Problem-Oriented Guides for Police
Problem-Specific Guides Series
No. 52

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Bicycle Theft

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Center for
Problem-Oriented Policing

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About the Problem-Specific Guide Series

The *Problem-Specific Guides* summarize knowledge about how police can reduce the harm caused by specific crime and disorder problems. They are guides to prevention and to improving the overall response to incidents, not to investigating offenses or handling specific incidents. Neither do they cover all of the technical details about how to implement specific responses. The guides are written for police—of whatever rank or assignment—who must address the specific problem the guides cover. The guides will be most useful to officers who:

- **Understand basic problem-oriented policing principles and methods.** The guides are not primers in problem-oriented policing. They deal only briefly with the initial decision to focus on a particular problem, methods to analyze the problem, and means to assess the results of a problem-oriented policing project. They are designed to help police decide how best to analyze and address a problem they have already identified. (A companion series of Problem-Solving Tools guides has been produced to aid in various aspects of problem analysis and assessment.)
- **Can look at a problem in depth.** Depending on the complexity of the problem, you should be prepared to spend perhaps weeks, or even months, analyzing and responding to it. Carefully studying a problem before responding helps you design the right strategy, one that is most likely to work in your community. You should not blindly adopt the responses others have used; you must decide whether they are appropriate to your local situation. What is true in one place may not be true elsewhere; what works in one place may not work everywhere.

- **Are willing to consider new ways of doing police business.** The guides describe responses that other police departments have used or that researchers have tested. While not all of these responses will be appropriate to your particular problem, they should help give a broader view of the kinds of things you could do. You may think you cannot implement some of these responses in your jurisdiction, but perhaps you can. In many places, when police have discovered a more effective response, they have succeeded in having laws and policies changed, improving the response to the problem. (A companion series of Response Guides has been produced to help you understand how commonly-used police responses work on a variety of problems.)

- **Understand the value and the limits of research knowledge.** For some types of problems, a lot of useful research is available to the police; for other problems, little is available. Accordingly, some guides in this series summarize existing research whereas other guides illustrate the need for more research on that particular problem. Regardless, research has not provided definitive answers to all the questions you might have about the problem. The research may help get you started in designing your own responses, but it cannot tell you exactly what to do. This will depend greatly on the particular nature of your local problem. In the interest of keeping the guides readable, not every piece of relevant research has been cited, nor has every point been attributed to its sources. To have done so would have overwhelmed and distracted the reader. The references listed at the end of each guide are those drawn on most heavily; they are not a complete bibliography of research on the subject.

- **Are willing to work with others to find effective solutions to the problem.** The police alone cannot implement many of the responses discussed in the guides. They must frequently implement them in partnership with other responsible private and public bodies including other government agencies, nongovernmental organizations, private businesses, public utilities, community groups, and individual citizens. An effective problem solver must know how to forge genuine partnerships with others and be prepared to invest considerable effort in making these partnerships work. Each guide identifies particular individuals or groups in the community with whom police might work to improve the overall response to that problem. Thorough analysis of problems often reveals that individuals and groups other than the police are in a stronger position to address problems and that police ought to shift some greater responsibility to them to do so. Response Guide No. 3, *Shifting and Sharing Responsibility for Public Safety Problems*, provides further discussion of this topic.

The COPS Office defines community policing as "a policing philosophy that promotes and supports organizational strategies to address the causes and reduce the fear of crime and social disorder through problem-solving tactics and police-community partnerships." These guides emphasize *problem-solving* and *police-community partnerships* in the context of addressing specific public safety problems. For the most part, the organizational strategies that can facilitate problem solving and police-community partnerships vary considerably and discussion of them is beyond the scope of these guides.

These guides have drawn on research findings and police practices in the United States, the United Kingdom, Canada, Australia, New Zealand, the Netherlands, and Scandinavia. Even though laws, customs, and police practices vary from

country to country, it is apparent that the police everywhere experience common problems. In a world that is becoming increasingly interconnected, it is important that police be aware of research and successful practices beyond the borders of their own countries.

