



JDiBrief - Analysis

Interstitial crime analysis: PURPOSE & THEORY (2 of 5)

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PURPOSE: Crime on public transport can be very difficult to analyse. 'Stealth crimes' like pick-pocketing present a particular challenge because victims often have an imprecise knowledge of the location and time of the offence. This is complicated further by busy transport systems which can involve complex journeys between A and B with an interchange at C. Whilst victims may be able to recall the last time and location they had their possessions, their intervening journey through the transport network may have involved multiple stations and lines, therefore increasing the spatial and temporal uncertainty of their loss. In other words a crime takes place in one location whilst the victim is unaware, and is not discovered until much later, and at another location.

For that reason, the location of theft offences on UK public transport are normally recorded as the station the offence was reported at, known as 'end of line'; not necessarily where it occurred. Crime analysis with these locations results in the end journey destinations having a high concentration of crimes associated with them, when crimes may in fact be occurring elsewhere on the network. Interstitial crime analysis (ICA) is a technique which overcomes this problem and improves the estimation of the spatial distribution of crime on networks when the exact location of offences is unknown, i.e. a crime has taken place at an undetermined location between two points on a network.

Research informs us that a small number of stops and stations on the public transport system are responsible for a disproportionate amount of crime (the so-called '80/20' rule). This is important to acknowledge as the ICA technique seeks to identify the more vulnerable, or risky, sections of a linear network. In turn this facilitates a more informed understanding of where to deploy resources and target crime prevention efforts.

THEORY: In the case of residential burglary, victims often find they have been burgled many hours – sometimes days - after they first left their home. This presents an interval of time between the victim leaving home and returning in which the crime could have occurred. In this situation it isn't sensible to use the moment when the property was left unattended, or when the victim returned, as the time of the offence. Mid-points of the time ranges could be used but these would also be inaccurate and possibly distort the analysis. Instead it is much more meaningful to use aoristic analysis which involves interpolating (estimating) between the start and end times of the interval and calculating probabilities of when the burglary could have taken place. Interpolating over a series of crimes provides a richer more intuitive view of when it is most likely crimes could have occurred, compared to relying upon the start and end or mid-points of a given time range. This aoristic approach is the theoretical foundation for the ICA technique, which is used to estimate the location of crimes in the interstices – the intervening spaces - of a network when the location is unknown.