

Why did Crime Drop?

Graham Farrell, Nick Tilley and Andromachi Tseloni ¹

ABSTRACT

The ‘crime drop’ is the most important criminological phenomenon of modern times. In North America, Europe, and Australasia, many common crimes have fallen by half or more since the early 1990s, albeit with variation in the specifics. Seventeen explanations are examined here including demographics, policing, imprisonment, drug markets and lead poisoning. Some have been falsified, some lack evidence, some are inconsistent with the evidence, and some claim a minor contribution at most. Pioneering research that developed explanations only relevant to the United States now appears, with the benefit of hindsight, somewhat parochial. Sixteen of the seventeen hypotheses fail one or more of four evidence-based standardized tests on which they are assessed. The one that passes is the security hypothesis, underpinned by crime opportunity theories. Here there is strong evidence from four countries that vehicle theft fell due to more and better security, and mounting evidence that improved security was critical in reducing burglary and other acquisitive crime. Many crime types are inter-related, while most criminal careers are dominated by property crime, so removing these volume crimes might be expected to reduce violence. The policy implication of the security hypothesis is that governments should promote regulation and incentives to promote designing-out crime and crime-proofing for the remaining common crimes plus new and emerging crime types.

Suggested keywords: crime drop; crime decline; security hypothesis; keystone crime hypothesis; debut crime hypothesis; crime opportunity theory.

¹ Graham Farrell is professor at the Institute for Canadian Urban Research Studies and the School of Criminology at Simon Fraser University, Nick Tilley is professor at the Department of Security and Crime Science at University College London, and Andromachi Tseloni is professor of quantitative criminology in the Department of Social Sciences at Loughborough University. They thank Gloria Layock, Louise Grove, Becky Thompson, Jen Mailley and Laura Garius for collaboration, Paul Brantingham for Canadian data, Martin Andresen, Ron Clarke, Jan van Dijk, Chris Kershaw and Martin Killias for sage advice, and the Economic and Social Research Council for grants RES-000-22-2386 and ES/K003771/1.

I. Introduction

Truth is stranger than fiction. Twenty five years ago, had anyone the audacity to suggest crime would soon embark on a steep and prolonged decline in most advanced countries, they would have been laughed out of the room. It was unthinkable! Hence while it is popular to start essays such as this by pillaring those criminologists who predicted crime's incessant rise, it is rarely acknowledged that such views were almost universally held. This essay will not make predictions. It will, however, provide theory and evidence to help explain why crime has declined, and conclude with policy recommendations for sustaining the crime decline and extending it to crimes that are currently increasing, such as internet-related crime, smartphone theft and other iCrime¹.

Has crime really declined? Where, by how much, and with what variation? This is the topic of Section II that follows. There is emerging scientific consensus regarding the existence of an international crime drop, with remaining debate focusing on the specifics. The most reliable sources of information are victim surveys, particularly the national surveys of England and Wales, France, the Netherland and the United States, all of which find many types of common or street crimes, such as assault, burglary and car crimes, to have declined dramatically since the 1990s. National sources are buttressed by the International Crime Victims Survey, the only methodologically standardized general victim survey, and it indicates the international nature of crime's decline. While supplementary sources including police recorded crime data, health data, and insurance data, are each individually less reliable, the extent of supporting evidence they provide is rather overwhelming: the likelihood that so many different sources in different places point in the same direction by chance is infinitesimally small. There is variation in when, by how much, and which crime types have fallen, but such variation around the mean is to be expected in the real world and adds to overall credibility. An overview of this evidence is given in the first section of this essay but there is no real diversion from the general theme: crime has declined in many advanced countries, though sometimes with considerable variation in the timing and trajectory.

Why has crime declined? This is the subject of Section III of this essay. Seventeen hypotheses are examined. Much of the pioneering research focused on declining violence in the United States, exemplified by the landmark collection of studies edited by Blumstein and Wallman

(2000). This seems to form a natural 'phase 1' of research that was highly innovative and informative but which has been rather superseded by the emergence of what is here characterised as phase 2 crime drop research: growing recognition of the international nature of the crime drop and the importance of declining property crime. Explanations proposing that crime fell due to particular characteristics of the United States now appear somewhat parochial. The clearest evidence for this comes from Canada which has similar crime trends and strong socio-economic and cultural links, but significantly different policies in many of the areas where explanation has been sought. The suggestion that crime fell due to legalized abortion or due to a decline in lead poisoning of children appear unable to account for the fact that offending rates fell among other age-groups, not just those born in the 1970s who reached peak offending ages in the early 1990s. The demographics hypothesis suggests that crime rates fell due to an aging population. This and many other hypotheses suggest that crime fell due to a decline or relative decline in either the number or motivated of offenders, and such hypotheses seem unable to explain why some crime types, such as phone theft and e-crimes, have increased when others have fallen.

Some criticisms apply to more than one hypothesis, and these are identified and used as a series of 'tests' to determine if any hypothesis passes each one. Of research to date it is concluded that only the security hypothesis passes each test. This hypothesis suggests that crime fell due to a reduction in crime opportunities caused by improved security, and is the focus of Section IV of this essay. There is strong empirical support for the security hypothesis from independent research into the drop in car theft in four countries which suggests it was caused by improved vehicle security, particularly electronic immobilizers and central deadlocking systems. There is also mounting evidence that household burglary fell due to improved household security. It is suggested that while further research is needed, declines in several other crime types, including shoplifting and some types of robbery, may also have been due to improved security as business began to realise the cost of high crime rates. The link is made to criminal career research which finds most criminal careers are dominated by property crime, and that property crimes are often the debut crimes that begin a criminal career. If security improvements have reduced the volume property crimes, it is suggested that this may have caused the less prevalent violent crimes to also decline, because much violence would likely be dependent upon that property crime in some way.

This essay concludes that the security hypothesis, nested in the theoretical framework of crime opportunity theory, rational choice and routine activities, offers the most likely explanation for why crime has declined in many countries. While a significant amount of further research is required to make this conclusion definite, there is already quite a lot of supporting evidence from different countries and data sources. Based on this conclusion, the main policy implication is that designing-out crime should be given far greater prominence: Government and police should seek to encourage both the public and private sector to reduce the emission of crime opportunities. This is likely to require a mix of regulation and market-based incentives, and policing to re-emphasise crime prevention as its primary mission and to give a far greater emphasis to problem-solving approaches.

Here is a summary of the structure of this essay. Section II examines the extent and nature of the crime drop. Section III assesses seventeen hypotheses that have been offered to explain the crime drop, and finds sixteen largely wanting. Section IV focuses on the strongest explanation identified, which is the security hypothesis. It reviews strong evidence from independent research in multiple countries that greatly improved security caused property crime and acquisitive crime to fall, and that, since they are so prominent, it is possible they triggered the fall in violence by various routes. Section V offers conclusions and recommendations.

The term 'crime drop' is used in this essay in the same sense that it is used in much of the literature. It is a portmanteau term that identifies broad similarities in downward crime trends since the early 1990s, while acknowledging significant variation in their timing, extent and nature. Global or international crime trends remain rather elusive due to data limitations, which means there is some reasonable generalisation when reference is made to an international crime drop; just as any reference to a national-level crime drop incorporates considerable local variations which are themselves crude aggregations of smaller pockets of crime and widely varying individual experiences.

II. Extent and Nature of the Crime Drop

This section gives an overview of key trends and data sources. The importance of this section is that the evidence it provides underpins the assessment of the various explanations for the crime drop that have been offered that is the subject of Section III that follows.

This sections shows that there is extensive evidence from multiple independent sources and methodologies, that indicates crime has fallen substantially in many countries in recent years. It thereby demonstrates that the crime drop is not an artefact of statistics or method.

A. The United States

Figures 1 and 2 show trends based on the National Crime Victimization Survey (NCVS) and Uniform Crime Reports (UCR) respectively. Homicide, sexual violence, robberies and assault rates declined rapidly from the early 1990s. While there has been some flattening of the trend from around the turn of the century, the crime drop has continued for two decades. By 2011, violence in the US had fallen 70 percent since 1993 according to the National Crime Victimization Survey (Truman and Planty 2012). Household burglary and larceny theft also fell over this period but had been in decline longer. Between 1973 and 1995 burglary fell by half and theft by 43 percent (Rand, Lynch and Cantor 1997), trends that continued: burglary fell 56 percent between 1994 and 2011 (Hardison Walters et al. 2013). Figure 2 suggests a strong relationship between car theft rates and rates of violence with a two-year lag.²

INSERT FIGURES 1 AND 2 ABOUT HERE

B. Canada

There is a remarkable similarity between the Uniform Crime Reports of Canada and those of the United States. These are held to be the best comparative source for present purposes. This is because, while Canada conducts a national victimization survey every five years, its findings relating to crime trends have been significantly questioned and contradict the findings of all other sources that crime has been declining in a similar fashion to the United States. The Canadian national crime survey is conducted as part of a more general social survey by one part of Statistics Canada while its findings seem to have been openly contradicted by the Centre for Criminal Justice Statistics that is also part of Statistics Canada (see Farrell and Brantingham

2013 for further details; see also Greenspan and Doob 2011), and so Canada's UCR data is preferred here.

Figure 2 shows a panel of comparative crime trends for the US and Canada for roughly similar crime types. Each chart is indexed to 100 in 1962 to facilitate comparison of the trends. This shows that trends in the homicide rates are very similar over time even though the per capita homicide rate in the United States is significantly higher.

A visual inspection of Figure 2 suggests, and as others including Ouimet (2002, 2004), Zimring (2006), and Mishra and Lalumiere (2008) have concluded, there is a strong relationship between crime trends in Canada and the United States. Burglary in the United States appears to fall earlier than that in Canada. Car theft in Canada falls rather later than in the United States and this seems likely to reflect differences in the timing of the introduction of improved vehicle security, an issues discussed at length later in this essay. Yet it is despite these differences that the strong similarities in crime trends in the two countries are apparent.³

INSERT FIGURE 3 (Panel of 6 charts) ABOUT HERE

C. England and Wales

The United Kingdom has data of similarly good quality to the United States, with the Crime Survey for England and Wales (formerly the British Crime Survey) conducted since 1982. It identifies a crime drop with similar timing to that of the US. Again following around three decades of increasing crime in the post-World War II period, the household crime rate peaked in 1993 and the personal crime rate in 1995 (Figure 3)^{4,5}. By 2012, relative to those peaks, all household crime had fallen 64 percent and all violent crime by 56 percent.⁶ Figure 4 shows the rates indexed to 100 at the first survey sweep of 1981 to allow a clearer comparison of change. It demonstrates the similarity in the 'crime drop' with the fall in household crimes including motor vehicle crime slightly preceding that of personal crime. The homicide rate is an anomaly in England and Wales. Unlike most other crime types it continued to rise through the 1990s to a peak in 2002, whereafter it fell by half over the subsequent decade (Office of National Statistics 2014).

INSERT FIGURE 4 (2 charts in panel) ABOUT HERE

D. Australia and New Zealand

Australia and New Zealand have conducted national victimization surveys infrequently, so that information is supplemented from other sources, particularly police recorded crime, to derive trends. Mayhew (2012) provides the authoritative review of the range of data sources and previous studies of crime trends in these countries. She concludes in relation to property crime that

“The pattern of falling property crime in many industrialized countries in the last two decades or so is mirrored, then, in Australia and New Zealand. The timing of the ‘turn’ in property crime seemed to be around 2001 in Australia according to police figures. In New Zealand, it was about a decade before – more in line with other countries.”
(Mayhew 2012; 98)

and in relation to violent crime that

“In other countries, the picture for violent crime has been more mixed, although there is evidence of some stabilization in some countries. This seems to apply to Australia in the last decade and to New Zealand at least in the previous one.” (Mayhew 2012; 98)

Among prior studies, Morgan and Clare (2007) focused on household burglary in Western Australia while suggesting that trends were generally similar for other states. Following national burglary rate increases of 150 percent between 1973/4 and 1991/2, Western Australia experienced further increases of a quarter from 1003 to 1995 then fell by half between 1995 and 2005. This meant the overall rate emerged a third lower in 2005 compared to the 1993 peak, with Morgan and Clare suggesting the decline was similar elsewhere in Australia.

From 2001, vehicle theft in Australia plummeted, falling around three quarters over the next decade. Police recorded crime data for car theft is generally held to be more reliable than most because it is reported for insurance purposes. Kriven and Zeirsch’s influential (2007) study examined the early years of this decline and links it strongly to improved vehicle security. In particular, and consistent with the work of Brown and Thomas (2003) and Brown (2004) in the

UK, they find an aging of stolen vehicles, which would be expected when newer cars are more difficult to steal (see also Laycock 2004, Webb 2005 in relation to the UK).

E. The International Crime Victims Survey

The International Crime Victimization Survey is the only cross-national methodologically standardized general victim survey. It has smaller national sample sizes and hence larger standard errors than most national surveys. It has been conducted in 1988, 1992, 1996, 2000, 2004-5 and for six countries for 2010 (with the 2010 data supplemented by some complementary studies based on the ICVS method – see van Dijk 2012, 2013). This gives a spread covering more than two decades but for a maximum of six data points, making short-term variation less easy to specify. The ICVS reveals a crime drop of broadly similar nature to what has been discussed so far, but for a far wider set of countries. As an independent source it further buttresses the evidence of widespread crime declines.

Aebi and Linde (2012) suggest that there is no ‘general’ crime drop in Europe, due to variation between countries. Few would disagree that there is variation between countries, or that there is variation within countries and across crime types. Whether or not that means it can be termed a general crime drop is a different issue. Their analysis uses police records of crime, police records of suspects, and court conviction statistics, and while the multiple sources are useful, these data sources are not as reliable as the multiple survey sources examined by van Dijk and Tseloni that were discussed above. Killias and Lanfranconi (2012) suggest, mainly with data from police and insurers, that Switzerland is the exception to the rule, though that conclusion is not borne out by the International Crime Victims Survey which shows declines in most crime types in Switzerland (van Dijk et al. 2007). Overall, the preponderance of evidence does seem to suggest that the term general might be appropriately and usefully applied to the crime drop in Europe.

F. Evidence Relating to Violence Against Women and Children

The nation state has been the main unit of analysis so far, with particular crime types and groups discussed in that context. This section highlights key crime types or studies that tend to be

excluded from such analysis or are often less comprehensively measured by some of the large-scale victim surveys.

With respect to violence against women, Kangaspunta and Haen Marshall review data sources and measurement issues relating to trends in different countries. The methodological issues are myriad due to the hidden nature of violence against women. Despite those issues they conclude that

“[There are] some similarities in the violence against women trends: in all surveyed Western countries, partner violence is decreasing. Also, homicides against women are decreasing in nearly all countries, with the exception of Finland where the trend is stable.” (Kangaspunta and Haen Marshall 2012; 126)

These positive findings were tempered by far more negative findings for violence against women in non-western countries in particular. In a brief discussion of explanations, the authors suggest that declining violence against women in Western societies could be due to greater gender equality, improved resource availability and changing relational lifestyles (p. 128). This hypothesis may warrant further close examination but is not discussed in detail elsewhere in this essay because there are not, to our knowledge, any existing attempts at empirical evaluation.

