MARC (as well as Cohen and Felson, 1979 and Clarke, 1999), they present a set of characteristics that promote anti-theft design. These form the acronym IN SAFE HANDS from the characteristics: Identifiable, Neutral, Seen, Attached, Findable, Executable, Hidden, Automatic, Necessary, Detectable and Secure. Not only is this framework's presentation more likely to appeal to designers than CRAVED or VIVA, it also identifies characteristics which can reduce the theft of products as opposed to those which promote the theft of products (as CRAVED and VIVA do). Ekblom and Sidebottom describe and analyse some of the limitations of Project MARC (in particular those relating to concepts and terminology), discuss an approach to redesigning language, propose a 'basic grammar' of risk and security and suggest improvements to product assessment schemes. Examples of problems identified include confusion and overlap in usage of the terms 'risk' and 'vulnerability'. The latter being used as a synonym for risk, as a source of risk and as the resultant of the balance between risk and protection/security. Drawing upon Saraga's concerns that the MARC team failed to grasp the importance of the global market in the design, supply and marketing of portable electronic goods, it is vital that the language used in any future risk assessment mechanisms, design standards or guidance is both clear and consistent. A structure for the proposed expert group could (and should) readily be abstracted from the developments outlined in these papers. Finally, Saraga helpfully berates the criminological academy for its latent or overt hostility to manufacturers. One observation of the authors is that despite protracted and intensive efforts to engage the manufacturers of electronic goods in the MARC process, their wish to be involved was minimal or absent. Saraga's point that criminologists have to learn how to present the business case for security is well taken.

As the first paper presented within this journal outlines in more detail, Project MARC aimed to develop a mechanism to assess the risk of theft of electronic products and to take steps to operationalise that mechanism. The project presented both a mechanism for assessment of risk as well as a system to put this in practice. The project authors conclude that the vulnerability checklist designed as part of the project is fit for purpose, however, measuring security through a standardised quantitative checklist risks imposing an artificial ceiling upon the exercise of ingenuity and skill and understates the degree to which security is specific to product type. In short, vulnerability is effectively measurable, security is not. A parallel is the debate about standards, where product security can be designed down to a standard and hence more easily be by-passed. It is suggested that security should be measured by an independent technical group which would deem security features as good, adequate or insufficient with rated vulnerability, yielding a three level rating. In terms of applying the mechanism in practice, the project suggests two systems - the first an accreditation scheme and associated logo (similar to the Secured by Design scheme) which would allow products meeting the required standards to be marketed as a 'Secure Product', the second a 'signposting system' (similar to that suggested by the UK Food Standards Agency) which would provide consumers with instant information relating to levels of vulnerability and security. A third suggestion not raised in the project, is to explore the idea of implementing a system similar to carbon-trading where a cap is imposed upon manufacturers in terms of their permitted level of criminogenic design. Manufacturers exceeding their allowances would be required to buy credit from criminocclusive manufacturers. This system is an extension of the polluter-pays principle first raised in crime reduction by Roman and Farrell (2002). Although this suggestion (as well as others) should be explored further, care must be taken to avoid alienating manufacturers. In the concluding paper, Saraga warns that progress will not be made through name-calling and that the one perspective particularly likely to alienate manufacturers is the application of the polluter pays principle. Whilst Saraga's view that that the direct link between design and crime fails to acknowledge the role of the motivated offender, is not

accepted by the authors, his view that effective collaboration relies upon mutual respect is entirely accepted. As the title to his paper suggests, there is a need to create and maintain an open dialogue.

Whilst progress in other sectors, as well as the enthusiasm of key individuals involved in the project, persuades authors of viability of enterprise, frustrations and concerns remain. The first relates to the lack of interest shown by those outside the criminology/law enforcement sector – particularly from those within manufacturing. This was demonstrated by the low level of responses from manufacturers within the research phase of Project MARC – responses from manufacturers made up only 9% of the total (insurance representing 32%, consumer associations 27%, insurance 27% and European Standardisation Organisations 5%), as well as the attendance at the conference which concluded the two year project. The second area of concern lies with the lack of cohesion within the field of crime proofing products to date and the fear that whilst individuals are making their own contribution, these efforts are disjointed with little or no central guidance or leadership.

