

Grippa Working Paper

Grippa Impact Evaluation

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Background

The Grippa clip is designed to provide a secure fixing on which to anchor bags by hooking them onto the underside of tables or chairs. We hypothesised that usage of the Grippa clips would reduce opportunities for bag theft (thereby reducing bag theft levels) through increasing the effort and risk on the part of offenders attempting to steal (or dip from) anchored bags. The original aim of this project was to assess the impact of the Grippa clips on bag theft levels using a quasi-experimental design across 27 pubs of the same chain. Briefly, we identified (in collaboration with our business partner) 27 pubs to participate in the project. These were chosen to represent a range of barroom settings and because they were spread throughout London. The pubs were then analysed and ranked using an amalgam of bag theft levels between 2005/06, seating capacity and the presence (and level) of crime prevention measures more generally (for a detailed description see Bowers and Sidebottom, Grippa Evaluation Research Design: Matching Action and Control Sites). Next, each pub was assigned a matched pub on the basis of the above variables, totalling 13 matched pairs. One member of each pub couplet was then assigned to one of two conditions: action (to receive the Grippa clips) or control (not to receive the Grippa clips). The business collaborator had made the choices for the 'action' group pubs. The intended research design was that the 13 action bars would each receive the intervention. Impact would then be assessed on two levels: first, an aggregate comparison of bag theft levels across all action versus all control pubs before and after intervention; second, a comparison of each matched pair before and after intervention. We expected that implementation of the Grippa clips at the action sites would be associated with a significant reduction in bag theft levels compared to the control sites.

Regrettably, some two years into the project our business collaborator pulled out for reasons linked to the economic downturn. Their withdrawal occurred at a point where we were ready to install and evaluate our finalised Grippa security clips in the action bars. This also came after a series of observational trials in two pilot sites, in order to assess the function of and customer response to the latest version of Grippa clips. Because of their withdrawal we were unable to undertake the full-sized evaluation of the

kind described above. Given the timing of their departure, and the timing required to assemble conditions for a robust research design (i.e. matching action and control sites) we were also unable to identify a new business collaborator to work with.

This paper describes our attempts to conduct a more modest impact evaluation in light of the described circumstances. Specifically, we seek to analyse whether the implementation of newly designed clips (originally installed for the purposes of assessing design-related issues) in one pilot bar, Glassworks, (for which data were available) and an additional bar, the Shakespeare's Head, in which we first trialled an earlier prototype, was associated with any changes in theft patterns compared to the bars of the same chain which received no intervention. We acknowledge that if changes in bag theft levels are observed at the action sites then we could not confidently attribute an effect to the presence of the clips given our site observations suggest a low usage rate (see Sidebottom and Bowers, Changes in Customer Opinion in 2 Trial Pubs). That said, it is hoped an impact evaluation will allow us to draw some conclusions about the utilisation and impact of the clips.

Data

Recorded crime data were made available by the Metropolitan Police Service for 1st January 2005 to 31st August 2009 inclusive. The data comprised all theft offences at London retail establishments under the Metropolitan Police jurisdiction. Theft offences include Snatches, Picking Pockets and Other Theft offences. Snatch thefts refer to property which is stolen from the physical possession of a victim and where some degree of force is directed towards the property but not the victim. Picking pockets describes property which is taken from inside the victims' item of clothing (including bags) without their noticing at the time of offence. Other Thefts are defined as the theft of personal property from outside the home, such as thefts of unattended property in the workplace and theft of property while at licensed premises, cafés, restaurants or open spaces. Each crime event contained the following categories: the date and time of the offence, offence location (X and Y coordinates), property stolen indicators, victim characteristics such as sex, age and

ethnicity, and a free text field containing, among other things, Modus Operandi information. Whilst the primary interest in this project was bag theft, we decided to retain all theft offences for the analyses which follow. This was for two reasons: first, it would provide a broader picture of the patterns of acquisitive crime in bars; second, and from an analytical perspective, it would allow for a more reliable analysis of theft patterns through providing a larger sample size with which to analyse.