Finkelhor and Jones (2012) review evidence from different sources relating to trends in sexual abuse and physical abuse of children in the United States. The study was conducted because official sources, particularly the child protection system data, had been questioned, and so this review compared such sources to self-report surveys. Our summary of their findings, shown as Tables 1a and 1b, give very brief coverage of a lot of information and methodological issues that are covered in detail in the original studies and by Finkelhor and Jones (2004, 2006). The conclusion of Finkelhor and colleagues is worth repeating at length:

“There is fairly consistent and convergent evidence from a variety of sources pointing to large declines in sexual abuse from 1992 to 2010. The idea that child protection system data is a misleading indicator on this trend is contradicted by the fact that the decline shows up in other sources that do not rely on CPS. The NIS study is particularly important because it uses consistent criteria across time, and confirms the child protection system trends. The self-report surveys are also very important because they represent victim testimony itself. It seems unlikely that, in the face of more public attention to sexual abuse and decreasing stigma, youth would be more reluctant to disclose in

surveys. In fact one study shows greater reporting of sexual abuse to the authorities, but that the evidence relating to physical abuse is less clear and sometimes conflicting.” (Finklehor and Jones 2012; 3).

INSERT TABLES 1a and 1b ABOUT HERE

Finklehor and Jones conclude that the evidence of a decline in sexual abuse of children “is about as well established as crime trends can be in contemporary social science”, which means the evidence is compelling. Their review of trends in the physical abuse of children is slightly less conclusive, findings greater variation in the trends identified by different data sources (Table 1b). However, they conclude that the preponderance of evidence suggests physical abuse of children has also declined, with the most methodologically rigorous evidence being from the National Incident Study (NAS):

“The strongest evidence that overall physical abuse has declined is the evidence from the NIS. This study was specifically designed to monitor rates and it is unique in its use of exactly consistent criteria across time points.” (Finkelhor and Jones 2012; 5)

G. Conclusion

This section painted a broad brush picture of the nature of recent crime trends. It suggests there is compelling evidence for the following conclusions:

- There has been significant and prolonged ‘crime drop’ in many industrialised nations.
- The extent and nature of the crime drop appears to be more similar between more similar countries (in Canada and the US, for example, there are marked similarities).
- The extent of the evidence means the likelihood that crime drops in different countries are a coincidence is vanishingly small, which implies a causal link.
- These crime drops were generally preceded by several decades of rapidly rising crime.

- While many common crimes have decreased, some such as crimes facilitated by the Internet, and theft of phones and similar electronic products, have increased.

These conclusions are the basis for the assessment of explanations for the crime drop in Section III that follows.

III. Proposed Explanations

This section examines the competing explanations for the crime drop. The focus is those hypotheses that have been given some attention in the academic literature. The extent of supporting evidence varies by hypothesis, and some attempt is made to address this in what follows.

Each hypothesis is subjected to four evidence-based tests founded on the conclusions of the preceding section. It is proposed that each test must be passed for a hypothesis to be considered potentially viable. However, passing the four tests is considered a necessary but not a sufficient condition for a viable explanation of why crime has declined. The tests are straightforward, and variations on existing evaluation criteria, but they have the value of sidestepping many of the methodological dogfights in which some hypotheses appeared to be mired.

The assessment that follows finds that sixteen of the seventeen hypotheses fail one or more of the four tests. This is often in addition to other criticisms that have been levelled against them. The hypothesis that passes the tests is the security hypothesis. That hypothesis is covered only briefly in this section because it is the focus of Section IV of this essay. A summary of the results of applying the four tests to the hypotheses is given in Table 3 but it is discussed at the end of this section.

A. The Identification of Crime Drop Hypotheses

The literature does not uniformly refer to a 'crime drop' by that or a similar term and so, while it is hoped that the list of hypotheses in Table 2 is comprehensive, others may exist. However, the four tests outlined here can be applied elsewhere.

Seventeen hypotheses are listed in Table 2 with a brief description of each and key references. Some potential hypotheses are not included here if they are largely speculative, that is, without supporting evidence, or if they lack a clear preventive mechanism and a reasonable chance of withstanding further scrutiny. For example, Farrell et al. (2010) speculated on what might be termed a ‘Jeffreys Effect’: the possibility that DNA fingerprinting, which began in the 1980s but spread most rapidly in advanced countries in the early 1990s and gained a lot of media attention, could have introduced a broad deterrent effect. Since there is not, to our knowledge, any further research on this issue, it is not included in Table 1 even though, strictly speaking, it could still attract further research.

Some crime drop studies that provide useful insight are not included in Table 2 if they do not offer a distinct hypothesis. This includes some empirical studies with important findings. Thus Mishra and Lalumiere’s (2009) examination of how many types of declining risky behaviour (such as accidents at work or in cars, sexual behavior including teen pregnancy and sexually-transmitted diseases, and substance use including alcohol, tobacco and marijuana) correlate with the decline in crime is insightful and informative but does not constitute a distinct hypothesis. Similarly, studies of how the crime decline is disproportionately concentrated in high crime areas relative to others (Weisburd et al. 2004; Ignatans and Pease in press), and the fact that crime declines are disproportionately declines in repeat victimization against the same targets (Thorpe 2007; Britton et al. 2012; Farrell and Pease 2014) are not explanations *per se*. In each of these cases however, it would be expected that a viable hypothesis should be consistent with these findings, and while this is not included here as a separate requirement or ‘test’, each warrants consideration in that respect. The ordering and terminology of the table is based on that of Farrell (2013). For simplicity in cross-referencing, the sections below use the numberings assigned in Table 2.

INSERT TABLE 2 ABOUT HERE – 17 crime drop hypotheses

B. Four Tests for a Theory of the Crime Drop

The four tests are first outlined here. Clarification of the origins and specifics of each test should emerge from what follows. The tests, with brief justification for each that should become clearer as the tests are applied to the hypotheses, are described briefly here.

1. *The cross-national test*: Can the hypothesis be applied to different countries? (e.g. to Canada for hypotheses developed for the US?)

The basis for this test is the earlier conclusions that a crime drop has occurred in multiple countries and that this cannot be a coincidence. Marc Ouimet's comparative studies of crime in Canada and the United States identified not only strong correlations between the crime rates in these two countries, but also key implications for crime drop research. He observes that

'Crime trends in Canada are very similar to those observed in the U.S. The quest for a general explanation should therefore focus on changes that have affected both countries... If changes in the use of incarceration is to be invoked as an explanation, it would have to be shown why it worked in the U.S. but not in Canada. In terms of policing, contrary to the U.S., Canada has not increased the pro rata number of police officers ... [and] there has been no move toward more aggressive policing as was observed in many U.S. cities.'" (Ouimet 2002; 46).

Zimring, shortly before publication of his book *The Great American Crime Decline*, declared his epiphany as follows:

"Closer inspection showed that the timing of the Canadian decline (1991–2000) fit perfectly with the timing of the declining in the United States (Zimring, 2006:Chapter 5). The extraordinary similarity of these trends in breadth, magnitude, and timing suggested that whatever was driving the decline in the United States was also operating in Canada. ... But ... Canada in the 1990s didn't increase its imprisonment, didn't hire more police per 100,000 population, and didn't have anything close to the economic boom we enjoyed south of the border.'" (Zimring 2006; 619)

Other have made similar observations outside of north America. Van Dijk et al. (2008) and Rosenfeld and Messner (2009), for examples, both observed that crime drops in Europe cannot

be due to policy or legislation in the United States. Dill, Miron and Summers (2008) similarly conclude that we

“know little about the empirically relevant determinants of crime. This conclusion applies both to policy variables like arrest rates or capital punishment and to indirect factors such as abortion or gun laws. The reason is that even hypotheses that find some support in U.S. data for recent decades are inconsistent with data over longer horizons or across countries. Thus, these hypotheses are less persuasive than a focus on recent U.S. evidence might suggest.” (p.3)

Hindsight is twenty-twenty, and the preference here is to celebrate the pioneering nature of crime drop research focused on the United States, while noting the general dearth of research elsewhere until rather later (Ouimet being among the honorable exceptions). However, the key point is that the evidence suggests a hypothesis should be applicable in different countries to warrant serious consideration, and any that does not, without appropriate justification, should be considered suspect. This is the basis for what is here termed the cross-national test.

2. *The prior crime increase test*: Is the hypothesis consistent, or at least not in contradiction, with the fact that crime was previously generally increasing for several decades?

The basis for this test is the earlier conclusion that, prior to the crime drop, crime in most advanced countries had been rising in previous decades: it is fair to say there is scientific consensus on this issue. The extent and duration of crime increases varied, as with crime's more recent decline, and some evidence relating to some of the prior crime increase was touched on earlier in this essay. In short, any explanation for why crime has declined should not be in contradiction with the fact that crime was previously rapidly increasing. This may sound rather obvious and straightforward but, as the discussion of hypotheses below suggests, it is a test that is failed surprisingly often.

3. *The e-crimes and phone theft test*: Is the hypothesis consistent, or at least not in contradiction, with the fact that some crime types have been increasing while many have fallen?

The basis for this test is the fact that some types or sub-types of crime have increased during the ‘crime drop’ when many crime types have decreased. The United Kingdom appears to have been ahead of the game in collating national crime survey data on phone theft since the 1990s and police data, at least for metropolitan London, since the early 2000s after the establishment of the National Mobile Phone Crime Unit. Mayhew and Harrington’s (2001) landmark study shows how phone theft increased in the 1990s in Britain. Yet it is now increasingly recognised that phone theft and robbery, and theft of similar portable electronic products including laptops and tablet computers, have been increasing in many countries. Roman and Chalfin (2007) coined the term iCrime for thefts of phones and similar electronic products that increased in the United States where in 2013 it was observed that

“In 2013, 3.1 million people [in the United States] reported their smartphones stolen, up from 1.6 in 2012. More people are misplacing their smartphones, too; last year, 1.4 million Americans lost their smartphones, up from 1.2 million in 2012.” (Lowe 2014 reporting information from Consumer Reports 2014)

and

“mobile device theft costs consumers \$30,000,000,000 [\$30 Billion] each year according to the Federal Communications Commission” (H.R. 4065).

There is also strong evidence that e-crimes of various sorts relating to the Internet have increased in recent years. Clarke and Newman (2006), for example, examined e-commerce crime.

These increases in some crime sub-types run against the grain of the ‘crime drop’. What is here termed the ‘e-crimes and phone theft test’ is consequently straightforward. It proposes that any hypothesis should be consistent with this fact, or at least not contradict it. Again, this may sound obvious when viewed in isolation, but many of the crime drop hypotheses focus primarily on change in the number or motivation of potential offenders. If crime fell due to a change in demographics, abortion, or lead poisoning which primarily reduced the number or motivation of

offenders then it might reasonably be expected that this would reduce all types of crime similarly. This is particularly true when it comes to phone thefts and robbery which are variations of the broader categories of theft and robbery that have often declined (or which may be the main reason why these crimes have not declined as precipitously as others in some instances).

4. *The variable trajectories test*: Is the hypothesis compatible, or at least not in contradiction, with variation in the timing, trajectory and composition of crime falls both between countries and between crime types?

The basis for this test is the earlier evidence-based conclusion that there has been significant variation between and within countries in the nature of the crime drop. While the cross-national test implied an emphasis on the broad similarity in the fact that crime has declined significantly in different countries, the present test emphasises differences within that picture. For instance, homicide in the UK did not begin its steep decline until considerably after the drop in most other crime types examined here. Likewise, in the United States, the NCVS identifies burglary and theft as having been in decline for around two decades before the major decline in auto theft and violence began. Similarly, there were significant differences in the timing of the crime drop in Australia, and between the trends in property and violent crime in both Australia and New Zealand. Hence within the overall discussion of a 'crime drop' there are a range of significant differences. The variable trajectories test proposes that any explanation of the crime drop must be compatible, or at least not in contradiction of, this evidence.

C. Review of Hypotheses

This section examines the seventeen hypotheses in turn. Its sequence follows that of the listing of hypotheses in Tables 2 and 3.

Hypotheses 1-4. Strong Economy, Concealed Weapons Law, Capital Punishment, Gun Control Laws

It has been suggested that crime fell because economies in the 1990s were growing rapidly, that laws allowing concealed weapons generated deterrence and guardianship, that the application of the death penalty deterred crime, and that stricter gun control laws meant weapons were less freely available for use in crime such that crime declined.

Those four hypotheses are, based upon previous research, taken to be falsified. They were dismissed in two key reviews of crime drop research, being either formally discarded based upon the evidence offered in Levitt (2004) or implicitly dismissed by their absence from consideration in the review of Blumstein and Rosenfeld (2008) (that is, by that time those authors did not even really feel the need to address some of the hypotheses that Levitt had included).

For symmetry these hypotheses will be considered in relation to the other four tests, though it is not coincidental that they largely fail them. Many advanced countries had strong economies in the 1990s and so that hypothesis is taken to pass the cross-national test. However, concealed weapons laws, increased use of the death penalty, and weak gun control laws are largely particular to the United States among advanced countries. They fail the cross-national test because legislation specific to that country is not responsible for reducing crime in the range of other countries experiencing the crime drop.

The basis for the original proposals that concealed weapons laws, capital punishment and gun control laws may have caused the crime drop was that they appeared to be some fit in their timing. That is, although they may have subsequently been proved otherwise, they appeared to have some initial fit with the prior crime increase test. However, they do not appear consistent with the fact that some crime types have increased, and fail the e-crime and phone theft test. Likewise, they all offer little by means of explaining differences in the timing of the crime drop between crime types, or in the timing and trajectories between countries, and so they fail the variable trajectories test.

Hypothesis 5. Imprisonment

The possibility that increased imprisonment caused the crime drop is a hypothesis developed in relation to the United States. However, a recent National Research Council notes that

“over the four decades when incarceration rates steadily rose, U.S. crime rates showed no clear trend: the rate of violent crime rose, then fell, rose again, then declined sharply.”
(National Research Council 2014; 3)

and concludes that

“The increase in incarceration may have caused a decrease in crime, but the magnitude of the reduction is highly uncertain and the results of most studies suggest it was unlikely to have been large.” (National Research Council 2014; 4)

This differs from some earlier findings, perhaps most notably the work of Spelman (2000) that suggested a quarter of the crime drop in the United States was due to increased use of imprisonment.

Cross-national comparative analysis sheds useful light on the imprisonment hypothesis. Zimring’s critique relating to neighboring Canada where imprisonment policy is very different, cited earlier, was telling. Van Dijk and colleagues (2007) observed that

“Prison populations have since the early nineties gone up in many EU countries but not consistently so. Between 1995 and 2000 rates went down, for example, in Sweden, France, Poland and Finland (European Sourcebook, 2003). Sentencing policies in Europe as a whole are considerably less punitive than in the USA (Farrington, Langan, and Tonry, 2004) and yet crime is falling just as steeply in Europe as it is in the USA. No relationship between the severity of sentencing of countries and trends in national levels of crime is therefore in evidence.” (van Dijk et al. 2007; 23).

Rosenfeld and Messner (2009) add weight to this conclusion with their comparative analysis of European and American imprisonment rates, finding no significant relationship. Hence it is fair to conclude that the imprisonment hypothesis fails the cross-national comparative test and thereby, via comparison with Canada in particular, also further impugns the hypothesis in relation to the United States. Further, the major increases in imprisonment that occurred in the United States before the crime drop occurred suggest the imprisonment hypothesis fails what is here termed the prior crime increase test. Likewise, if imprisonment caused crime to drop, it is not apparent why phone theft or e-crimes would increase when other crimes fell, or how it might

account for variation in the timing and trajectory of crime trends in different countries, and so it fails the third and fourth tests. Overall there is little evidence that imprisonment played much if any role in the crime drop even in the United States, and no evidence that it played a role in most other countries experiencing a crime drop.