First to the issue of the difficulties of engaging manufacturers. The two-day crime proofing conference which represented the culmination of this two year project was held in April 2006. The aims of the conference were to disseminate the findings of this strand of Project MARC and to discuss the feasibility of the ideas being proposed. The research team, aware of the dangers of over-emphasising crime/security at the expense of designers and manufacturers, took great care to ensure that a balance was struck. The research team recruited the services of Central Saint Martin's College of Art and Design who not only designed the invites and associated merchandise, but also volunteered (at no expense) the services and expertise of two members of staff who devoted approximately one month to identifying and contacting the appropriate individuals/organisations to invite. The conference invites and merchandise were branded with an eye-catching, colourful design and the conference was titled: iWant to design secure products. The aim was

to achieve a balance of those from a security/criminology background as well as designers, manufacturers, retailers, insurers and those representing consumer organisations. Care was also taken to ensure a balance between attendees from the UK and other EU states. The conference was held in April 2006 in London, UK. The research team began identifying and contacting individuals and organisations in December 2005 and the following four month period was devoted to ensuring the appropriate people had been invited, pitching the design and content at the correct level and reminding invitees of the benefits of attendance. Approximately 200 named individuals were invited to the conference. A review of the invites suggests that 49% were from the UK and 51% were EU or international. 33% were manufacturers, 29% criminologists (or from law enforcement backgrounds), 11% represented the insurance sector, 9% consumers, 5% designers, 5% security and 4% policy. Attendance at the conference was good, the balance between sectors was not. Approximately 80% of those who attended were criminologists or those representing law enforcement. The remaining attendees were policy makers, consumer representatives and those from the insurance sector. Only two attendees represented manufacturers (of the 41 invited). The geographical balance was also disappointing. Although 60% of invitees were from outside the UK, more than 90% of attendees were from UK based organisations.

Now to the second concern – that progress within this field has been disjointed and has lacked leadership from a central organisation. In the final paper within this journal, Saraga condemns the Home Office – the Government Department primarily responsible for crime matters within the Foresight programme, for failing to act upon recommendations which were made. A review of the gains made since the Foresight programme would lead the authors to agree. Much has been discussed, but little has made the transition from research to policy or practice and the little which has been done risks being wasted as individuals move on, funding ceases and organisations (who may have shown early interest) become frustrated with the duplication of effort.

The Foresight Crime Panel was one of three cross-cutting panels which the Department of Trade and Industry established in the second phase of its work in 1999. Recommendations made by the panel were included in the report *Turning the Corner* (DTI, 2000). Some of the most relevant recommendations to this subject include:

- 1) That a dedicated funding stream be established to focus science and technology attention on crime reduction.
- 2) That a national e-crime strategy be established for all levels of e-crime.
- 3) That thinking on crime reduction be incorporated into the mainstream of central government and business decision-making. Similarly, ongoing programmes to encourage horizon scanning to identify and prepare for future threats should be established.
- 4) That a programme be developed to address crime at all stages of a product's life-cycle.

The ensuing seven years have seen some progress made towards achieving these goals. In response to the first recommendation, the Engineering and Physical Science Research Council launched its 'Think Crime' initiative (November 2002), the aim being to encourage cross-cutting work encouraging those from disciplines such as engineering and science to play a part in the reduction and detection of crime. In relation to the second, some progress has been made (McKinnon and Tallam, 2002; Newman and Clarke, 2002; Newman and Clarke, 2003) and it is expected that the work currently being conducted under the AGIS Programme – E-Services Crimes: Theft and Illegal Use of Electronic Services (led by Professor Farrell at Loughborough University) will make further progress towards this objective. The third recommendation is crucial to the field of crime proofing products yet is still to be addressed. As Pease (2005) highlights, one of the ways in which this recommendation could be concretized include the application to central government and business the obligation imposed upon local authorities,

police, fire services and primary care trusts to consider the crime implications of every decision that they make in Section 17 of the Crime and Disorder Act (1998). Regrettably, despite this recommendation, there remains a failure to extend the provisions of Section 17 to central government and the private sector. In reality this means that whilst legal action<sup>ii</sup> can be used as an incentive to convince local authority planning departments that (for example) housing in the area should be built to Secured by Design standards, which render them less vulnerable to victimisation (Armitage, 2000)<sup>iii</sup>, those who design, manufacture and retail desirable and expensive electronic goods have no legal responsibility for the crime and disorder implications of their products. Whilst legislation alone may not always be the answer, the omission of central government and the private sector from the provisions of the Crime and Disorder Act portrays the message that currently these sectors are not charged as major suppliers of criminal opportunities. In terms of 'horizon-scanning', the Home Office's Police Science & Technology Strategy Group has a 'Future Scanning' Sub-group chaired by the Home Office Scientific Development Branch which assesses science technological innovations for crime risk and crime reduction opportunity.