Data Preparation

For the purposes of impact evaluation, we needed to extract theft data for the 22 pubs participating in our project which fell within the Metropolitan Police region. Extracting the relevant data was multi-tiered. First, we used a Geographic Information System to capture all theft offences which occurred within a 100 metre circular buffer of the pubs of interest (for which we had x and y coordinates). Next, the Euclidean distance between each crime event and the closest pub of interest was calculated. It was assumed that those with larger distances (up to 100 metres) were more likely to be unrelated to the pub of interest. Events were then ranked by distance in descending order per pub. The address of the reported crime was then cross-referenced against the pub of interest. Cases which were recorded as occurring at a pub of interest but which were falsely geocoded (as indicated by a distance greater than 1) were assigned to the relevant pub. The final dataset comprised 2,530 incidents of recorded theft offences, of all kinds, across the 22 pubs. This process helped ensure that as much theft data as possible had been captured for each pub – even events that had been incorrectly geo-coded by the Police.

The analyses which follow begin with some descriptive statistics concerning bag theft. This is followed by an analysis of the impact of the Grippa clips in the action sites compared to the controls.

Descriptive Statistics

Frequency of Crime by Crime Type

Table 1 shows that the vast majority of offences within the current dataset are defined as Other Thefts.

Table 1 Number of Offences [?] taking place at study bars by Crime Category, Jan 2005 – Aug 2009.

Crime Type	Frequency	Percent
Snatch theft	7	.3
Pick Pocketing	72	2.8
Other Theft	2451	96.9
Total	2530	100.0

Distribution of Theft Offences across Pubs

Figure 1 indicates that the distribution of thefts between bars varies considerably. It shows that across the near 5-year period, the volume of theft incidents per bar ranged from 621 to just 6. This skewed distribution is commonly referred to as a J-curve pattern (Eck et al., 2007), whereby, in this instance, a small number of bars account for the majority of theft offences in our sample. The Shakespeare’s Head, for example, accounts for 25 per cent of the total number of thefts observed. The top five pubs in terms of theft volume account for 65 per cent of all reported incidents across the 22 bars. Figure 2 shows that similar patterns are found when analyzing only bag thefts in the 22 bars.

Figure 1 Distribution of recorded theft incidents across 22 Wetherspoon pubs, Jan 2005 – Aug 2009 (n = 2,530)

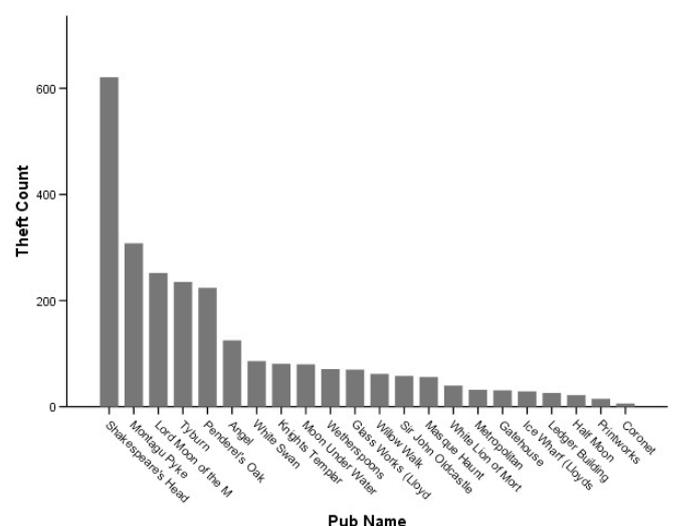
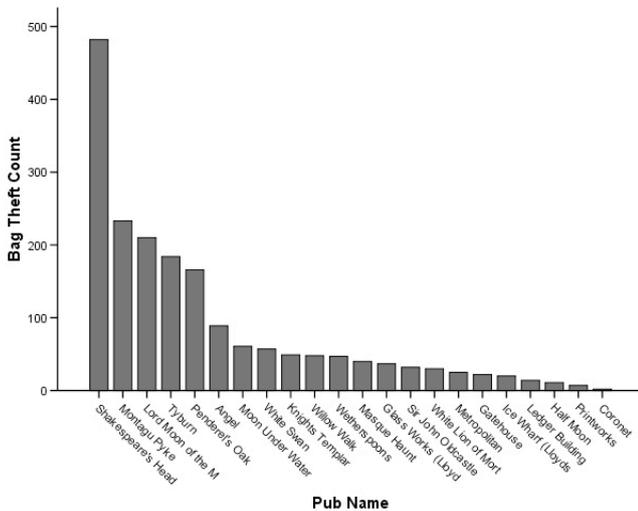
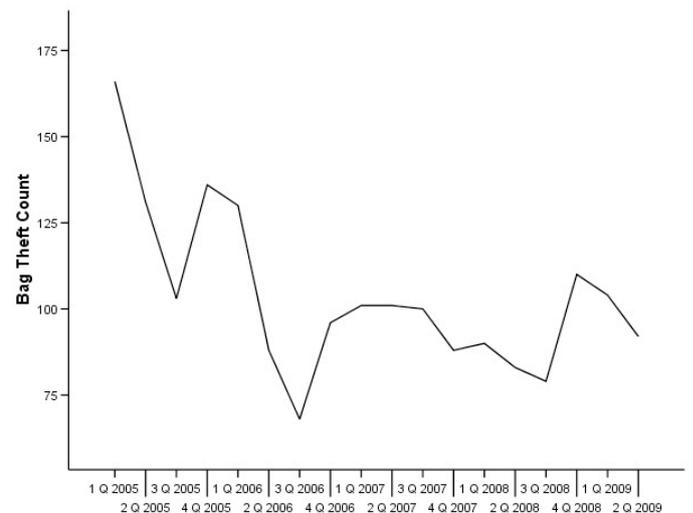