Hypotheses 6 and 7. Policing strategies and more police

Eck and Maguire's (2000) review of police numbers and policing strategy concludes that there is no real evidence supporting the notion that policing caused the crime drop. This is consistent with Bowling's (1999) study of New York City. However, a key role for policing in New York City has been claimed (Kelling and Sousa 2001), though while Zimring (2012) suggests policing was a cause of the crime drop, he does not appear to identify the precise mechanism by which it is meant to have occurred. Ouimet summarises the critical issues:

“The main problem with the policing explanation is that innovative police practices such as gun patrols (stop and frisk) or Compstat type systems had been implemented after the crime rate had already begun declining. Moreover, the rate of crime dropped in cities that had not experienced major changes in policing.” (Ouimet 2002; 39)

Note that this does not mean that policing strategies cannot affect crime. There is clear evidence that they can in some instances, particularly when resources are focused where crime is concentrated, particularly problem-oriented policing to prevent repeat victimization (Grove et al. 2012) or target crime hot spots (Braga, Papachristos and Hureau 2012). Similarly there is also evidence that increased police numbers may reduce the crime rate (Lin 2009). However, this is a different issue and does not overcome the timing problem noted above.

Both policing hypotheses also fail the cross-national test because other countries did not experience the increases in police numbers, or changes in strategies, that were proposed as causal for the United States. Similarly, if policing had induced the drop in many types of street crime, this could reasonably be expected to similarly impact upon phone theft, and so it fails the fourth test. Neither policing hypothesis appears compatible with the variations in the timing and trajectory of declines in crime exhibited between countries and crime types, and so they fail the fourth test.

Hypothesis 8. Legalization of abortion

Donohue and Levitt (2001) proposed that the legalization of abortion in the United States in 1973 was a cause of the crime drop. They argued that legalized abortion reduced the number of births of children who would otherwise become those most at-risk of becoming offenders in their teenage years. The evidence and methodology of this work has been revised and updated and remains significantly disputed most notably by Joyce (2009, 2011). In particular is not clear that Cook and Laub's (2002) criticism has been addressed. They concluded that "The timing of the downturn is simply wrong for legalized abortion to be the driving force" of the crime drop. They argue that the age cohorts that would experience reduced offending do not coincide with the timing of the crime drop. Thus Cook and Laub suggest that the crime drop must be due to period effects, that is, something changed at around the time that crime dropped rather than many years earlier. This is a significant criticism that also applies to the lead poisoning hypothesis addressed later in this essay. The point is reiterated by Blumstein and Rosenfeld (2008) in their review for the National Research Council, who conclude that

"the important omitted variables in the initial analysis and the replications showing no significant effect suggest that any such effect [of this hypothesis] is likely to be quite small." (p.27)

Once again, cross-national comparative analysis sheds significant further light on the validity of this hypothesis. An in-depth analysis of abortion rates and crime in the United Kingdom (Kahane, Paton and Simmons 2008) could identify no evidence to support the hypothesis in that country, and Zimring (2007) suggests this is true elsewhere. Dills, Miron and Summers (2008) compare homicide rate trends from around 20 countries to the timing of abortion legalization laws. They conclude that

"While the data from some countries are consistent with the [abortion legalization] hypothesis (e.g. Canada, France, Italy), several countries' data show the opposite correlation (e.g. Denmark, Finland, Hungary, Poland). In other cases crime was falling before legalization and does not decline any more quickly (20 years) after legalization (e.g. Japan, Norway)." (Dill, Miron and Summers 2008; 17).

Hence the hypothesis appears to fail the cross-national test. It can be taken to pass the prior crime increase test for present purposes, since the purported fit with the timing of the crime drop is its key feature. However, it fails the phone theft and e-crimes test because, if abortion reduced crime across such a wide range of crime types it is unclear why it would not also affect these crime types (phone theft in particular). Similarly, the timing of its effect would be expected to be somewhat uniform and so it cannot account for the variations detailed in relation to the variable trajectories test even within the United States where burglary and theft had been declining for significantly longer than violent crime. Overall, the preponderance of evidence suggests that the abortion hypothesis contributes little if anything to explanations of crime's decline.

Hypothesis 9. *Immigration*

The notion that immigration might have induced the crime drop appears to have been floated in a news article by Sampson (2006) and furthered in Sampson (2008). In a more extensive empirical examination of the immigration hypothesis, Stowell et al. (2009) claim that it accounts for 6 percent of the crime drop.

For present purposes it, and in the absence of evidence to the contrary, it is assumed that other countries have had immigration experiences with a similar effect to those of the United States, and so it is taken to pass the cross national test. However, that assumption requires closer examination in further study because the nature of immigration in other countries is likely to be rather different both in terms of volume as well as the origins of immigrants. Unless the effect is the same for immigrants of all origins, which does not seem to be a proposition of studies focused on the United States, then it is quite possible that this hypothesis fails the cross-national test.

Just as it was suggested that policing strategies can reduce crime but do not appear to have caused the crime drop, so it is possible that immigration may reduce crime in some instances but not account for the crime drop. There does seem to be evidence that immigration can reduce crime (see Martinez and Mehlman-Orozco 2014), but the evidence that immigration caused the crime drop appears less conclusive. In particular, while immigration in the United States may have increased in the 1990s, it was also increasing prior to the 1990s when crime was increasing

rapidly. This suggests that this hypothesis fails the prior crime increase test. Figure 5 shows the number of persons naturalized annually in the United States between 1960 and 2013. The significant increase in the 1990s is clear, though uneven and it does not track (inversely) the decline in crime in any clear fashion. Perhaps more importantly, the trend in immigration prior to 1990s, using naturalization as the proxy here, was also upward when crime was increasing. Why, if immigration reduces crime, was crime increasing so rapidly for several decades previously? It may suggest that while immigration may have increased more rapidly in the 1990s in the United States, that the relationship with rapidly decreasing crime may be somewhat spurious. At the very least this issue may warrant further examination. Aspects of two other key studies seem to lend weight to this suspicion: perhaps tellingly, Sampson's analysis (2008, see chart on p.29) begins in 1990 and uses a three-year average to iron out the large annual variation in immigration, while Stowell et al.'s (2009) pooled time series analysis appears to consider only the crime and immigration relationship after 1994.

INSERT FIGURE 5 ABOUT HERE

If immigration caused the crime drop then it is unclear why it would impact differentially for phone theft or e-crime, and so it fails the phone theft and e-crimes test. Similarly, it does not appear to accommodate the variable trajectories of crime in different countries and for different crime types and so it fails the fourth test. Hence while we despise the xenophobia that immigration seems to bring out in some sections of society, this should not allow us to overlook the high probability that immigration seems unlikely to underpin much if any of the crime drop.

10. Consumer confidence and price inflation

Rosenfeld and Messner (2009) and Rosenfeld (2009) proposed the consumer confidence hypothesis as the cause of the decline in violence in the United States. They suggested that consumer confidence increased when the economy was strong in the 1990s, causing consumers to move away from purchasing at second-hand markets that support the stolen goods trade, the converse being true when consumer confidence was less strong. They hypothesised that this reduction in property crimes moved offenders away from risky activity more generally such that it also caused the reduction in violence. However, the trend in violence is tracked rather better by

auto theft than by an aggregate set of property crimes (as Figure 2 implies), and so the evidence underpinning the hypothesis is questionable. It also seems that since the global economic downturn in 2008-9 when consumer confidence has declined, that the crime drop has continued, thereby appearing to falsify this hypothesis. Consumer confidence in many other countries may not have been as strong as that in the US in the 1990s but can be taken to be moving in the same direction for present purposes and such that the hypothesis passes the cross-national test. However, while economies were particularly strong in the 1990s they were also strong for significant periods prior to that when crime was increasing rapidly in the post-WWII period, and so the hypothesis does not pass the cross-national test. Similarly, the hypothesis does not appear to offer an explanation for why some crimes increased when many decreased, or for the variation in the crime drop between countries and crime types, and so it fails the fourth and fifth tests.

A problem with the consumer confidence hypothesis was the global economic downturn that began in 2008-9 when consumer confidence declined but crime continued to fall. In a further iteration of the work, Rosenfeld (2013) proposed that crime is linked to inflation via a similar mechanism of the purchasing of stolen goods. Inflation rates are suggested to have declined across several countries studied and that inflation rates remained low when crime also remained low during the global economic downturn. The essence of the supporting evidence for hypothesis is that "As inflation rates began to fall in the early 1990s, so did crime rates in both Europe and the United States." (Rosenfeld 2013; 2). Data from 1982 onwards is analyzed and the annual change in consumer prices for eight nations is compared to that of homicide, robbery and burglary, with some possible correlation evident. A limitation of the research is identified as follows:

“... the empirical base for the current findings is limited by and large to a period of falling inflation and crime rates. It would have been desirable to broaden the study’s temporal coverage to capture the equally precipitous rise in prices and crime that began in the 1960s.” (Rosenfeld 2013; 21)

It is possible to overcome this limitation, at least for the United States. Figure 6 shows the annual inflation rate for the United States for 1960 to 2013.

INSERT FIGURE 6 ABOUT HERE

In addition to the trend in inflation, two vertical lines have been added to Figure 6. The first indicates 1982 which is the start date for the analysis underpinning the inflation hypothesis. The second indicates 1991 which is when the crime drop is typically identified as beginning in the United States. The inflation rate does appear to be higher on average between 1982 and 1990 than it was after 1990 when it has declined. However the annual inflation rate before 1982 is telling. The chart suggests that, for the United States at least, a possible correlation between inflation and crime that may exist in recent years is likely spurious: inflation fell dramatically from 1980, which was a decade or more before crime fell. By this analysis the 'crime and inflation' hypothesis appears to fail the prior crime increase test and the implication is that, as with the consumer confidence hypothesis, it may be founded on a somewhat selective analysis.

11. Waning crack market

The waning crack market hypothesis appeared a strong contender in the United States, and held to be at least a significant contributing factor by influential reviews (e.g. Blumstein and Wallman 2006, Blumstein and Rosenfeld 2008). Yet other countries did not have the same experience with crack cocaine that was held to be central to the problem in the United States. Hence the hypothesis appears to fail the cross-national test. It is taken to pass the prior crime increase test for present purposes insofar as, to the extent it is known, the timing of the decline in the crack market may well coincide with that of the crime drop. However, it is unclear why phone theft and e-crimes would increase if most other types of crime fell due to the waning crack market, and so it fails the third test. In addition, it is unclear how a declining crack market could explain variable trajectories in different countries and crime types and so it fails the variable trajectories test.

12. Lead poisoning

Lead (Pb) is a poison that can damage the brain of humans when ingested, with children particularly susceptible. From this foundation, Nevin's (2000) study in the United States posited that lead poisoning of children led to violent crime when they became adolescents. His work was

extended by Stretesky and Lynch (2001, 2004) to include property crime (see also Reyes 2007, 2012). The evidence suggests that, with a 22 year delay, there is a strong aggregate correlation between lead exposure and the rates of some crime types. Following environmental laws requiring cleaner air and the removal of lead from petroleum gasoline in particular, this poisoning declined and so, goes the theory, did crime 22 years or so later. A recent statement examining only lead compared to assault rates summarises the lead hypothesis as holding

“that present period rates of adult violence are associated with spatial and temporal variation in childhood Pb exposure, linked together by the behavioral and cognitive mechanisms of impulsivity, aggressivity, and depressed IQ.” (Meilke and Zahran 2012; 49)

Nevin (2007) extended the analysis to a series of developed countries where lead appeared to correlate with crime many years later, such that the hypothesis can be said to pass the cross-national test.

As with abortion legalization, Cook and Laub (2002) define the lead poisoning hypothesis as a ‘cohort explanation’ for the crime drop. Its effect should be produced primarily upon the cohort that reaches adolescence at the time when crime begins to fall. The offer evidence showing that the crime drop was not experienced solely as the product of a single cohort, but that the range of age cohorts of offenders, including older offenders, experienced a reduction in offending rates at this time. Similarly, in their review for the National Research Council, Blumstein and Rosenfeld (2008) also seems to dismiss the lead poisoning hypothesis, suggesting that

“There is a clear similarity between time trends in environmental lead levels and violent crime rates lagged by 23 years. But demographic trends—the arrival and waning of the baby boom generation from the high crime ages—coincided roughly with the arrival and departure of leaded gasoline, and so the apparent effect of exposure to lead on crime rates may be confounded with demographic change.” (Blumstein and Rosenfeld 2008; 27)

Dills, Miron and Summers (2008) apply a longer-term version of what is here termed the prior crime increase test. They identify multiple measures of lead exposure for the United States dating from 1910 and conclude that

“All proxies for lead increased dramatically from around 1910 through 1970. If the lead hypothesis is correct, then crime should have displayed a measurable increase between 1925 and 1985. The U.S. murder rate, however, decreased between the 1930s and 1950s. The murder rate does rise from the 1960s through the mid-1970s, but much unexplained variation remains between the mid-1970s and mid-1980s” (Dills, Miron and Summers 2008; 16).

The prior crime increase test identifies a further issue, which is that lead poisoning is really a hypothesis of why crime increased before the fall. It is only a theory of the crime drop in its absence. This raises the issue that it appears to claim to explain all major trends in crime over the last fifty years or so. In so doing it implies that routine activity theory does not offer the compelling explanation for the post-WWII crime increases, as most convincingly argued by Cohen and Felson (1979).

The lead poisoning hypothesis also appears incompatible with recent increases in phone thefts and robbery as well as internet-related crime. Why would they experience such large increases at a time when the hypothesis suggests the number of motivated offenders is sharply declining? Hence the hypothesis seems to fail the phone theft and e-crimes test. In addition, the lead poisoning hypothesis appears to fail the variable trajectories test. It is unclear how it would explain some within-country variations. Violent and property crime fall simultaneously in some countries but at different times or at different rates in others. If the cause of both really is lead poisoning then the patterns ought to be similar. Yet if the lead hypothesis only applies to violent crime, as implied by the omission of property crime by some studies, then how would it explain the drop in property crime? As a specific example, why would auto theft in the United States fall before violent crime? And why would homicide in England and Wales only begin to plummet several years after the decline in many other types of common crime including other types of violence? Hence while some of the correlations between levels of lead in the air and some crime rates a couple of decades later are quite compelling, the overall evidence implies these may be spurious and that, while lead is clearly a nasty poison it does not seem to explain the crime drop.

13. Changing Demographics

It is well known that most advanced countries are experiencing an aging population. Hence the fact that it is easily understood may be the basis for a popular belief that demographic change induced the crime drop. If the population is aging then the proportion of younger people who constitute those most at risk as both victims and offenders will decline and so too will per capita crime rates.

In their review for the National Research Council, Blumstein and Rosenfeld give the demographics hypothesis short shrift, observing that:

“during the sharp crime drop of the 1990s, age composition changes were trending in the wrong direction: the number of 18-year-olds in the U.S. population was increasing while crime rates were declining for other reasons.” (Blumstein and Rosenfeld 2008; 20).

This contradicts some earlier studies, perhaps most notably that by Fox (2000) had suggested that demographic change accounted for perhaps 10 to 15 percent of the crime drop at most. Hence the demographics hypothesis is included here but is likely to account for a small proportion of the crime drop, at most. It passes the cross-national test since aging is occurring in many advanced countries, and for present purposes is assumed to pass the prior crime increase test, though the turning point and rate of change in crime seems too sharp to be due to demographics.