In relation to the fourth recommendation, that a programme be developed to address crime at all stages of a product's life-cycle, the goal is in sight, yet remains frustratingly distant. The sub-elements of this recommendation suggest:

- An annual award for new products which have been designed with crime reduction in mind.
- How to encourage a climate of demand for secure products amongst consumers.
- Identifying the roles for manufacturers, retailers and consumers in developing secure products.
- A voluntary standards system within manufacturing which would show that the criminogenic capacity of a product has been addressed.

Progress has been made with the first in the form of the Student Design Awards of the Royal Society of Arts well as the Design Council's Design Challenge competition. The second has remained largely untouched; however, findings from Project MARC strongly recommended that lessons are learnt from the field of designing out crime within the built environment. Research published in 2003 (Armitage and Everson, 2003) found that those considering the purchase of a new property rated 'a secure environment' as more important than five other variables selected by estate agents for their popularity. This research also highlighted that consumers are willing to pay for extra security and do not expect developers to absorb these costs. This research has allowed policy makers to challenge developers who suggest that housing described or marketed as 'secure' would give consumers the impression that the areas had a high crime rate. The argument by many developers of electronic products that consumers do not want their products to be safe as a stolen product will be replaced by a new upgraded product must be challenged. Manufacturers need to be confronted with the facts – do consumers want secure products? Are they willing to pay an additional premium for security? Would a secure product give manufacturers a market advantage? Do the benefits of a new upgraded replacement compensate for the emotional and physical trauma of being a victim of theft? Without this information, the assumptions made by manufacturers will remain unchallenged.

The third - identifying the roles for manufacturers, retailers and consumers in developing secure products, although not specifically targeted is being encouraged by the Design against Crime team at Central St Martins College of Art and Design (University of the Arts London) and the Designing Out Crime Association (DOCA) which was formed in 1999. Unfortunately, the Home Office Designing out Crime Working Group which was attended by agencies such as ACPO (the Association of Chief Police Officers), Intellect (the trade association for UK high-tech industry), ABI (Association of British Insurers), the Consumer Association and RETRA (radio, electrical and television retailers' association) disbanded in 2005 after just three meetings.

The final element – to develop a voluntary standards system within manufacturing which would show that the criminogenic capacity of a product has been addressed, formed large part of the crime proofing strand of Project MARC. In aiming to achieve this goal, a desirable (if perhaps naive) sequence of events would have been for the EU to commission Project MARC to develop mechanisms for measuring the risk of theft and to discuss the feasibility of making this system operational. Following the conclusion of Project Marc, time would have been allowed for those working within the field of designing out crime to offer their views, to critique the proposals and to suggest improvements (as is being done within this journal). Regrettably, the actual sequence of events was very different. Project MARC began in May 2004 and finished in April 2006. The period between its conclusion and the publication of this journal has been used to review its findings, discuss weaknesses and suggest improvements to the proposals. Although the EU must be praised for trying to progress the development of crime proofing standards, their haste may jeopardise quality. Three months after the commencement of Project MARC, the European Union's issued mandate M/355 EN to European Standardisation Organisations (ESOs) CEN, CENELEC and ETSI for the elaboration of European standards to identify and reduce crime risk in products and services. The mandate was issued with the request for a submission of a standardisation work programme by August 2005, eight months before Project MARC's final report was submitted and more than a year before the reviews/critiques of Project MARC's findings (presented within this journal) were published.

ESOs were specifically asked to provide a rationale for producing standards for crime proofing products and services; to conduct a stock take of current or developing standards on product and service proofing; to identify potential European standards to enhance industry; to identify areas, features, processes and interfaces where standards could support effective product proofing and to identify stakeholders within the EU that could contribute to the standardisation process. A CEN expert group was convened in January 2005

including members from ACPO, DTI (Department of Trade and Industry, UK), NSAI (National Standards Institution, Eire), BSI (British Standards Association), UCL (University College London), Home Office, Selectamark, Fraunhofer Institut, British Telecom and ABI. CEN's report which contained seven recommendations, was submitted to the EU in September 2005. Unfortunately by coincidence rather than co-ordination of responses, one of the authors (who sat on the CEN expert group) was asked to comment on the ETSI response to this mandate in January 2007 – 17 months after the EU deadline and 16 months after the CEN response was submitted. Unfortunately this lack of co-ordination results in duplication of effort, lack of consistency and ultimately a delay in standards being produced.