Figure 2 Distribution of recorded bag thefts across 22 Wetherspoon pubs, Jan 2005 – Aug 2009 (n = 1,866).



NOTE: July and August 2009 have been removed from the above analysis in order to produce full three month quarters.

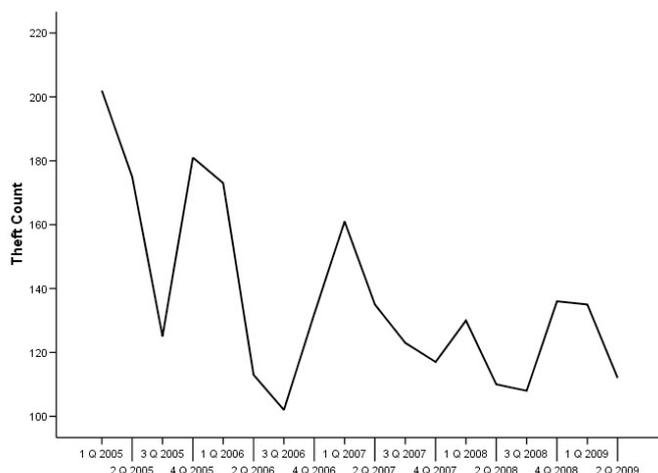
Figure 4 Bag Thefts across all 22 Wetherspoon Pubs, Jan 2005 – June 2009 (n = 1,866)



Theft Offences over Time

Figure 3 indicates that theft offences aggregated across the 22 pubs display a general downward trend over time. There also appears to be a seasonal pattern with theft offences peaking during the winter months (Q4 and Q1). Such seasonal effects are most likely explained by an increase in the number of opportunities for theft: more people are likely to frequent bars (or stay inside them) in the colder months than the warmer summer periods. As with Figures 1 and 2, the number of bag thefts over time displays a similar temporal pattern as an aggregate of all theft offences (Figures 3 and 4).

Figure 3 Theft Offences across all 22 Wetherspoon Pubs, Jan 2005 – June 2009 (n = 2,470)



Victim Characteristics

Sixty four per cent (n = 1,616) of theft victims were female. The modal age group was those aged 20 – 29 which contributed 45 per cent (n = 1,131) of the 2,408 offences for which victim age was recorded.

Impact Evaluation

Below are crime figures for each action pub and their matched control. For the Shakespeare's Head there are two figures. The first relates to all thefts and the second only bag thefts (Figures 5 and 6). The vertical line indicates the date at which the Grippa clips were implemented. For Glassworks only one figure is shown which displays all theft offences as the number of bag thefts was so small. (This was not an ideal choice of venue for the evaluation, but according to the original evaluation plan the intention had been to save the highest-crime bars for the full evaluation, which of course never happened.)