If demographic change caused rates of crime to change then it would not be expected that rates of some particular types of theft, notably phone theft, as well as fraud and other crime conducted via the Internet, would increase, and so it fails the phone theft and e-crimes test. In addition, since demographic change might be expected to affect crime types somewhat uniformly within a country, it does not appear to account for within-country variations across crime types, and so fails the fourth test.

!4. The Civilising Process

The ‘civilizing process hypothesis’ is derived from the work of Norbert Elias (2000 [1939]). Elias’s study is not about crime as we are discussing it here. The book’s focus is largely feudalism and medievalism. Of the 45 chapters in the book by this count, it has chapters on, *inter*

alia, developments in each of: going to the bathroom; blowing one's nose; spitting, and; behaviour in the bedroom. A nine page chapter on 'Changes in aggressiveness' is mainly about the joys of battle and hunting, and is closely followed by *The Life of a Knight*. The index notes two references to violence, the first being:

"The civilizing process does not follow a straight line. ... But if we consider the movement over large time spans, we see clearly how the compulsions arising directly from the threat of weapons and physical force have gradually diminished, and how those forms of dependency which lead to the regulation of the affects in the form of self-control, gradually increased." (Elias 2000 [1939]; 157).

The reference to 'large time spans' is telling. It refers to very gradual change over the centuries rather than to rapid change over the course of a few years which is our focus here. More specifically, there is no identified mechanism in Elias's work that could explain the recent changes in crime.

Eisner gives Elias's work a criminological voice by linking it to evidence of declining violence over the centuries (Eisner 2008). Yet Eisner is skeptical about applying the civilizing process to the post-1990 crime drop, noting problems:

"not the least of which is whether such a theoretical perspective could be moved beyond the level of speculation and be subjected to more rigorous empirical tests." (Eisner 2008; 312)

LaFree (1999), Rosenfeld (2000), Ouimet (2002) have suggested the civilizing process may have role to play in explaining the current crime drop. More recently, and drawing heavily on Eisner's work and evidence on violence trends over the centuries, Pinker (2011) addresses the issue. Pinker's (2011) focus is on violence but also primarily the multiple centuries time spans that concern Elias and Eisner. However, the book does discuss the recent crime drop, focusing on the United States, and proposes similar mechanisms of change to those suggested by LaFree (1998):

"It is possible that the recent declines in crime were related to the renewed legitimacy of three traditional, and the growing support for three newer, social institutions during the

last decade of the twentieth century. Declining crime rates in the 1990s may have been produced by increasing trust in political institutions, increasing economic well-being, and growing institutionalization of alternatives to the traditional two parent American family. Increasing support for criminal justice, welfare, and educational institutions in the 1990s has also put downward pressure on crime rates.: (LaFree 1998; 1367).

Two issues are critical here. First, the mechanism by which the civilizing process occurs is extremely general – a notion that society improved by a wide variety of means – and so the way this is meant to have caused such a rapid and substantial decline in crime rates as detailed here is extremely unclear. Notions of ‘increasing trust’ and ‘increasing support’ in institutions are vague at best in terms of how they might reduce a range of types of crime ranging from property crimes to homicide, child sexual abuse and intimate partner violence. For instance, one of Pinker’s indicators of social improvement is the rate of increase in mentions of rights issues in literature in recent decades, despite the fact these do not even really track changes in crime. Second, insofar as a mechanism can be identified, the brief section of the Pinker book on the recent crime drop provides no real evidence to support its assertion that institutional social control over the population declined in the 1960s (causing the crime rate to triple or more) and that it strengthened in such a way that caused the crime drop. On the other hand, if we interpret the civilizing hypothesis as so general that it means ‘something positive happened to society in the 1990s’, then nobody could disagree but it becomes sufficiently vague that it cannot be considered a hypothesis. Hence, and in line with Eisner’s suggestion as quoted above, the inclusion of this as a hypothesis here is generous.

The civilising process could be assumed to have occurred cross-nationally, though the specifics of the human rights issues were likely different in the United States to Europe and elsewhere. Similarly, in the absence of evidence to the contrary the timing of improvements in trust and support by offenders cannot be said to *not* coincide with prior increases in crime. However, this hypothesis fails both the e-crime and phone theft test as well as the variable trajectories test. If society has civilised so rapidly that homicide fell by half in a decade or so in some instances, then this is seriously contradicted by increased theft and robbery of mobile phones and the range of Internet-related crime. Similarly, if a civilizing process has occurred so rapidly and broadly, then why are there some quite significant anomalies both within countries and between

countries? These are the primary reasons why this review concludes that the civilizing process offers little prospect of explaining the recent crime drops. In a 2000 study on US homicide rates, Rosenfeld is unable to identify an explanation and reverts to the civilizing process as a potential catch-all hypothesis. Yet his skepticism is evident and he brilliantly captures its vagueness:

“If church is the last refuge of scoundrels, ‘culture’ is the final recourse of social scientists in search of explanations when existing economic, social and political theories have been exhausted.” (Rosenfeld 2000; 157).

15. Improved security

Did improvements in the quality and quantity of security induce the crime drop? There is strong evaluation evidence from studies covering Australia, England and Wales, the Netherlands, and the United States, finding that improved vehicle security (particularly electronic immobilizers and central deadlocks) caused dramatic declines in vehicle crime (Kriven and Zeirsch 2007; Farrell et al. 2011a, 2011b; Fujita and Maxfield 2012; van Ours and Vollaard 2013). There is also mounting evidence from the ICVS and from studies relating to England and Wales, that improved household security caused the decline in household burglary (van Dijk et al. 2007; Tilley, Farrell and Pease 2014), which fits with a range of studies identifying household security as effective (see Tseloni et al. 2014). Hence this hypothesis passes the cross-national test. In each instance, the timing of the spread of security coincides with the start of the crime drop, and so it passes the prior crime increase test.

The security hypothesis is located within the crime opportunity theoretical framework which suggests the opportunities are crime-specific. This framework means that it is theoretically compatible for some crime types to increase (as opportunities for those crimes increase) at the same time as other crimes decrease (as opportunities for those crimes decrease). Hence since valuable phones and the internet offered new and enticing crime opportunities, those crimes increased and this is compatible with the fact that security improvements induced decline in other types of crime. Hence, unlike most other hypotheses, this passes the phone theft and e-crimes test. In a similar vein, since opportunities and the spread of security occurred at different times in different places and in relation to different crime types, this hypothesis is compatible

with the fact that there is variation in the timing and trajectory of the crime drop between countries and with the fact that there is variation between crime types within countries. Hence the hypothesis passes the variable trajectory test.

This hypothesis passes each of the four tests and is the only one that does so. It is examined in more detail in Section IV.

16. The Internet induced Changes in Lifestyles

‘The Internet’ is included because although there have been few studies, there is some prima facie reason to suggest its rapid increase coincides with the rapid decrease in crime, such that:

“The rise in the use of the internet has very roughly coincided with falls in crime (in 1995 use of the internet was not widespread). As it became more popular, it may have helped to occupy young people’s time when they may otherwise have turned to crime. It also provides more opportunity for online crime which is not as easily quantifiable at present as traditional crime types ...” (Office of National Statistics 2013; 7)

and the suggestion that

“Lifestyle and routine activity changes, plus perceptions, may have a larger explanatory role in relation to other crime types. The rise of the Internet has roughly coincided with the declines in crimes that get measured in traditional victimisation surveys, and took place sooner in the US. Coincidence? Perhaps the huge criminal opportunities presented by the Internet sucked some offenders away from traditional street crimes into online offending that is less routinely or easily recorded.” (Farrell et al. 2008)

For present purposes the Internet began on its public release by AOL in 1994, but the crime drop began, at least in the United States, in 1991, with crime falling dramatically there in the first few years. This makes it implausible that the Internet caused the crime drop. Further, the spread of the Internet was most tardy in the least affluent areas, and comprised dial-up connections (remember the screech?) and often pay-per-minute connections for many years. Any significant effect on the lifestyles of potential offenders and victims could only have taken effect

significantly after the precipitous crime declines began. This review has not been able to identify a peer-reviewed study of the role of the Internet in the crime drop but its importance is such that it receives attention in relation to most things and so it deemed worthy of brief discussion, and elimination. At most it is conceivable that the Internet has induced lifestyle changes for both potential offenders and potential victims (with consequent impacts on guardianship if everyone stayed home more) that have had a subsequent consolidation effect significantly after the crime drop began.

17. Phone Guardianship

The final hypothesis included here is that the rapid spread of mobile cell phones occurred around the time that crime was falling, which may have a causal connection if phones enhanced personal guardianship (Farrell et al. 2010; Klick et al. 2012; Orrick and Piquero 2013). Orrick and Piquero (2013) examine the correlation between mobile cell phone ownership and both property and violent crime in the United States. They conclude

“In sum, the relationship of cell phone ownership to the property crime rate between 1984 and 2009 indicates a negative, significant association ... but virtually no relationship between cell phone ownership and violent crime.” (Orrick and Piquero 2013; 8)

This seems counterintuitive insofar as, if mobile phones reduce crime via guardianship, we might expect any effect to be mainly upon personal crime because phones are carried on the person. Hence while Orrick and Piquero (2013) acknowledge that an association does not identify causation, the nature and existence of that causation remains to be established. This suggests the research to date does not really provide supporting evidence other than some correlation and some argument, while it also raises some inconsistencies. Overall this tends to suggest that phone guardianship is unlikely to prove to be a major contributor to the crime drop and that the supporting evidence to date is somewhat less than compelling.

5. Discussion and Conclusions

The tests utilised here are imperfect as formal evaluation criteria. They are better framed as broad guidelines that add some clarity with respect to key issues. Each relates to evaluation issues more generally, and many published assessments include elements of some of the tests. Nevertheless the tests add value through facilitating some standardisation of assessment criteria and allowing the wood to be seen from the trees.

One hypothesis fails all four tests, ten hypotheses fail three, four fail two, one fails only one but lacked basic evidence (phone guardianship). Most of the failures were accompanied by a range of other criticisms, some rather damaging. One hypothesis passes the four tests, and that is the security hypothesis. While the tests are proposed as necessary criteria for a valid theory of the crime drop, they are not deemed sufficient, and so the security hypothesis is examined in the next section.

IV. The Security Hypothesis

This section examines the security hypothesis. The most extensive supporting evidence to date relates to car theft, which is tackled first, followed by burglary. The role that improved security may have played in reducing other crime types is then addressed. This is followed by an explanation and preliminary supporting evidence relating to how reductions in property crime, which accounts for most crime and the bulk of crime in criminal careers, may have also caused reductions in violent crimes of various types.

A. The Security Hypothesis

The security hypothesis proposes that that change in the quantity and quality of security was a significant driver of declining crime:

- Security improvements, including specific security devices, vary for different crimes but have been widely implemented.
- Different security measures work in different ways to reduce the crimes to which they are applied: they increase actual or perceived risk to the offender; and/or they reduce actual

or perceived reward for the offender; and/or they increase actual or perceived effort for the offender.

- The different ways in which security measures work produce variations in expected changes in crime patterns associated with crime drops. These comprise expected security device crime change ‘signatures’.
- The specific falls in crime produced by improvements in security alongside their associated diffusions of benefit (preventive effects spilling out beyond the operational range of measures; see Guerette and Bowers 2009) to other targets and methods of committing crime are not matched by equivalent displacement.

A progenitor is identifiable in Clarke and Newman’s (2006) book on terrorism. They list developments in security that they link to declining crime in many countries, concluding that

“In fact, the one thing in common amongst all these countries, including the United States, is that they have all made a huge investment in security during the past 25 years, affecting almost every aspect of everyday life.” (Clarke and Newman, 2006; 220).

A newsletter article by van Dijk (2006) made similar suggestions informed by ICVS data on the spread of security across Europe, elaborated as:

Perhaps a more significant factor inhibiting crime across the Western world is the universal growth in the possession and use of private security measures by households and companies over the past few decades. ICVS-based trend data on the use of precautionary measures confirm that in all Western countries, without exception, the use of measures to prevent property crimes such as car thefts and household burglaries has risen drastically over the past 15 years. (Van Dijk et al. 2007:23)

In the context of the existing criminological literature, the security hypothesis applied to the crime drop can be viewed as simply a specific version of the more general notion that situational crime prevention can be effective. In what follows, key empirical findings relating to the relationship between security and the crime drop are examined.

B. Vehicle Theft

With crime close to its apex in many countries, Clarke and Harris cited a study of 56 new cars that found:

“The ease with which locked cars can be broken into would be laughable if it weren't so serious. Our security tester has got into nearly all cars he has checked in a matter of seconds, using the unsophisticated tools of the car thief's trade" (Which? 1988, p. 118, cited in Clarke and Harris 1992; 37).

Key studies of auto theft spanning Australia, England and Wales, the Netherlands, and the United States, lend support to the security hypothesis suggesting that more and better vehicle security reduced vehicle crime and, thereby, may also have contributed to the collapse in other crime types. The following sections describe key data signatures that indicate both how and why improved vehicle security was a key determinant of declining vehicle theft. Eck and Madensen (2009) link such data signatures to the broader evaluation literature.

Turning Point and Trajectory

Two data signatures are detailed here. The first is the correlation between the growth of vehicle security and the crime decline. Of course correlation does not prove causality, which is what the other signatures collectively provide. The second signature is the assessment of the timing of the introduction of improved security in different countries at different times, and how in each instance it occurs immediately prior to the downturn in car crime.

Fujita and Maxfield (2012) observe that the introduction and spread of electronic immobilizers and central deadlocking systems in the United States coincides with the start and trajectory of the crime drop. They also show that, in contrast, the introduction of parts marking does not. Brown (2013) notes that unlike many other countries, there was no national legislation to require electronic immobilizers in the United States and suggests that, rather, it was indirectly promoted by the Motor Vehicle Theft Law Enforcement Act (1984), noting that:

“The legislation, which came into force in 1987, required manufacturers to mark the Vehicle Identification Number on to the engine, transmission and 12 major body parts. The legislation also allowed for exemption from parts marking on some of the manufacturer's models if anti-theft devices were installed as standard equipment. It appears that these ‘anti-theft’ devices commonly consisted of electronic immobilisers.” (Brown 2013; 12)

While the European Union formally mandated electronic immobilizers in new cars from 1998, the underpinning legislation had been passed in 1995, and the writing on the walls for some time. In the UK, for instance, a car theft index had been published in 1992 (Houghton 1992) and government pressure brought to bear on vehicle manufacturers to tackle the car crime problem. Laycock (2004) identifies the car theft index and government leverage as instrumental in inducing the drop in UK car theft, and to the extent that both the introduction of immobilizers and the subsequent decline in car theft occurred in advance of other European countries, we might reasonably deduce that she is correct.

Figure 7 contains two panels. Figure 7s shows trends in vehicle insecurity (those without security) for immobilizers and central locking alongside the trend in theft of and from vehicles, for England and Wales 1991-2007. The CSEW did not distinguish between electronic and other vehicle immobilisers until the late 1990s and so Figure 7b extrapolates backwards for the trend in electronic immobilisers prior to 1999. The exponential regression line fits the known data almost perfectly ($R^2=0.9988$), and assuming the extrapolation is correct, the timing of the introduction of electronic immobilizers since 1993 fits precisely with the initiation of the crime drop - just as Fujita and Maxfield (2012) found it did for the United States - and squares with Laycock's (2004) assessment. Van Ours and Volland (2013) similarly link the introduction of immobilizers in the Netherlands directly to the timing of the major drop in car theft that occurred in that country, and estimate the theft risks of cars with immobilizers at around half that of those without.

