THEORY: As the intelligence-led paradigm in policing has developed, with it has been the introduction of management models that aim to improve the production and use of analysis (e.g. the UK’s National Intelligence Model). In practice, this has though often led to a procedural production of intelligence products, with content based on standardised templates, which in turn has limited creativity in the analysis process. This can lead to many analysis products only being descriptive in content and offering general findings that many are already aware of. It can also lead to a tendency towards presenting reports with lots of facts and figures, but that are weak in explanatory substance.

PURPOSE: The hypothesis testing crime analysis approach is designed to help improve the explanatory content of analytical products, such as problem profiles. It is based on the principle of identifying a number of plausible reasons for the crime problem (i.e. hypotheses) and using these to frame the direction and content of the analysis. Testing the hypotheses firmly focuses the analysis on determining ‘why’ the problem exists, drawing from techniques analysts would use for exploring who, what, where, when and how. The process of deciding on hypotheses is also designed to help improve the commissioning of analysis products. That is, it encourages a better dialog to occur between the person requesting the analysis and the analyst.

METHOD: Using hypothesis testing in crime analysis helps to better understand (and evidence) why a crime problem exists. The process also identifies the data that are required. The production of analysis using the hypothesis testing approach involves four stages:

1) The overview
2) Deciding on hypotheses
3) Analysis, and
4) Conclusions and response recommendations

The analyst is responsible for stages 1 and 3, the wider stakeholders (people who have an interest in the problem, and/or are in positions of responsibility to potentially do something about it) are involved in stages 2 and 4.

APPLICATION: This analytic approach is illustrated using a burglary case study from Oldham, Greater Manchester. Following an increase over the winter of 2010/11 Greater Manchester Police (GMP) and the Oldham CSP initiated a hypotheses testing crime analysis approach to better understand the reasons for the increase. Four hypotheses were tested, with no support for the first two, and modest support for the third. The fourth hypothesis was that the increase in burglary was attributable to an increased opportunity for burglars to offend in the early evening due to the extended hours of darkness over the winter. This was tested using temporal analysis of burglary data for different seasons. The results showed that the increase could be attributed to the offending between midday and 9pm over the Winter. This trend was also seen over the previous three years. In response the crime awareness programme that was usually run in Autumn was refined so that households at an elevated risk of burglary were given verbal crime prevention advice by officers. This programme began in October 2012, and was considered to be the main reason for a 25% reduction in burglary over the 2012/2013 winter period.
THEORY: In the last twenty years, the growth of the intelligence-led paradigm in policing has placed a greater emphasis on the need to conduct analysis. The gathering of information and its interpretation is a key principle that underpins intelligence-led policing, be it for supporting the daily tactical and operational targeting of police patrols, assisting an investigation, or for identifying persistent issues that require a strategic response. The generation of good quality analysis is also at the heart of the problem-oriented policing approach introduced by Herman Goldstein in the 1990s.

The production of analysis has been formalised in several countries with the introduction of more routinised management processes. For example, the adoption of police management frameworks such as the UK’s National Intelligence Model (NIM) are designed to better integrate analysis and intelligence into the core of all police business and decision making (Ratcliffe, 2008). These formal, systematic processes have resulted in the creation of a more standardised approach to analysis report production. In UK NIM terms this includes problem profiles - analytical products that aim to help better understand particular crime problems.

With this increasing demand for analysis and the subsequent standardisation of intelligence products has come the production of templates that aim to determine a consistent structure and content to these materials. Over time, the routine production of these analytical materials has led to many reports being constrained in their analytical creativity, most often only providing a general descriptive narrative of a crime or public safety problem (providing interesting facts and figures on who, what, where, when and how), rather than understanding why the problem exists or has recently emerged.

PURPOSE: The hypothesis testing crime analysis approach is designed to help improve the explanatory content of analytical products such as problem profiles. It is based on the principle of identifying a number of plausible reasons for the crime problem (i.e. hypotheses) and using these to frame the direction and content of the analysis. Testing the hypotheses firmly focuses the analysis on determining ‘why’ the problem exists, drawing from techniques analysts would use for exploring who, what, where, when and how. For example, a reason/hypothesis to explain why burglary has increased in an area is “it’s because we have had an increase in burglars, due to an increase in the number of former prolific burglars recently being let out of prison into our area”. This hypotheses can then be tested by determining (using the available intelligence) who has recently been released from prison, where they live, have they committed any burglaries since their release, and if so where have these offences been committed. This will help conclude if the offending of these former prolific burglars is responsible for the entire increase in burglary, part of the increase, or not at all.

The process of deciding on the hypotheses to test is also designed to help improve the commissioning of analysis products. That is, it encourages a better dialog to occur between the person requesting the analysis and the analyst.
Using hypothesis testing in crime analysis helps to better understand (and evidence) why a crime problem exists. The process also identifies the data that are required. The production of analysis using the hypothesis testing approach involves four stages:

**STAGE 1 – THE OVERVIEW:** this involves clearly defining the crime problem. It should determine the magnitude and scale of the problem, trends, and any specific information that helps more clearly identify what the problem involves. The overview should be concise (i.e. a maximum of three pages in length), but should provide enough detail for stage 2.