Shakespeare's Head

Figures 5 and 6 show that while the reduction in (bag) theft at the Shakespeare's Head seems to coincide with the installation of the Grippa clips, similar reductions were also observed at the matched control site. We cannot therefore conclude that changes in theft patterns were associated with the intervention. This is supported by the results presented in Table 2 which displays the number of thefts in the Shakespeare's Head compared to the twenty control pubs before and after implementation. It shows the proportion of thefts recorded at the Shakespeare's Head is similar to the proportion in the other control pubs over this period and no noticeable change is observed following intervention.

Figure 5 All Theft Offences at Shakespeare's Head and Montagu Pyke, Jan 2005 – June 2009 (n = 900)

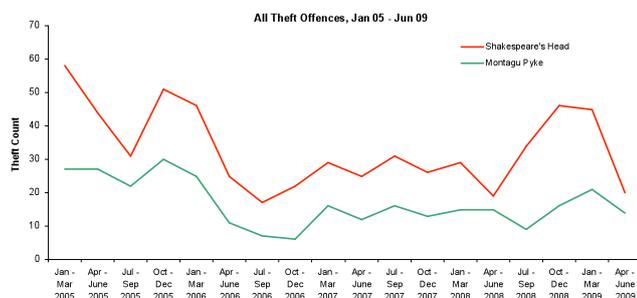


Figure 6 Bag Theft at Shakespeare's Head and Montagu Pyke, Jan 2005 – June 2009 (n = 715)

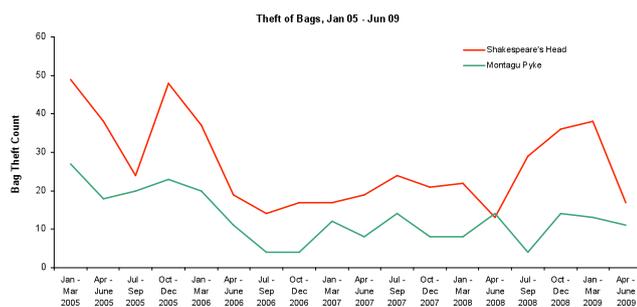


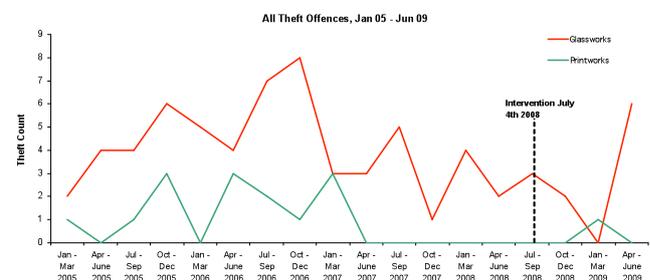
Table 2 All Theft Offences in Shakespeare's Head compared to Control Pubs, Jan 05 – Jun 09

		Shakespeare's Head	Control Pubs (n = 20)	Total
Before	Count	144	400	544
	%	24.08%	22.19%	
After	Count	454	1403	1857
	%	75.92%	77.81%	
Total		598	1803	2401

Glassworks

Figure 7 plots the number of thefts recorded at the action pub (Glassworks) and its matched control (Printworks). The vertical line indicates the date at which the Grippa clips were installed. Despite the low volume of offences recorded at these venues, it can be seen that theft levels appeared to decrease at the action site following intervention. However this decrease was not enduring, with marked increases observed in the quarter of April to June 2009. [?] It was also indistinguishable in magnitude from the fluctuations that preceded it.

Figure 7 All Theft Offences at Glassworks and Printworks, Jan 2005 – June 2009 (n = 85)



As with Table 2, Table 3 shows the proportion of thefts in the Glassworks compared to the twenty control pubs is similar before and after implementation. This suggests the Grippa clips produced little effect in terms of theft levels.