INSERT FIGURES 7a and 7b ABOUT HERE

The emphasis here on the timing of electronic immobilizers partly reflects additional analysis that suggests they have been most effective in reducing vehicle thefts (Farrell et al. 2011b; Brown 2013). The evidence that the timing of electronic immobilizers in the United States, England and Wales, and the Netherlands, coincides with crime's turning point is further supported by evidence from Australia. Australia also facilitates a natural experiment because high quality immobilizers were introduced in the state of Western Australia ahead of elsewhere (Farrell et al. 2011). Consistent with electronic immobilizers being instrumental, the decline in vehicle theft in Western Australia began in 1998 (immobilizers had been subsidised from 1997

and were mandated in 1999), whereas immobilizers were mandated elsewhere in Australia in 2001, whereafter national car theft rates fell rapidly.

Impact on professional and organized crime

Figure 8 shows the decline in vehicle theft in England and Wales from 1995 to 2010, split into permanent and temporary theft. In the sixteen years from 1995 to 2010, the vehicle theft rate declined 84 percent, comprised of a 90 percent fall in temporary thefts and a three-quarters (76 percent) fall in permanent thefts. Temporary theft, whereafter a vehicle is abandoned and recovered, is a reasonable proxy for thefts motivated by joyriding, theft for transportation, or theft for use of the vehicle in the commission of another crime (Clarke and Harris 1992). Permanent theft is a reasonable proxy for theft of vehicles to be sold for parts or ‘chopped’ and vehicles to be re-sold. Hence temporary and permanent theft are held to be good indicators of the relationship between more amateur or early-career thieves and those who are more professional or working with an organized crime group.

INSERT FIGURE 8 ABOUT HERE

Temporary theft declined more rapidly and to a greater extent than permanent theft in the first decade of decline. Between 1995 and 2001, temporary theft declined by 76 percent and permanent theft by ‘only’ 44 percent. This conforms with expectation if improved vehicle security is more likely to disrupt thefts by less experienced adolescent car thieves.

Between 2005 and 2010, however, the decline in permanent and temporary thefts was similar (50 and 48 percent respectively). This, we conjecture, may be due to the more recent spread in tracking devices that prove a highly effective deterrent. The suggestion is based on the expectation that tracking devices are unusually disruptive of the work of professional thieves. This is consistent with Ayres and Levitt (1998) and with detailed analyses of CSEW data to 2007 by Farrell et al. (2011a, 2011b) who concluded tracking devices were highly effective but had not penetrated the vehicle fleet to sufficient extent to have played a major role in prior crime drops. From the perspective of the security hypothesis, the fact that permanent theft also declined

dramatically is notable because it suggests security can be highly effective against professional and organized crime.

The findings reviewed here for England and Wales are largely replicated in Australia (Kriven and Zeirsch 2007; Farrell et al. (2011a). The decline in vehicle theft in Australia began around 2001 when electronic immobilizers were mandated, with overall vehicle theft declining by around half in the six years to 2007. Here, temporary theft declined 58 percent compared to a 13 percent reduction in permanent thefts, though the proportion of permanent thefts was always significantly lower than in England and Wales.

Broken windows and forced doors

Figure 9 shows trends in the means of entry for vehicle theft in England and Wales from 1995 to 2010. In 1995, the forcing of a door or lock was by far the most prevalent means of entry, accounting for almost two thirds (65 percent). The decline in vehicle theft that ensued was experienced as primarily a decline in the forcing of doors and door locks. This pattern is consistent with improved central deadlocks on doors having induced the decline in crime. Over time, other means of entry also declined but the way in which they did so is different. The second most prevalent means of entry to vehicles in 1995 was window breaking. Yet there was no decline in the prevalence of window breaking as a means of entry between 1995 and 1997, and it subsequently declined less rapidly than door and lock forcing. Likewise, other means of entry also declined, but can be interpreted as likely a diffusion of benefits: even if they could enter a vehicle, offenders had learned they probably could not steal it because of the spread of immobilizers. Hence the general decline in most means of entry, driven by the decline in door and lock forcing appears consistent with the expected impact of improved vehicle security.

INSERT FIGURE 9 ABOUT HERE

The analysis of means of entry to vehicles was also conducted for Australian vehicle thefts for the period 2001 to 2007 by Farrell et al. (2011a), extending the work of Kriven and Zeirsch (2007) that covered 2001 to 2004. The data covers a shorter period but the findings are similar to those for England and Wales: lock forcing was the dominant means of entry prior to 2001 and

accounted for the bulk of the decline in means of entry, falling disproportionately relative to other means of entry which fell later and less dramatically.

Vehicular demographics

An increase in the average age of stolen vehicles is an important data signature. This is what would be expected if newer vehicles are more difficult to steal. Brown and Thomas (2003) and Brown (2004) found that the average age of stolen vehicles in England and Wales increased significantly as vehicle theft declined. Likewise, Kriven and Zeirsch (2007) identified significant aging of stolen vehicles in Australia after 2001 when electronic immobilisers became mandatory on new vehicles, and van Ours and Vollaard (2013) produce similar findings for the Netherlands.

Horses for courses

The Security Impact Assessment Tool (SIAT) was developed to assist in identifying the different crime reduction effects of individual security devices (Farrell et al 2011b). It is also described later in relation to household security devices. It produced a metric that gauges the effectiveness of devices relative to the absence of security, termed the Security Protection Factor (SPF). There is a useful parallel with Sun Protection Factor (SPF) used for sunscreen cream, because each states the amount of time units, relative to the absence of protection, after which the owner is burned.

The analysis found considerable variation in the effectiveness of individual vehicle security devices. Tracking devices produced the largest effects but mostly too recent to account for the drop in vehicle thefts of the early 1990s. Electronic immobilizers were found highly effective. Moreover, as might be expected, newer vehicles often included combinations of devices including built-in immobilizers, central locking and alarms, and these produced positive interaction effects that improved overall security.

The best-ranked security combinations were found to reduce theft risk by a factor of 25 compared to a vehicle without security devices. The impact of devices and combinations worked

better for some crime types than others, and the patterns squared with theoretical expectation based on assessment of the preventive mechanism. For example, electronic immobilizers impact more upon theft of vehicles than theft from vehicles, while central locking systems impacted upon both theft of and theft from vehicles. Alarms had a more modest effect generally but this was greater against theft from vehicles than theft of vehicles. While the study acknowledges that the findings may conflate some effects of vehicle age and security quality, the strength of the findings is sufficient to conclude that, at minimum, security devices can have a considerable impact on crime and that the effect of individual device and their combination varies by crime type.

Implication for Other Hypotheses

While developed to examine the role of security, the data signatures examined here can be assessed in terms of their implications for other crime drop hypotheses. None of the other hypotheses can explain these data signatures. Further, the data signatures would not be expected to demonstrate the variation shown here if car theft was subject to the alternate hypotheses. There would be no particular reason for any change in the proportions of different means of entry, for example, or for the aging of stolen vehicles, that were found in each of Australia, the Netherlands and England and Wales and that, we anticipate will be identified in north America and elsewhere should suitable data be identified for analysis. Hence while all of these data signatures are consistent with a security hypothesis, they also further refute rival hypotheses.

This does not mean that all data patterns relating to vehicle crime have been explained in terms of the security hypothesis, as much research remains to be undertaken. For instance, Fujita and Maxfield (2012) note that declines in car theft in the United States were geographically skewed, being higher in the north east for example. A possible explanation is the differential rates of turnover of vehicles in different areas: areas where the car fleet is replaced more quickly, particularly affluent areas, would be expected to experience preventive gains more quickly.

C. Burglary

Comparative analysis of eighteen European Union countries using data from the 2005 ICVS concluded that

“It is clear that levels of household security have increased in most European countries. Specifically the percentages of households with burglar alarms show upward trends in all countries for which trend data are available, with the possible exception of France. There have been particularly steep increases since 1992 in Sweden and Italy but also among the countries at the bottom of the scale (Poland, Estonia, Finland, Denmark and Spain).”
(Van Dijk et al. 2007; 84)

While the ICVS is the best source for extensive cross-national comparison, the in-depth analysis it facilitates is more limited both in terms of information and sample sizes. Tseloni et al. (2014) examine work on the effectiveness of household security devices and seek to identify the contributions to burglary reduction from each of individual devices and their combination. They use the SIAT approach mentioned previously in relation to vehicle security devices, with detailed data for England and Wales. Their findings are largely consistent with previous studies, concluding that combinations of devices, particularly deadlocks on doors, internal and external lights, can dramatically reduce burglary risk. Figure 10 shows trends in the household burglary rate alongside trends in insecurity, measured as households *without* individual household security devices in England and Wales. While household security was increasing while burglary was decreasing, the correspondence between the two is not as clear as it was for vehicle crime. That is, the increase in household security appears more modest and less rapid than was the increase in vehicle security. One possible explanation is the positive interaction effect of multiple security devices at the same property, which can sometimes be considerable (Tseloni et al. 2014). Another, offered by Tilley, Clarke and Farrell (2014) is that there was an increase in the quality of security devices that is not apparent in the trend data of Figure 10. In relation to auto theft, the timing and extent of the spread of electronic immobilisers and central locking coincided well, and this was most evident when legislation mandated immobilizers to meet particular standards (as in Australia and the European Union). In relation to households however, security devices of various types were already quite prevalent by the early 1990s, and so not only is the increase in prevalence of devices per household more modest but any coincidence with the turning point in burglary rates is less obvious. Tilley, Farrell and Clarke (2014) hypothesise that the spread of double glazing for home insulation may have been particularly important in promoting the spread of better quality security in new and replacement windows and doors. The data signature

that they develop relates to a change over time in the means of entry to property. The rationale is that some burglaries do not require security to be overcome to gain entry, whereas others do. Burglaries where security had to be overcome were defined as those requiring

- the forcing of locks on doors; the forcing of locks on windows; the removal or breaking of a door panel, and; the removal or breaking of a glass window.

Burglaries where security was not overcome, that is, where there was another entry method, were identified as those where entry required:

- a door (or window) that was already unlocked or open; where the burglar had a key; where the burglar pushed past the occupant, or; burglaries involving false presences (deception).

Trends in these two broad types of entry are shown for completed burglaries with entry in Figure 11. In the early stages of the downturn in burglary, between 1996 and 1998, security-related burglaries decline 21 percent compared to 4 percent for burglaries with entry by other means. Over the longer term, between 1994 and 2003, burglaries that were security-related declined 59 percent compared to 28 percent for burglaries by other means, consistent with security improvements having induced a diffusion of benefits that also reduced burglaries by other means of entry.

INSERT FIGURES 10, 11 AND 12 ABOUT HERE.

In addition, the decline in burglary via a window had a strong inverse correlation with the spread of double glazing where the whole household was double-glazed (Figure 12). Data was available for 1996 to 2008 during which time burglaries where the window was the entry method fell by 70 percent compared to a 20 percent fall in burglaries by another entry method. The study concludes that

“The importance of this analysis is, we think, as follows. Counts of numbers of security devices do not show changes in the quality of particular devices. Door and window locks

in particular are much better than they once were, particular when combined with double glazing and home insulation efforts. The result is that, in a survey's counts, a better device still just counts as one device. Further, when it is a new-for-old replacement, no change in the count of devices is registered. So, the finding that there is a greater decline in security-breaking burglaries relative to other means of entry is, we suggest, a signature of the improved quality of household security devices." (Tilley, Farrell and Clarke 2014).

The amount of research linking security to falling burglary rates is less extensive than that for car crime. This likely reflects both the slow pace of research and the possibility that specific household security data may be less readily available and well as the fact that change in the quality of devices is less readily perceived. In addition, household burglary in the United States has been declining far longer than in many countries according to the NCVS. Examining double glazing and household insulation may not transfer to the US because the housing stock is, on average, somewhat different. In particular, wooden-structure housing is far more common across much of North America than in England and Wales. Likewise, the need for insulation and the more extensive adoption of air conditioning offer somewhat different prospects for research. Central air conditioning is increasingly common and could promote the closing and locking of windows and doors. However, air conditioning units sited in windows could conceivably afford an opportunity for illegal access though, at the same time, perhaps less than that of an open window or door. Hence there is an identifiable need for context-specific research in different countries.

D. Other Crime Types

In the overall picture of crime drop research, the security hypothesis is a relatively recent contender. This partly reflects more recent recognition of the international nature of declining crime as well as declines in property crimes. Yet a foundation has been laid for a range of further research examining the role of security, and situational and routine activity factors more generally.

Robbery and Theft

Tseloni et al. (2012) outline a preliminary research agenda that incorporates a learning process. They suggest a progression of research from property crime to acquisitive crime involving personal crime components (robbery and theft) that, they conjecture, will provide information to inform the study of violent crime. Certain types of robbery seem likely to be the low hanging fruit for next steps in research into the security hypothesis. If rates of improvement in bank security of various sorts can be identified, particularly at the level of individual bank chains and locations, then the relationship between security improvements and bank robbery might be investigated. Other types of risky facility offer similar possibilities, and banks are just one where good data may well be available. Were different types of bank security introduced at different branches at different times, for example, then this ought to facilitate the development of data signatures that parse out the security-robbery relationship. As with cars, if newer banks have better designs and security then they ought to have lower crime rates. Security measures that are independent of capital infrastructure, such as exploding dye in money bags given to robbers, would be expected to produce different data signatures, including perhaps upon the rate of repeat robberies at the same locations (Matthews, Pease and Pease 2001 identify repeat bank robbery as extensive). Bank robbery is one obvious research possibility, but other types of risky facility experiencing robbery or other crime types may offer other good prospects.

Shoplifting

Theft from stores, termed shoplifting, is a volume crime. It typically receives less attention than many crime types because it is not captured in victim surveys of the population (only in surveys of businesses), and because it is less serious, per average offense, than many crime types.

Prolific and violent offenders are also frequent thieves (and more evidence to that effect is offered in the next section of this essay). This means that shoplifting may, alongside car theft, be a keystone that, once removed, leads to broader declines in other crime types. Purchasing of goods in stores used to take place primarily over-the-counter, with store owners passing each item to the customer. This practice changed largely in the post-WWII period when it became apparent that removing the counter and allowing customers to interact with the products would increase sales. The opportunity, temptation, and impulse purchases that access to goods on sale

provided also provided major new crime opportunities for theft, and so shoplifting increased rapidly, likely promoted by larger stores and superstores with reduced surveillance and increased anonymity as well as a proliferation in consumer products that are suitable for theft. Consequent upon this wave of shoplifting, it has been suggested that:

“Bit by bit, countermeasures were introduced: staff were trained to be vigilant, cash tills were relocated to give better sight-lines down the aisles, window displays were changed to expose vulnerable corners to glancing passers-by, mirrors and CCTV were introduced, store detectives and exit guards were recruited, high-value items were tethered or locked behind glass, dummy goods or packaging were put on display without the costly product inside, and a whole ingenious new industry was spawned to provide lockable cabinets, tell-tale markers, sensors, alarms, spider wraps, security gates, radio-frequency tags and extended families of visible deterrents. ... Just as the removal of shop counters had led to a crime epidemic, so restoring a semblance of security alleviated it. Shoplifting still accounts for almost half of all known commercial crime, but surveys suggest it fell 60 per cent in the decade up to 2012.” (Ross 2013; Kindle Locations 312-319)

The report on the survey of businesses that compared crime rates in 2002 to those in 2012 found that:

“In both 2002 and 2012, the crime type most frequently experienced by wholesale and retail premises was theft by customers, with 11.5 million of this type of incidents estimated in 2002 and 4.1 million in 2012. In both years, this was followed by theft by unknown persons, with 3.2 million incidents in 2002 and 1.8 million in 2012. ... In addition, the proportion of wholesale and retail premises experiencing theft by customers (the crime most commonly experienced by wholesalers and retailers) fell from 43 per cent to 21 per cent between the 2002 and 2012 CVS [Commercial Victimisation Survey].” (Home Office 2013; 14)

Hence shoplifting (theft by customers) incidence fell 64 percent, the incidence of theft by unknown persons fell 44 percent, and the prevalence of shoplifting fell 51 percent across the decade. The time period covered here does not go back to the 1990s when many other crimes were falling, but an earlier version of the survey had been conducted in 1994. The comparison of that survey to the 2002 survey identified a decline in crime, though not as steep as that which ensued, and concluded that “[t]he findings re broadly consistent with trends in crime against individuals.” (Taylor 2004; 2). Hence while only a small segment of the relevant research has been addressed here, it identifies a potentially fruitful line of enquiry for further research into the security hypothesis.