It is hoped that this journal will stimulate interest within this subject as well as helping to maintain momentum. It is clear that progress is being achieved and that the gains made in the last two years must not be lost. Many will dismiss the ideas presented within this journal as unfeasible, unrealistic and even insane! What is clear though to the authors is that the craziest course of action would be to allow this hard work to go to waste. Perhaps it is time to be brave and even a little bit mad - in the words of George Bernard Shaw: "We need a few mad people now. See where the sane ones have landed us". The hopes of the authors are that Project MARC and this subsequent publication will encourage the development of an international expert group who can take forward and build upon MARC's recommendations; further funding to explore consumer appetite for secure products, the development of a risk index of electronic products and further exploration of offender decision making at point of theft and finally, that criminologists and manufacturers can become friends.

## **REFERENCES**

Armitage, R. (2000) *An Evaluation of Secured by Design Housing within West Yorkshire – Briefing Note 7/00*. London: Home Office.

Armitage, R. (2006) Predicting and Preventing: Developing a Risk Assessment Mechanism for Residential Housing. *Crime Prevention and Community Safety: An International Journal*. Vol 8, No. 3, pp. 137-149.

Armitage, R. (2007) Sustainability Versus Safety: Confusion, Conflict and Contradiction in Designing out Crime. *In: G. Farrell, K. Bowers, S. Johnson and M. Townsley (Eds.) Imagination for Crime Prevention: Essays in Honour of Ken Pease*. Crime Prevention Studies, vol. 21, pp.???. Monsey, New York and Cullompton, Devon: Criminal Justice Press and Willan Publishing.

Armitage, R., and Everson, S. (2003) Building for Burglars? *Crime Prevention and Community Safety: An International Journal*. Vol.5, No.3, pp.15-25.

Bevis, C. and Nutter, J.B. (1997) *Changing Street Layouts to Reduce Residential Burglary: Paper presented to the American Society of Criminology*. Atlanta.

Brantingham, P.L. and Brantingham, P.J. (1981) *Environmental Criminology*. Beverley Hills: Sage.

Brantingham, P.L. and Brantingham, P.J. (1984) Burglar Mobility and Preventive Planning. *In: R.V. Clarke and T. Hope (eds.) Coping with Burglary: Research Perspectives on Policy*. Boston, Kluwer-Nijhoff. P. 77-96.

Brantingham, P.L and Brantingham, P.J (1993) Environmental Routine and Situation: Towards a Pattern Theory of Crime. *Advances in Criminological Theory*, 5, 259-294.

Brantingham, P.L and Brantingham, P.J. (2000) *A Conceptual Model for Anticipating Crime Displacement: Paper presented at the American Society of Criminology Conference*. San Francisco.

Brown, J. (1999) *An Evaluation of the Secured by Design Initiative in Gwent, South Wales* (unpublished MSc. Dissertation). Scarman Centre for the Study of Public Order: Leicester.

Brown, B. B. and Altman, I. (1983) Territoriality, Defensible Space and Residential Burglary: An Environmental Analysis. *Journal of Environmental Psychology*, 3, 203-220.

Brown, B. and Bentley, D. (1993) Residential Burglars Judge Risk: The Role of Territoriality. *Journal of Environmental Psychology*, 13, 51-61.

Burgess, E. W. (1916) Juvenile Delinquency in a Small City. *Journal of the American Institute of Criminal Law and Criminology*, 6, 724-728.

Chi-Feng Shu, S. (2000) Housing Layout and Crime Vulnerability. *Urban Design International*, 5, 177-188.

Clarke, R.V. 1999. Hot Products: Understanding, Anticipating, and Reducing Demand for Stolen Goods. Police Research paper 112. London: Home Office. Accessed July 2006 at:  
<http://www.homeoffice.gov.uk/rds/prgpdfs/fprs112.pdf>

Clarke, R. V. and Newman, G.R (2005) Modifying Criminogenic Products: What Role for Government. In: R. V. Clarke and G. R. Newman (eds.) *Designing Out Crime from Products and Systems*. Cullompton, Devon: Willan Publishing.

Cohen, L. and M. Felson. 1971. 'Social change and crime rate trends: a routine activity approach' *American Sociological Review*, 44, 588-608.

Coleman, A. (1986) *Utopia on Trail: Vision and Reality in Planned Housing*. London: Hilary Shipman.

Cromwell, P.F and Olson, J.N. (1991) *Breaking and Entering: An Ethnographic Analysis of Burglary*. Newbury Park, California: Sage.

Design Council (2002) *Design Against Crime*. London: Design Council.

Department of Trade and Industry (2000) *Turning the Corner*. London: Department of Trade and Industry.

Farrington, D (1978) *The Family Backgrounds of Aggressive Youths* in L. Hersov, M. Berger and D. Shaffer (eds.) *Aggression and Antisocial Behaviour in Childhood and Adolescence*. Oxford: Pergamon.