Table 3 All Theft Offences in Glassworks compared to Control Pubs Jan 05 – Jun 09

		Glassworks	Control Pubs (n = 20)	Total
Before	Count	58	1468	1526
	%	84.06	81.42	
After	Count	11	335	346
	%	15.94	18.58	
Total		69	1803	1872

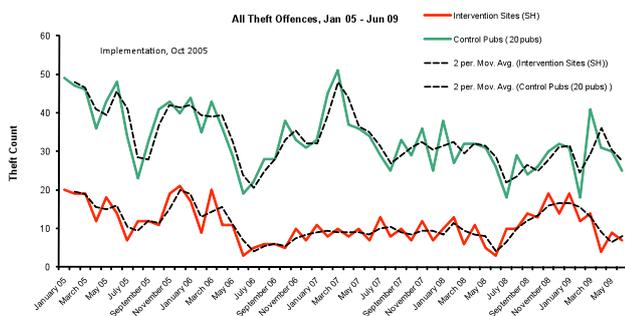
Action vs. Control

For the analyses that follow we decided to select only the Shakespeare's Head as our action site as opposed to a combination of the Shakespeare's Head and Glassworks. It was considered inappropriate to collapse the two sites into a single 'action' group given the considerable gap between implementation at the two sites and because each site received different iterations of the Grippa clip. Moreover, the Shakespeare's Head was selected

ahead of the Glassworks as our action site because the implementation date (October 2005) allowed for a much longer after period than that of the Glassworks (June 2009) with which to assess any changes. In addition, and from an analytical perspective, there were so few theft offences at the Glassworks compared to the Shakespeare’s Head that analyses could not be reliably undertaken on the Glassworks alone; time series analysis requires an uninterrupted time series of equal duration and in the Glassworks, unlike the Shakespeare’s Head, many months (the temporal units) contained no offences thereby flouting the assumptions of this test.

Figure 8 displays the time course for all theft offences committed at the intervention pub (Shakespeare’s Head) compared with all thefts at the remaining twenty control sites. Plotted along the x axis is the implementation date for the Grippa clip. Whilst both the action and control groups display similar trajectories in terms of the number (and pattern) of theft offences over time, it can be seen that no discernible reductions can be observed in the sites receiving intervention compared to the control group. [need to explain the moving averages. Or do we need them – what do they add?]

Figure 8 All Thefts at Shakespeare’s Head and Control Pubs, Jan 2005 – June 2009 (n = 2,401)



Time Series Analysis

The next step was to conduct inferential statistical analysis to assess recorded theft levels between the two groups (action versus control) over time. Specifically, we wanted to examine whether theft patterns across the two groups shared a similar trajectory over time. If they do, then this would suggest that the implementation of the Grippa clips in the action pub had little effect on the theft patterns observed.

The data used here is time ordered – recorded theft levels

per unit of time. Consequently, it was necessary to account for this in our analysis to ensure that the estimates produced were unbiased. Briefly, many standard statistical tests require that the data are normally distributed. When using structured data, as with data observations recorded over time, the data is not normally distributed and observations appearing closer in time are more likely to be similar than those which are further apart. In awareness of this, we used time series analysis which accounts for such data properties.

Table 4 Time Series Analysis Results

	Estimates	Std Error	t	Approx Sig
Rho (AR1)	.357	.132	2.704	.009
Regression Coefficients				
Theft count in 20 control pubs	.240	.078	3.065	.004
Pre/Post Implementation	-2.786	2.121	-1.313	.195
Constant	5.404	3.591	1.505	.139

Table 4 displays the relevant statistics produced by the time series analysis. It shows that AR1 is positive (Estimates column) and statistically significant. AR1 refers to Auto-Regressive one and represents other variables currently omitted from the model (perhaps currently unknown) and their temporal relationship with the dependent variable of interest – here, theft patterns in the action bar. The results therefore indicate that there are other temporally fluctuating variables absent from the current model which may explain a significant amount of the variance observed in theft levels at the action pub. To advance the research agenda it is worth considering what those variables might be. Possibilities include police activity, such as the number of arrests per month. Another candidate explanatory variable is the level of acquisitive crime in the wider area, for example are increases in theft offences at the action bar merely the product of a methodological artefact representative of some wider upward theft trend in the area surrounding the bar.