Homicide

Homicide appears to represent a challenge. While there is a body of research into homicide and the crime drop (e.g. Rosenfeld 2000), there is not, to our knowledge, a study of the widespread falls in homicide that focuses on its situational aspects. This, we suggest, may be a worthy avenue of enquiry.⁷ From the perspective of crime opportunity theory, other changes in the opportunity structure in addition to security, could influence homicide. Here there is a potential overlap with what are termed the debut crime hypothesis and the keystone hypothesis, described next.

E. The Keystone and Debut Crime Hypotheses

Keystones and Criminal Careers

Many types of crime are inter-related. Security improvements bringing dramatic reductions in volume crimes including car crime and household property crimes, might reasonably be expected to have knock-on effect upon other types of crime. There is an analogy with the removal of the keystone from an arch wherein the other stones tumble, such that this relationship has been termed the keystone hypothesis (Farrell et al. 2008, 2010). Reductions in car theft deny use of the road to offenders who steal vehicles for the commission of other types of crime. Stolen cars are instrumental in many burglaries where they are used for transportation. Cars stolen for transportation are relocating offenders who, *ceteris paribus*, have greater than average likelihood of being involved in further crimes, including violence, on arrival. Fencing of stolen goods is likely to decline when burglary is harder to commit and stolen transportation vehicles less readily obtained. Shrunken stolen goods markets would likely incur lower rates of disputes, robberies and assaults. Where stolen cars were used either to drive to drug markets or to provide a supply, this becomes increasingly difficult. Without a stolen vehicle it may be more difficult to start and continue a gang feud. Retributive violence including drive-by shootings may be delayed and, where delayed, less likely overall, as is the case when suicide is delayed (Lester 2012). Inducing delay may be a technique of situational crime prevention that warrants further study.

Criminal career research provides a platform for investigating the keystone hypothesis. Offending careers are typically divided into the majority that are short and adolescence-limited, and those that are long or life-course-persistent (Moffitt 1993). The 'keystone' element of the hypothesis rests partly on the relationship between the commission of different types of crime for which career specialism and generalism might be used as a proxy. There is strong evidence that most offenders are versatile, or generalists, though there is some specialisation. Most crime is property crime not violence, and so the careers of most life-course offenders tend to be dominated by property crime despite the fact there can be some violence specialisation. Farrington observed that

“only a small proportion of offenses in criminal careers are violent: 15 percent up to age 40 in the Cambridge Study ... 9 percent up to age thirty in the first Philadelphia age cohort study ... and 5 percent up to age twenty-five in the Stockholm Project Metropolitan”. (Farrington 1998; 435)

While a more recent review indicates that

In a long-term analysis of specialization using conviction records from the South London male cohort through age 40, Piquero et al. (2007) found little evidence of specialization in violence and concluded that the strongest predictor of a violent conviction over the course of a criminal career was the number of convictions. More frequent offenders had a higher likelihood of conviction for a violent crime. (Piquero et al, 2014; 14)

That review also suggests that serious theft offenders are also more likely to be violent offenders (Piquero et al. 2014), potentially linking reductions in shoplifting to broader crime declines.

If property crime dominates the portfolio of most offenders, and it is property crime upon which improved security has acted most dramatically, then disrupting this primary component of the offending portfolio may have disrupted the less frequently committed, and probably related, violent offences. In particular, violence that is committed as an instrumental or supporting part of property crime, as an inadvertent consequence of involvement in property crime, or as the result of involvement with criminal peers (victimization rates amongst offenders being inordinately high: Lauritsen and Laub 2007) is likely to decrease as natural wastage when the property crime keystone is removed. More broadly, this suggests that preventing property crime may be the best way to prevent violent crime. The review by Piquero et al. further notes that:

“The analyses of specialization in criminal careers suggest that there is little specific concentration within offense types among most offenders. This overall conclusion holds

with respect to different samples, measures of offending (*including the incorrect presumption of specialization among sex offenders*; Zimring et al., 2008, 2009), and time periods.” (Piquero 2014; 15; emphasis added)

The ‘incorrect presumption of specialization among sex offenders’ is particularly important in the present context. It potentially provides the missing link that could explain why sexual victimization may have declined as a result of security-induced reductions in property crime. From here it is a small conceptual leap to suggest that child abuse and domestic violence may also have declined as a beneficial knock-on effect of the drop in property crime.

Debuts and Legacies

Among first-conviction offence types “the crime most readily identifiable as a strategic offence is vehicle theft, but non-vehicle thefts and robberies (including mugging) are also predictive of a long and serious subsequent career in delinquency”. (Svensson 2002; 395). More recently, Owen and Cooper (2013) found that “offenders who committed robbery or vehicle theft as their debut offence were at the greatest risk of becoming chronic offenders” (p.3). Hence vehicle theft is a strategic debut crime offence, and preventing vehicle theft may be a means of disrupting the onset of criminal careers which in turn might be expected to reduce frequency and seriousness of offending. This is termed the debut crime hypothesis. Cook and Laub (2002) observed that the prior crime peaks were an ‘epidemic of youth violence’, and Butts (2000) observed that the crime drop in the United States has been experienced disproportionately as a decline in adolescence-limited offending. This is shown in Figures 13 and 14 as age-specific offence rates for aggregate groups of violent crime and property crime in the United States 1980-2010. Each of the figures contains two panels of which the first shows a set of age-crime curves and the second the percentage change in arrest rates between the crime peak (measured by the UCR) and 2010. The change over time in the age-crime curves is, we suggest, consistent with the security hypothesis. That is, we suggest that the disproportionate drop in adolescence-limited offending is consistent with an interpretation that the number of crime opportunities declined, reducing offending among the less experienced and those less entrenched in a criminal career. This squares well with the fact that reductions in car theft occurred disproportionately as a reduction in temporary theft for joyriding and transportation.

INSERT FIGURES 13 AND 14 – AGE-CRIME CURVES FOR US 1980-2010.

The comparative age-crime curves demonstrate a decline in offending rates in most age groups by 2010, with the exception of those offenders aged in their 40s. This is shown in the second panel of each Figure when the bars cross from negative to positive at the right-hand side or less obviously in each first panel when the age-crime curves cross to the right-hand-side. That is, in 2010 the per capita rate of offending among those in their 40s is, in contrast to other age groups, higher than when crime was at its peak. Yet these offenders, close to age 40 by 2010, were at the peak offending ages when crime rates were highest 20 years previously. We anticipate the higher offending rates among offenders in their 40s as a legacy of the plentiful crime opportunities of the late 1980s when these offenders learned their trade (Farrell et al. under review). If plentiful crime opportunities of the 1980s increased the number of offenders who continued into lengthy criminal careers, this suggests that decisions to embark on criminal careers are significantly influenced by situational factors, and that a significant proportion of life-course-persistent offenders may be swing-voters who would be deterred were easy crime opportunities unavailable when they were in adolescence.

Discussion

This section reviewed evidence that improvements in security reduced crime opportunities and caused the crime drop. The evidence that improved security caused some crimes to fall, particularly car theft, is strong, while evidence relating to other types of property crime is mounting.

Further research into the keystone and debut crime hypothesis that link the declines in violent crime to those of property crime might be pursued with cautious optimism. Most criminal careers are non-specialist and dominated by property crime, while some violent crime is undertaken as an endeavour to support property crime, and the trends in age-specific arrest rates appear consistent with the security hypothesis. Together these facts suggest that some further exploration of this connection is warranted. However this must be tempered by, and take account of, the empirical anomalies identified earlier including the later decline in car theft in Canada,

the later decline in homicide in the UK, and the apparently significant variation in the decline across crime types in other countries.

V. Conclusions

There has been significant progress in crime drop research. The quest to identify the causes of the dramatic decline in crime has spurred a range of competing hypotheses, theory development and theory testing, innovative approaches and methodologies. Hence it is proving an unusually productive research question. In that context it is surprising that there was perhaps never really the same drive among criminologists to explain the prior crime increases, where even the compelling routine activities approach seems to remain both under-researched and under-appreciated. The routine activities approach is, we suggest, compatible with the security hypothesis, the main difference being that crime increases were argued to be due to inadvertent changes in the opportunity structure whereas security is deliberate.

Many criminological theories once thought to be influential have not got out of the starting blocks when it comes to explaining the crime drop. This observation has only become more apparent as the crime drop persisted through recession and the global economic downturn that began in 2008-9. Thus the long-term inadvertent benefit to criminological theory of crime drop research should be extensive, requiring substantial revision to many theory texts.

Two key changes in the orientation of crime drop research emerged largely in its second decade that are characterised here as Phase 2 research. The first was recognition that the crime drop has been international in nature, affecting many advanced countries in ways similar though far from identical to the United States. The second has been recognition of the importance of property crime. Within the United States, the drop in violence followed that in auto theft, and seems to continue to track it remarkably closely. The available evidence suggests that the drop in auto theft in different countries coincided with the growth of vastly improved vehicle security, particularly high quality electronic immobilizers and central deadlocking.

Blumstein and Wallman's (2000) book is rightly considered a landmark. It achieved sufficient recognition that a second edition appeared only six years later - somewhat unusual for an

academic work that is not a textbook. Yet it has not dated well in the subsequent 'phase 2' decade of crime drop research, and much of its content seems to now be largely of historical, with hindsight suggesting its focus on violence and a single country was rather too narrow.

Seventeen explanations for the international crime drop from the academic literature were examined. In addition to an examination of the specific literature relating to each, some extra light was shed on them by subjecting them each to four evidence-based tests. While hindsight is twenty-twenty, a surprising number of hypothesis now appear rather parochial and cannot explain the crime drop in more than one country, failing the cross-national test. Likewise, some hypothesis were inconsistent with what seems to be the basic fact that crime had previously been increasing for several decades. Most were irreconcilable with the fact that some crimes have increased at the time that many crimes have decreased, and few hypotheses could account for the variation between countries and crime types in the timing and trajectory of the crime drop. Sixteen of the seventeen hypotheses failed at least one of the four tests, and most failed at least two.

The evidence examined here identifies the security hypothesis as the most promising explanation of why crime has declined. The framework of crime opportunity theory and routine activity theory in which it nestles provide flexibility in terms of addressing different types of crimes in different contexts. It is worth speculating on why security, and the theoretical areas of crime opportunity theory, principally rational choice and routine activities, seem to have featured little in earlier debates. Perhaps it was how the debate was circumscribed as relating primarily to violence, perhaps these theories are not driven as much by an underlying ideology as many others, or perhaps it is the manner in which they tend to frame offenders as typically less able decision-makers who are relatively easily influenced by their surrounding environment.

The main policy implications of the security hypothesis are straightforward. Architects, urban planners, products designers and others should take account of crime in their blueprints. Governments should encourage this by all appropriate means, including regulation where necessary, but perhaps preferably through market-based incentives (Farrell and Roman 2006; Eck and Eck 2012; Tilley 2012). Problem-solving and situational crime prevention would appear to offer the most viable approach to e-crime, and to new crimes that emerge in the future. Policing might adapt to re-emphasise crime prevention as its primary mission, using problem-

solving approaches to improve the crime opportunity structure and playing a role in nudging business owners, place managers, and others into reducing their emissions of easy crime opportunities.

Further research into the security hypothesis is required, and several possible avenues have been suggested here. At worst it seems likely to prove a good explanation for the drop in car theft and other property crimes while providing insight for continued pursuit of explanations for violence. For the present authors it is a rather positive hypothesis insofar as it suggests the solution to most crime lies in the hands of governments, and it provides a methodology – that of a problem-solving situational crime prevention – to achieve continued reductions in crime in the future. The best security is innocuous, liberating and empowering – witness the electronic vehicle immobilizer – and offers no threat but many benefits to democratic society.

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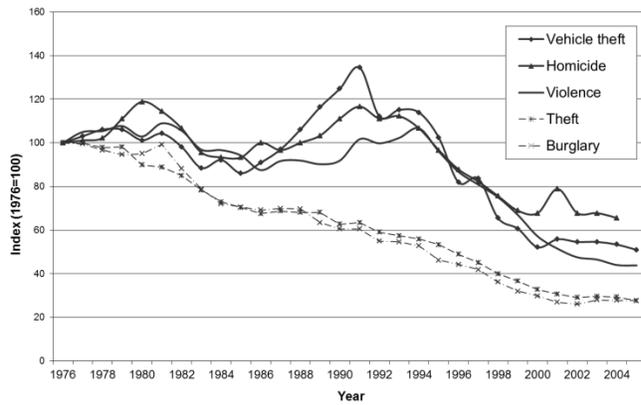


FIG. 1. – National Crime Victimization Survey crime rates 1976-2005 and homicide rate from Uniform Crime Reports, indexed to 100 in 1976. Source: Bureau of Justice Statistics (National Crime Victimization Survey; Uniform Crime Reports).

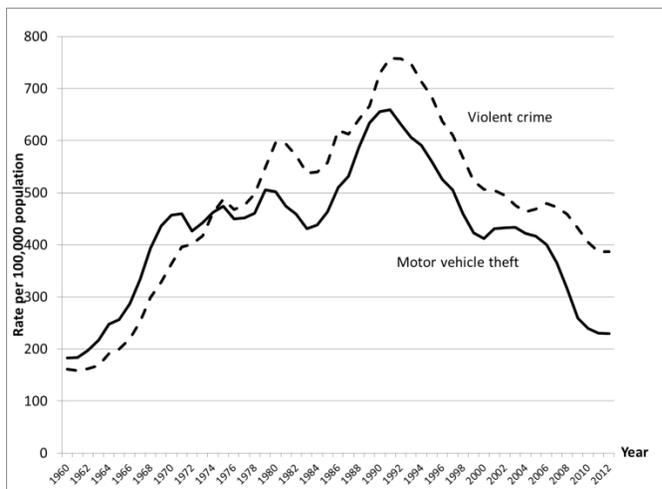


FIG. 2. – UCR Violent crime (including homicide) and motor vehicle theft rates per 100,000 population, United States 1960-2012. Source: Uniform Crime Reports.