Each guide is informed by a thorough review of the research literature and reported police practice, and each guide is anonymously peer-reviewed by a line police officer, a police executive, and a researcher prior to publication. The review process is independently managed by the COPS Office, which solicits the reviews.

The COPS Office and the authors encourage you to provide feedback on this guide and to report on your own agency's experiences dealing with a similar problem. Your agency may have effectively addressed a problem using responses not considered in these guides and your experiences and knowledge could benefit others. This information will be used to update the guides. If you wish to provide feedback and share your experiences, send your comments by e-mail to cops_pubs@usdoj.gov

For more information about problem-oriented policing, visit the Center for Problem-Oriented Policing online at www.popcenter.org. This web site offers free online access to:

- The *Problem-Specific Guides series*
- The companion *Response Guides* and *Problem-Solving Tools* series
- Instructional information about problem-oriented policing and related topics
- An interactive problem-oriented policing training exercise
- An interactive *Problem Analysis Module*
- A manual for crime analysts
- Online access to important police research and practices
- Information about problem-oriented policing conferences and award programs.

Acknowledgments

Contents

The Problem of Bicycle Theft

What This Guide Does and Does Not Cover

This guide addresses bicycle theft, first by describing the problem and reviewing the factors that contribute to it. It then identifies a series of questions to help you analyze your local bicycle theft problem. Finally, it reviews responses to bicycle theft and describes the findings of evaluative research and operational policing. It will be apparent that, despite the various responses being advocated or implemented, there are no systematic evaluations of what works to reduce bicycle theft. Addressing this is important for police practice, as the evidence base should inform decision-making regarding appropriate responses. We already know a lot and this guide outlines how such knowledge (including a portfolio of responses) can usefully inform the crime-reduction enterprise. In addition, it identifies what information you need to better understand your local problem and effectively evaluate implemented responses.

This guide refers specifically to the unlawful taking of nonmotorized pedal cycles. Bicycle theft can be further categorized into theft *of* and theft *from* bicycles. Awareness of these categories is important for understanding your local problem. Each category covers different offenses demanding different responses.

- Theft *of* bicycles describes the theft of a cycle frame *and* its components.
- Theft *from* bicycles describes the theft of components and accessories such as lights, seats, and wheels. As bicycles are of composite construction, they are particularly vulnerable to component theft, especially regarding "quick release" features.

§The International Crime Victim Survey has repeatedly found that the rate of car theft holds a strong inversely proportional relationship with the rate of bicycle theft (van Dijk and van Kesteren 2007).

Although this guide covers both forms of theft, unless otherwise stated, most of the research and practical examples focus on the prevention of theft *of* bicycles. This is simply because cyclists are more likely to report theft *of* bicycles to the police, largely to meet insurance requirements.

Bicycle theft is but one aspect of the larger set of theft- and vehicle-related problems that the police must address. This guide, however, is limited to the particular harms bicycle theft causes. Related problems and topics not directly addressed in this guide—each requiring separate analyses and responses—include the following:

- Thefts of motorcycles
- Thefts of mopeds and scooters
- Fencing of stolen property
- Burglary
- Thefts of and from motor vehicles§
- Vandalism
- Insurance fraud.

Some of these related problems are covered in other guides in this series, all of which are listed at the end of this guide. For the most up-to-date listing of current and future guides, see www.popcenter.org.

General Description of the Problem

Bicycle theft is typically seen as a low police priority, its impact and magnitude often overlooked because police often consider incidents on a case-by-case basis. This picture is often misleading, however, and when viewed at the aggregate level, bicycle theft represents a much larger problem, one with harmful economic and societal effects that warrant greater police attention.[1]