The variable for theft counts in the comparison area (Regression Coefficients) is also positive and statistically significant. This indicates that increases in theft levels in the action pubs are associated with an increase in theft levels in the control pubs to a statistically significant degree. This implies that the two groups held a similar trajectory over time and that the implementation of the Grippa clips did not appear to impact this pattern. The fact that the pre-post implementation variable did not have a significant relationship with the dependent variable confirms this. This dichotomous variable is zero for all the months preceding implementation (up to October 2005) and has a value of one for the post implementation period (October

2005 onwards). This variable has a negative coefficient with crime in the action area, demonstrating some trend that crime levels were lower for the post-implementation period. However, this variable was non-significant. Hence, when fluctuations in the control group were accounted for, there was no significant effect of the intervention. [I'm a bit rusty on time series, but do we not need to look for differential change action-control x pre-post? The 2 things you have tested on look like main effects.]

Odds Ratios

In addition to time series analysis, we also computed the odds-ratio statistic (see Welsh and Farrington, 2002). Odds ratios are a measure of effect size which provide a means of comparing the likelihood of an event occurring under two conditions (here, theft when Grippas are and are not present) as these change over time. The strength of this approach is that odds ratios require a fairly simple calculation needing only four values – crime in the action sites before and after implementation, and the equivalents in the control sites. Furthermore, the statistic does not need an estimate of the population at risk but uses crime as a proxy for the prevalence of the problem in the population before and after implementation. [An odds-ratio of greater than 1 indicates an effect consistent with crime prevention, ie the action shows a greater fall (or a lesser increase) than the control over time.]

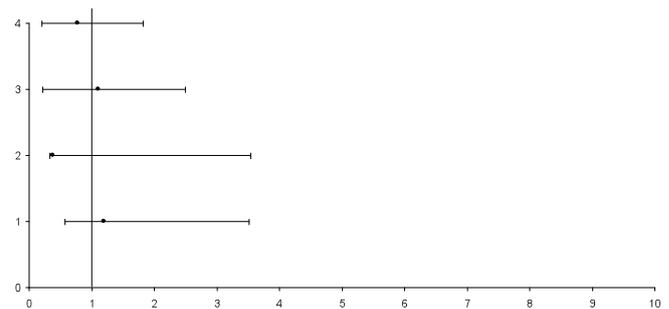
Shortcomings have been raised over the use of odds-ratio statistics when applied to crime prevention evaluation (see Marchant, 2005), most notably the issue of non-independent data. Despite these concerns, odds ratio methods have frequently been applied in evaluations of place-based crime prevention (like this) and though frequency of usage does not provide adequate justification of the appropriateness of method, frankly, satisfactory alternatives are not readily available.

The odds-ratio method produces a corresponding Z -score which indicates how many standard deviations a value is from the mean (here, the mean is an odds ratio of 1 or an outcome of no effect) allowing for assessment of the statistical significance of those conditions. Statistical significance is achieved if the Z -score is 1.96 or greater and the lower confidence limit of the odds ratio is over 1.

Figure 9 displays the odds ratios and upper and lower confidence limits for four scenarios:

- 1 = Glassworks versus All Controls
- 2 = Glassworks versus Matched Controls
- 3 = Shakespeare's Head versus All Controls
- 4 = Shakespeare's Head versus Matched Control

Figure 9 Odds ratios and confidence limits per scenario



Both scenarios 1 and 3 produce a positive odds ratio (1.20 and 1.11 respectively). This implies there was a larger reduction in theft offences in the action pub following implementation of the clips when compared to an aggregate of all the pubs not receiving the intervention. However this change was not statistically significant, as indicated by the lower confidence limit being less than 1. When compared to their matched control however (scenarios 2 and 4) both action pubs show an increase in crime albeit a non-significant one.

Implications and Conclusions

This document has investigated whether there was any discernible effect of the Grippa intervention on the level of theft (and bag theft) in pubs. In many ways this is not a fair trial of the measures as due to implementation difficulties it was not possible to test the impact of the final Grippa designs. In the statistical analysis that we were able to conduct, it appears that the sites which received 'treatment' showed little reduction in theft when compared to control sites. This is to be expected given previous analyses suggested the usage of the Grippa was patchy. However, the data used to perform such analyses is limited in terms of suitably timeframes before and after implementation; a lack of statistical 'power' due to small numbers of experimental units and insufficient opportunity to evaluate the innovative aspects of the new Grippa measures and their associated publicity. But this was the best that could be done in very unfavourable circumstances.

References

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