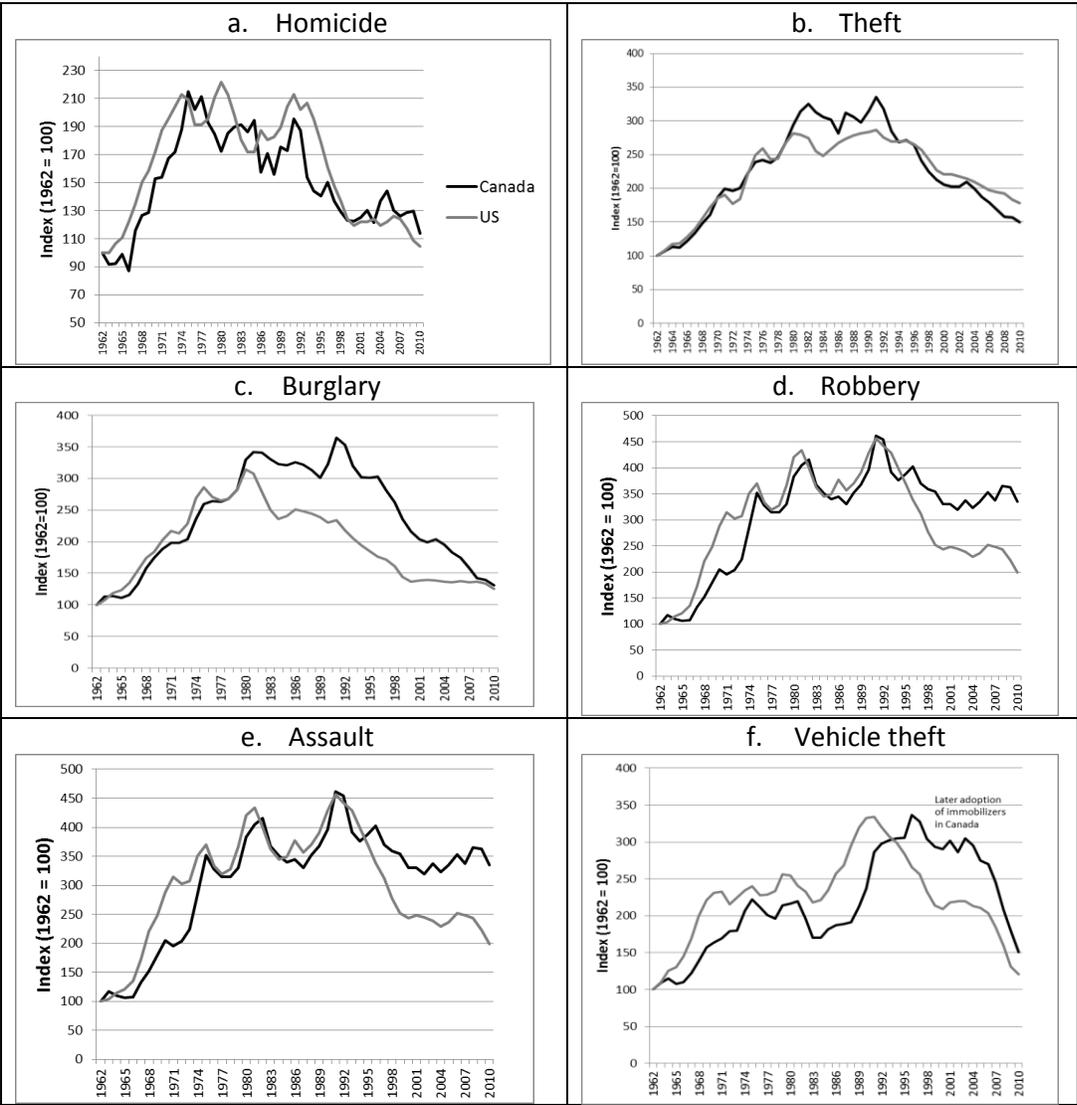


FIG. 3. – Uniform Crime Report data for Canada and United States 1962-2010, indexed to 100 in 1962.
 Source: Statistics Canada; Bureau of Justice Statistics.

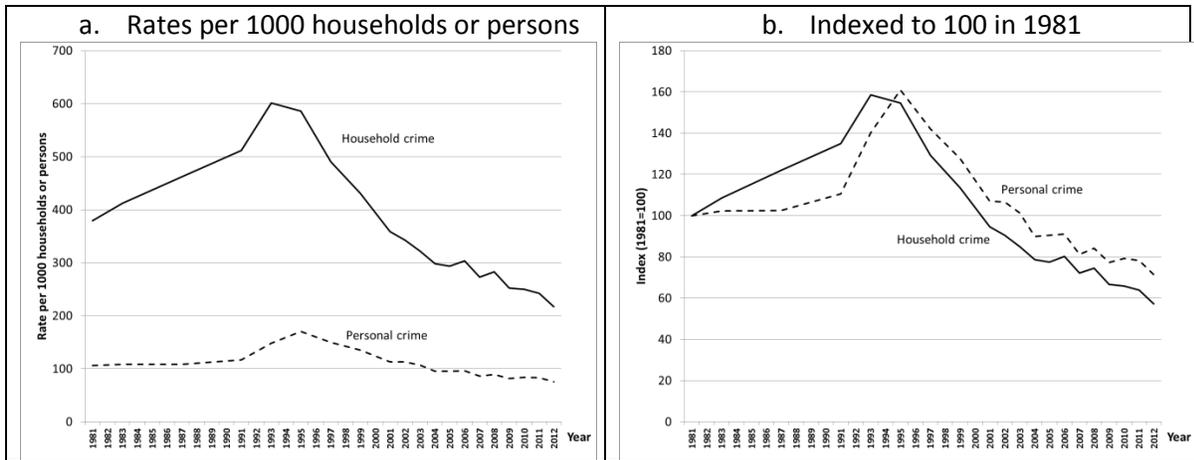


FIG. 4. – Household crime and personal crime rates (per 1000 households or persons), England and Wales 1981-2012. Source: Crime Survey for England and Wales.

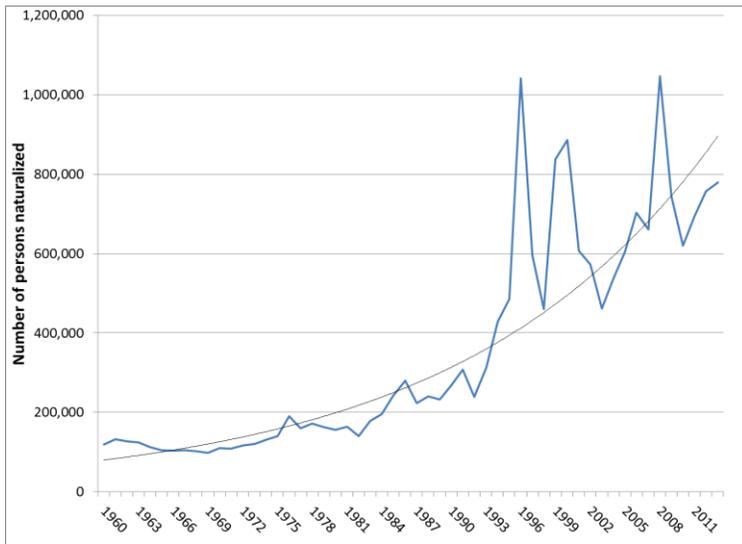


FIG 5 – Number of persons naturalized annually in United States. Source: Department of Homeland Security, Yearbook of Immigration Statistics 2013, Table 20.

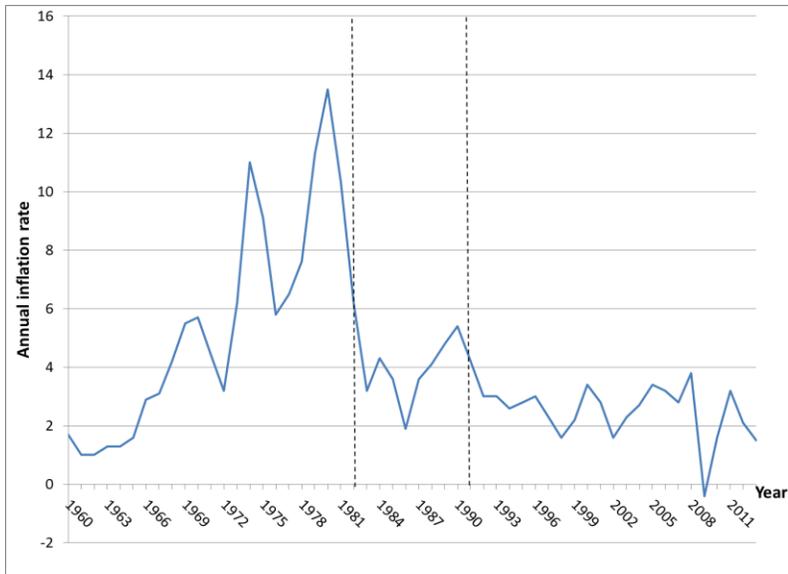


FIG 6 – Annual inflation rate, United States 1960-2013. Source: US Inflation calculator (<http://www.usinflationcalculator.com/inflation/historical-inflation-rates> accessed 04 June 2014).

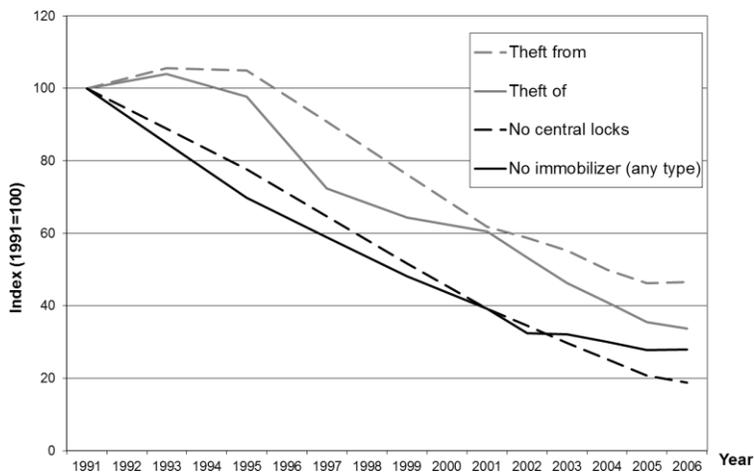


FIG. 7a. – Insecurity and crime: Trends in theft of and theft from vehicles and percent of vehicles without key security measures 1991-2006. Source: Crime Survey for England and Wales.

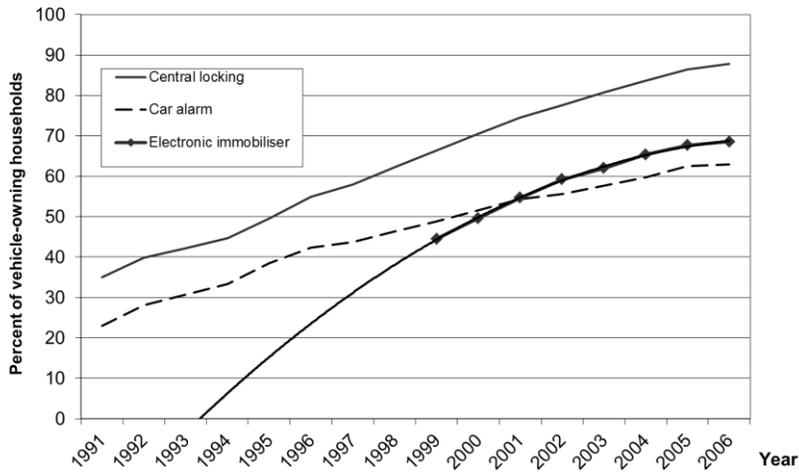


FIG.7b. – Trends in security devices as a percentage of vehicle owning households (with extrapolation for electronic immobilizers for years before 1999). Source: Office of National Statistics, Crime Survey for England and Wales.

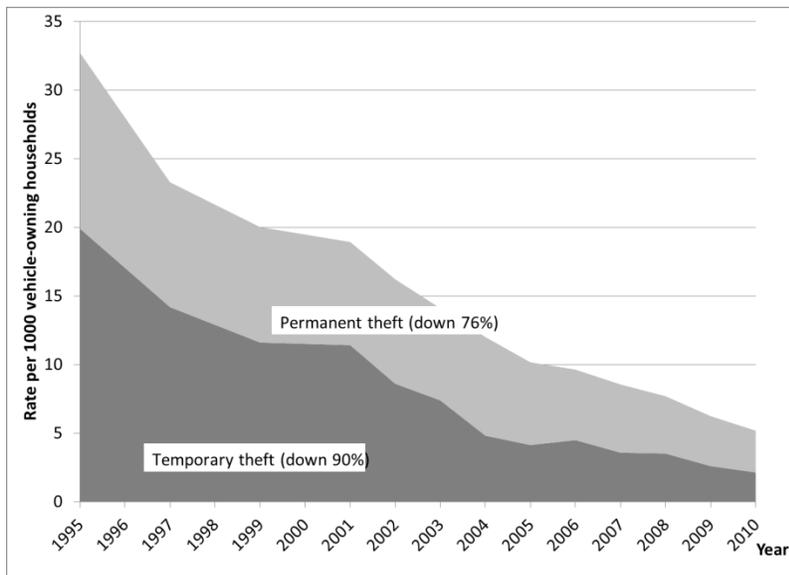


FIG. 8. – Vehicle theft rate per 1000 vehicle-owning households, England and Wales 1995-2010/11. Source: Office for National Statistics, Crime Survey for England and Wales.

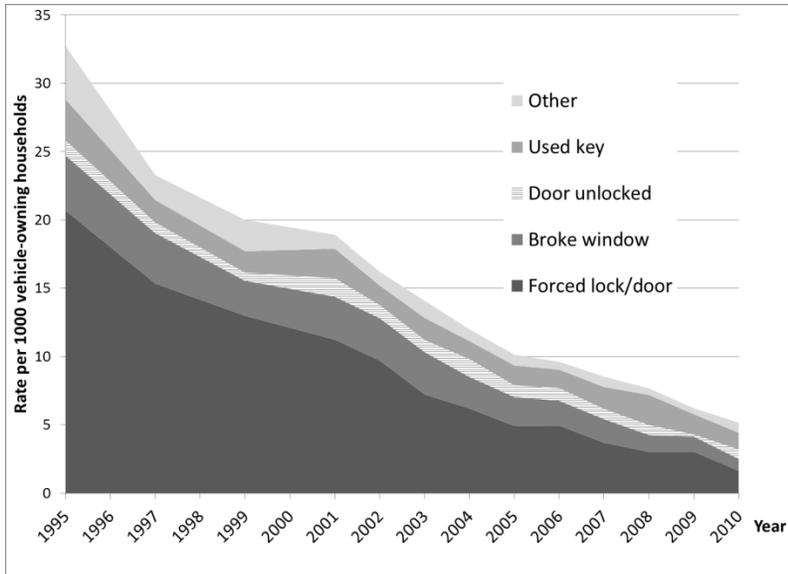


FIG. 9. – Means of entry for vehicle theft in England and Wales 1995-2011. Source: Office for National Statistics, Crime Survey for England and Wales.