Farrington, D (1986a) *Age and Crime* in M. Tonry & N. Morris (eds.) *Crime and Justice Vol. 7*. Chicago: Uni. of Chicago Press.

Farrington, D (1986b) *Stepping Stones to Adult Criminal Careers* in D. Olweus, J. Block and M.R. Yarrow (eds.) *Development of Antisocial and Pro-social Behaviour*. New York: Academic Press.

Farrington, D. P (1991) *Childhood Aggression and Adult Violence*, in D. Pepler and K. H Rubin (eds.) *The Development and Treatment of Childhood Aggression*, Hillsdale, New Jersey: Lawrence Erlbaum.

Farrington, D (1992) *Juvenile Delinquency* in J.C. Coleman (ed.) *The School Years* (2nd Ed.) London: Routledge.

Farrington, D.P (1995) *Teenage Antisocial Behaviour* in M. Rutter (ed.) *Psychosocial Disturbances in Young People. Challenges for Prevention*. Cambridge: Cambridge University Press.

Greenberg, S. and Rohe, W. (1984) Neighbourhood Design and Crime: A Tale of Two Perspectives. *Journal of American Planning Association*, 50 (1), 48-61.

Groff, E.R. and LaVigne, N.G. (2001) Mapping an Opportunity Surface of Residential Burglary. *Journal of Research in Crime and Delinquency*, 38 (3), 257-278.

Hillier, B. and Chi-Feng-Shu, S. (1998) *Crime and Urban Layout: The Need for Evidence: Home Office Crime Prevention College*. Easingwold.

Homel, R. et al (1999) *Pathways to Prevention: Developmental and Early Intervention Approaches to Crime in Australia*. National Crime Prevention, Attorney General's Department, Canberra.

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, California: Sage.

Newlands, M. (1983) *Residential Burglary Patterns in a Vancouver Neighbourhood* (unpublished honors thesis). Simon Fraser University.

Newman, O. (1973) *Defensible Space: People and Design in the Violent City*. London: Architectural Press.

Newman, G. and R.V. Clarke. (2002) *E-tailing: New Opportunities For Crime, New Opportunities For Prevention*. Report Produced For the *Foresight* Crime Prevention Panel. London: Department of Trade and Industry.

Newman, G. and R.V. Clarke. (2003) *Superhighway Robbery: Crime Prevention and E-Commerce*. Cullompton, Devon: Willan Publishing.

McKinnon, A. and Tallam, D. (2002) *New Crime Threats from E-tailing: Theft in the Home Delivery Channel*. Report prepared for the Products and Crime Task Force of the UK Government Foresight Programme. London: Department of Trade and Industry.

Park, R.E. et al. (1925) *The City*. Chicago, IL: University of Chicago Press.

Pascoe, T. (1999) *Evaluation of Secured by Design in Public Sector Housing – Final Report*. Watford: BRE.

Pease, K. (2005) Science in the service of Crime Reduction. In: N. Tilley and M. Smith. *Crime Science: New Approaches to Preventing and Detecting Crime*. Cullompton, Devon: Willan.

Poyner, B. (1983) *Design Against Crime: Beyond Defensible Space*. London: Butterworth.

Poyner, B. (1995) *Crime Free Housing in the 21<sup>st</sup> Century*. Cullompton, Devon: Willan.

Poyner, B. and Webb, B. (1987) *Successful Crime Prevention: Case Studies*. London: The Tavistock Institute of Human Relations.

Roman, J. and Farrell, G. (2002) Cost-Benefit Analysis for Crime Prevention: Opportunity Costs, Routine Savings and Crime Externalities. *Crime Prevention Studies*. 14: 53-92.

West, D.J and Farrington, D.P (1973) *Who Becomes Delinquent?* London: Heinemann.

West, D.J (1982) *Delinquency: its Roots, Careers and Prospects*. London: Heineman.

Wiles, P; Simmons, J and Pease, K. (2003) Crime Victimization: Its Extent and Communication. *Journal of the Royal Statistical Society: Series A*. 166 (2), 247-252.

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

Youth Justice Board (2001) *Risk and Protective Factors Associated with Youth Crime and Effective Interventions to Prevent it, Research Note 5*. London: Youth Justice Board.

---

<sup>i</sup> The actual (hazard) and perceived (risk) probability of an event often diverge. While an important topic, touched upon towards the end of this introduction and in other contributions, the ramifications of the point are not addressed here. See Wiles et al (2003)

<sup>ii</sup> In the form of liability in private law for breach of a statutory duty, or liability to judicial review under the doctrine of *ultra vires*.

<sup>iii</sup> As well as countless other examples involving agencies deemed 'relevant' to the reduction of crime.