**STAGE 2 – DECIDING ON HYPOTHESES:** in this second stage, the key stakeholders of the problem should review the overview, provide additional information to support it, and determine reasons for why they think the problem exists. The key stakeholders are people who have an interest in the problem, and/or are in positions of responsibility to potentially do something about it. Ideally, these key stakeholders should come from a number of different local agencies. This helps to ensure a better balance on the reasons why the problem exists and helps gain partner agency buy-in for any responses that are decided later on in the process. It is the role of the analyst to collate the hypotheses and determine with the key stakeholders the hypotheses that should be tested. To produce a shortlist, each hypothesis should be qualified in terms of whether it can be attributed to the problem that is being defined over the timeframe that the problem has emerged/exists. The testing of each hypothesis should also result in information that can inform a response. The hypotheses that are determined therefore need to be clear and specific. Practice suggests that three to five hypotheses is the preferred number to test, simply because there is unlikely to be analytical capacity to test any more in the timeframe required.

**STAGE 3 – ANALYSIS:** the hypotheses frame the direction and content of the analysis. The primary objective is to come to some conclusions that provide evidence that does or does not support each hypothesis. The type of analysis to conduct is determined by the hypothesis that is tested. For example, if a hypothesis states that a recent increase in residential burglaries is related to an increase in homes being left insecure (due to residents leaving windows open because of a recent prolonged period of hot weather), the analysis will need to identify if there has been a recent increase in overnight temperature that coincided with the increase in burglaries, and if the volume and proportion of insecure burglaries has increased in line with the burglary increase. This process will also identify where there are intelligence gaps and any data may need to be collected in order to test a hypothesis e.g. weather data or a survey of residents.

**STAGE 4 – CONCLUSIONS AND RESPONSE RECOMMENDATIONS:** the hypothesis testing approach naturally leads to building evidence that can help explain why the problem exists, and in turn makes it easier to interpret these findings into conclusions. Key stakeholders (rather than just analysts) should be involved in interpreting the analysis. This is best conducted by holding a meeting to discuss the findings. It is at this stage that the key stakeholders should use the analysis to help decide how the problem can be addressed. Experience suggests that the better the problem is understood, the easier it is to determine specific tactics and strategies that will counter the issues the analysis has identified.
APPLICATION: This case study provides an illustration of how a police force and Community Safety Partnership (CSP) have used the hypothesis testing crime analysis approach. Following an 18% rise in residential burglaries over the winter of 2010/11 in Oldham, Greater Manchester Police (GMP) and the Oldham CSP initiated a hypotheses testing crime analysis approach to better understand the reasons for the increase. The overview did not show any clear seasonal pattern to the burglaries, but certain areas of Oldham had experienced bigger increases than others. The following four hypotheses were determined:

1. The increase in burglary is attributable to an increase in burglary offenders living in Oldham as a direct result of an increase in prison releases
2. The increase in burglary has been driven by an increase in gold jewellery thefts, particularly in Asian neighbourhoods
3. The increase in burglary is attributable to a decrease in the effectiveness of “cocooning” in Oldham, leading to a higher level of repeat and near-repeat victimisation
4. The increase in burglary is attributable to an increased opportunity for burglars to offend in the early evening due to the extended hours of darkness over the winter.

In summary, there was little evidence to support the first two hypotheses. Analysis for hypothesis 3 determined that repeat victimisation levels had fallen, but near repeats had increased to explain 1 in 5 of the additional burglaries.

Figure 1 shows the results of the analysis conducted to test hypothesis 4. Comparing the time of day that burglaries were committed in Winter months to those in Summer months revealed that the difference in offending between midday and 9pm explained the entire burglary increase. This trend was also seen over the previous three years.

This finding led the CSP to refine their Autumn crime awareness programme so that it was more specific to those communities at risk of burglary. One of the core tactics used was directing neighbourhood police officers to visit the properties within 100m and within 24 hours of a recently burgled property. There, Officers asked residents to report any suspicious behaviour and provided practical crime prevention advice that helped minimise their heightened risk of burglary (e.g. leaving a light on if out mid-afternoon to early-evening). It was felt that by speaking to residents it was more likely that the message would resonate. The presence of officers on the streets also helped to deter offenders. This programme began in October 2012, and was considered to be the main reason for a 25% reduction in burglary over the 2012/2013 winter period, and in effect flattening much of the burglary peak between midday and 9pm that had been evident in the previous years.
GENERAL RESOURCES


- A training course that instructs the hypothesis testing crime analysis approach is run at least once every year by the UCL Jill Dando Institute of Security and Crime Science. More details can be found here: http://www.ucl.ac.uk/jdi/short-courses

A SELECTION OF ACADEMIC PAPERS AND BOOK CHAPTERS