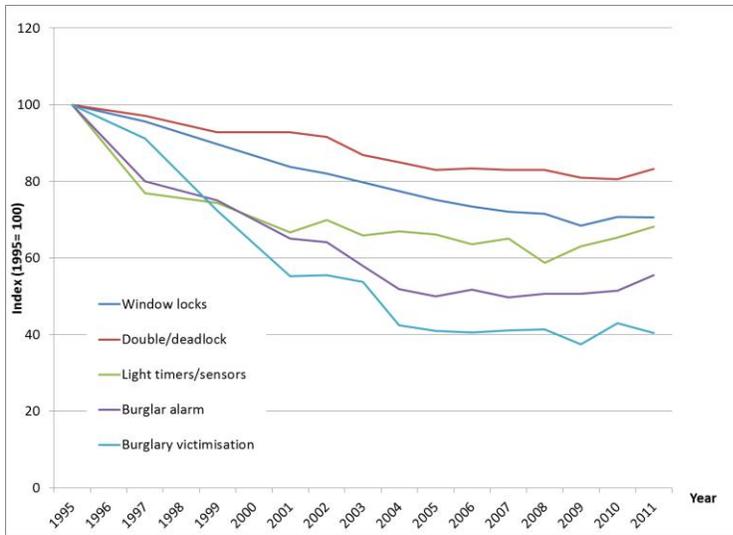


FIG. 10. – Household insecurity and burglary rate 1995-2011. Source: Office for National Statistics, Crime Survey for England and Wales.

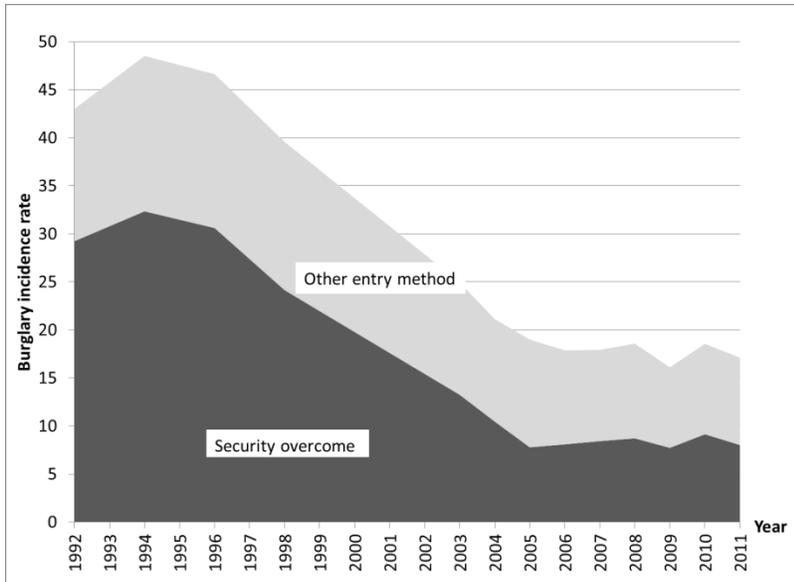


FIG. 11. - Means of entry as indicator of the role of security: Burglary with Entry in England and Wales 1992-2011. Source: Crime Survey of England and Wales.

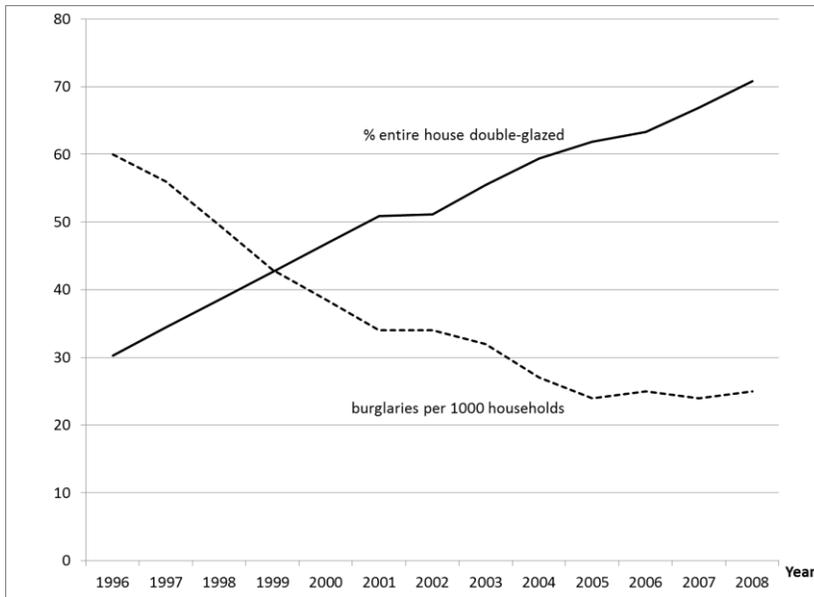
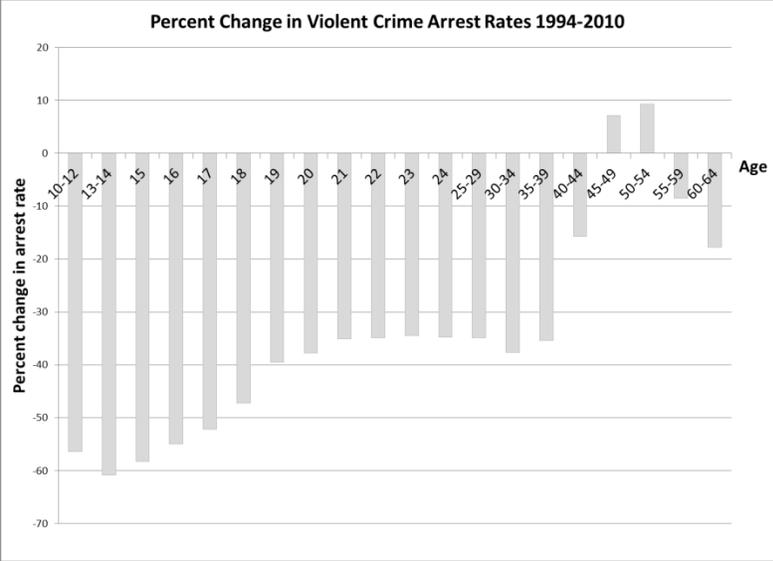


FIG. 12 - Change in levels of full double-glazing and burglary with entry 1976-2008. Source: Crime Survey of England and Wales.



Fig 13a and 13b



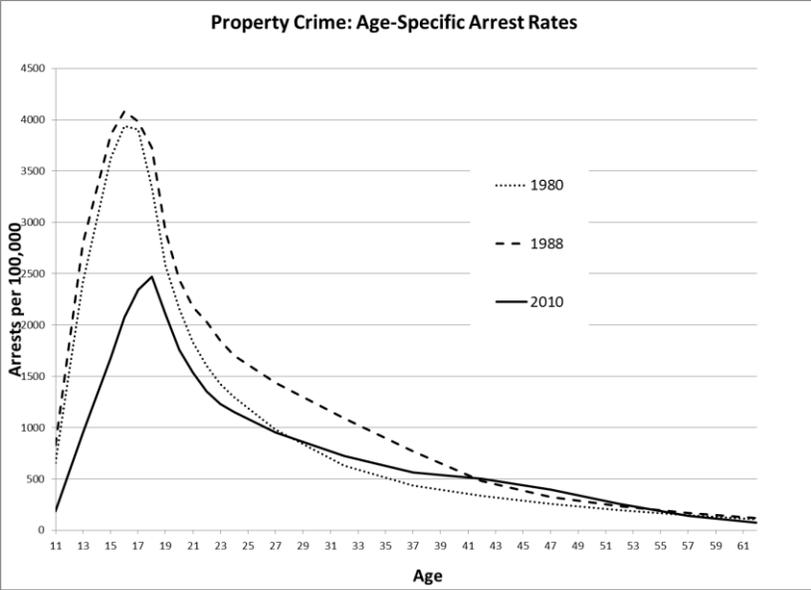


Fig. 14a and 14b

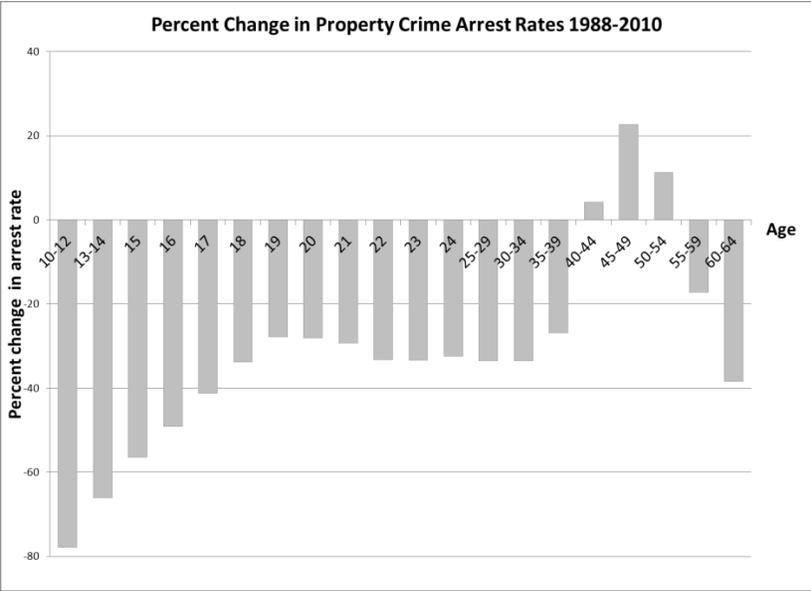


Table 1a: Sexual abuse of children, United States: Summary of change in crime rates

Source	Definition	Period	Rate change
National Child Abuse and Neglect Data System (NICANDS)	Substantiated sexual abuse	1990-2010	-62%
National Incident Study (NIS)	Sexual abuse	1993-2005	-47%
Federal Bureau of Investigation (FBI)	Forcible rape	1990-2010	-35%
National Crime Victimization Survey (NCVS)	Sexual assault against age 12-17	1993-2008	-69%
Minnesota School Survey	Sexual abuse	1992-2010	-29%
National Survey of Family Growth	Statutory rape	1995-2008	-39%
National Survey of Children Exposed to Violence (NatSCEV)	Sexual victimization	2003-2008	-16% ⁸
National Survey of Adolescents	Sexual assault – girls	1995-2005	-13% (n.s.)
	Sexual assault – boys	1995-2005	+9% (n.s.)

Source: Finklehor and Jones (2012). Note: n.s. indicates findings that were not statistically significant.

Table 1b: Physical abuse of children, United States: Summary of change in crime rates

Source	Definition	Period	Rate change
National Child Abuse and Neglect Data System (NICANDS)	Substantiated physical abuse	1990-2009	-56%
National Incidence Study	Physical abuse	1993-2005	-29%
National Child Abuse and Neglect Data System (NICANDS)	Child maltreatment fatalities (“majority are neglect and not physical abuse”)	1993-2007	+46%
Federal Bureau of Investigation (FBI)	Homicide – children 0-17	1997-2007	-43%
	Homicide – children 0-5	1997-2007	-26%
Acute care hospital admissions	Children < age1	1997-2009	+10.9%
	Children 1-18 admissions	1997-2009	-9.1%
Admissions to 38 hospital sample	Children age <6	2000-2009	+0.79%
	Children < age1 (brain injury)	2000-2009	+3%
National Survey of Children Exposed to Violence (NatSCEV)	Physical abuse by caregivers	2003-2008	
National Survey of Adolescents	Physical abuse	1995-2005	-6% (n.s.)
Minnesota School Survey	Physical abuse	1992-2010	-20%
National Crime Victimization Survey (NCVS)	Age 12-17 - simple assault	1992-2010	-59%
	Age 12-17 - aggravated assault	1992-2010	-69%

Source: Finklehor and Jones (2012). Note: n.s. indicates findings that were not statistically significant.

Table 2: Crime drop hypothesis

#	Hypothesis	Summary
1	Strong economy	General economic improvement reduced crime.
2	Concealed weapons laws	More concealed weapons increased deterrence.
3	Capital punishment	Increased use of death penalty induced greater deterrence.
4	Gun control laws	Gun control reduced crime due to gun control laws.
5	Imprisonment	Increased imprisonment reduced crime via incapacitation and deterrence.
6	Policing strategies	Better preventive policing reduced crime, (i.e. Compstat and its progeny).
7	More police	Police staff increased so crime fell.
8	Legalization of abortion	Abortions in 1970s meant less at-risk adolescents in 1990s.
9	Immigration	Immigrants commit less crime and promote social control in inner cities.
10	Consumer confidence/Inflation	Strong economy and low inflation shifts consumers away from stolen second-hand goods.
11	Waning crack market	Decline in crack drug markets reduced related violence. Younger men were deterred by death and imprisonment of elders.
12	Lead poisoning	Lead (Pb) damaged children's brains in 1950s on, causing crime wave from 1960s when they reached adolescence, then cleaner air from 1970s caused crime drop of 1990s.
13	Changing demographics	Aging population means proportionally fewer young people offenders and victims, so crime rates fall.
14	Civilizing process	Institutional control weakened in 1960s causing crime increase, then strengthened in 1990s causing crime drop.
15	Improved security	Improved quality and quantity of security reduced crime opportunities
16	The Internet	Attractive displacement of offenders to e-crimes and changed lifestyles of victims.
17	Phone guardianship	Portable phones spread rapidly in 1990s and provide guardianship

Table 3 Findings from Four Tests

#	Hypothesis	Cross-national	Prior crime increase	E-crime & phone theft	Variable trajectories
1	Strong economy	✓	X	X	X
2	Concealed weapons law	X	✓	X	X
3	Capital punishment	X	✓	X	X
4	Gun control laws	X	✓	X	X
5	Imprisonment	X	X	X	X
6	Policing strategies	X	✓	X	X
7	More police	X	✓	X	X
8	Legalization of abortion	X	✓	X	X
9	Immigration	✓	X	X	X
10	Consumer confidence/Inflation	✓	X	X	X
11	Waning crack market	X	✓	X	X
12	Lead poisoning	✓	✓	X	X
13	Changing demographics	✓	✓	X	X
14	Civilizing process	✓	✓	X	X
15	Improved security	✓	✓	✓	✓
16	The Internet	✓	✓	X	X
17	Phone guardianship	✓	✓	✓	X

Legend: ✓ = Pass. X = Fail.

Notes

¹ Roman and Chalfin (2007) use the term iCrime to refer to theft of attractive electronic goods such as phones, computer laptops and tablets, GPS-satellite navigation systems and the like.

² The Pearson correlation coefficient between auto theft and violence crime rates from 1960 to 2012 for the UCR is a remarkable 0.89 (and with a two year lag on auto theft it rises to 0.92), and 0.88 for the NCVS covering 1976 to 2005 as shown in Figure 2.

³ Due to definitional difference, the comparison of rates of rape in the United States to sexual assault in Canada is not included here, but the chart was broadly similar in nature to the others with a correlation coefficient of 0.81.

⁴ The Crime Survey for England and Wales category of 'all household crime' covers vandalism, burglary, vehicle-related theft, bicycle theft, and 'all personal crime' covers theft from the person, other theft of personal property, assault (wounding, assaults with and without injury), and robbery.

⁵ Unfortunately the CSEW does not cover 1994, so the year in which crime peaked in England and Wales remains undetermined.

⁶ From 2001 the CSEW coverage changes from a calendar year to be more akin to a financial year. For simplicity this essay refers to the main year, so that, for example, when the CSEW refers to 2012/13, here we refer to 2012. This is less cumbersome for readers, and the same practice is used in chart labels.

⁷ This suggestion owes a debt to discussions with Neil Boyd.

⁸ Calculated from Table 1 of Finklehor and Jones (2012) as the difference in the prevalence rate of 8.0 in 2003 to that of 6.7 in 2008.