The Rise of the Bicycle

The bicycle has become increasingly popular as a healthier and environmentally friendlier mode of transport.[2] In London, for example, cycle use has increased by 83 percent between 2000 and 2007.[3] In the United States, between 1992 and 2006, bicycle sales have increased from 15.3 million to 18.2 million per year (an increase of roughly 20 percent)[4], [§], illustrating an increase in cycle use there. While cycles enjoy the greatest share of transit options within campus towns, several major towns and cities such as Portland, Oregon, are continually improving cycling infrastructure to encourage cycling.[5] Moreover, anticipating consumer demand, General Motors has developed the Flex-Fix® system,[6] a retractable bicycle rack that is hidden in a car's bumper. These changes in bicycle usage and provision have been influenced in recent years by the following:

- Increased awareness of the detrimental effect of automobile carbon dioxide emissions, and pursuit of air quality and emission reduction targets
- Concerns over growing traffic congestion and accompanying noise pollution
- Rising levels (and fear) of obesity and heart disease
- Recognition that most trips are relatively short, or "bike-sized" [§§]
- Savings in road maintenance and improvement of street infrastructure
- Responses to policies such as charging fees to alleviate traffic congestion.

Several studies suggest that fear of cycle theft may discourage bicycle use,[7] and that many bicycle theft victims do not buy a replacement.[8] Combating bicycle theft, therefore, is a necessary step toward increasing the use of this sustainable form of transport, an increase that unexpectedly may also improve cyclist safety. To elaborate, a recent international

[§]According to the National Bicycle Dealers Association, in 2006 the United States bicycle industry was estimated to be valued at $5.8 billion.

[§§]Gardner (1998) uses the term "bike-sized" to refer to the relatively short average urban-trip distance. For example, the U.S. Department of Transportation found that in metropolitan areas, 49 percent of all trips are shorter than 3 miles, 40 percent are shorter than 2 miles, and 28 percent are shorter than 1 mile.

§Using data collected from a range of sources, the Transportation Alternatives web site estimates the figure to be much higher, at more than 5 million per year (www.transalt.org/press/magazine/965SepOct/06-7you-lock.html).

review of programs to encourage walking and cycling found strong evidence indicating that as the number of cyclists and walkers increased, the frequency of collisions between those groups and motorists actually decreased. The authors concluded that an effective means of improving the safety of cyclists and walkers is therefore to *increase* the numbers of people cycling and walking.[9] Despite this, little attention has been paid to the prevention of bicycle theft. Car theft has received much more attention, for example, yet according to data collected as part of the International Crime Victim Survey, for all countries for which data were available (including the United States), bicycle owners are far more likely to have their bikes stolen (4.7 percent) than car owners their cars (1.2 percent) and motorcyclists their motorcycles (1.9 percent).[10]

Bicycle Theft Data

Understanding the problem of bicycle theft is hampered because police data typically underrepresent the problem. This is illustrated by data from the International Crime Victim Survey (2000), which show that across the 17 countries surveyed (including the United States), on average only 56 percent of bicycle thefts were reported to the police.

U.S. crime statistics are collated using both National Crime Victim Survey (NCVS) data from a yearly national survey, and data recorded by the police. Comparing the two data sources highlights the problem of underreporting. For example, in 2004, bicycle theft accounted for 3.6 percent of all incidents of larceny (Federal Bureau of Investigation, 2005), which equates to more than 250,000 bicycles stolen each year. According to an estimate from the NCVS, in 2006 the number of incidents of theft-of or theft-from bicycles was more like 1.3 million (just under 2.5 incidents per minute).§ This suggests that for every crime reported, another four (or more) may have occurred.

Interviews with bicycle theft victims indicate that underreporting is largely due to victims' belief that the police are not interested in bicycle theft and cannot do anything about catching the offender and returning the stolen bicycle.[11] A further reason for an underrepresentation of the problem is that police departments record bicycle theft in different ways that, however inadvertently, may serve to conceal the full scope of the problem. For example, police may record a bicycle theft as a burglary from a residential property.

Clearance Rates

Clearance rates for bicycle theft remain consistently low. In the United States, 18.3 percent of incidents of larceny-theft were cleared by arrest,[12] but this figure (which includes all categories of larceny) is likely to be a gross overestimate of the arrest rate for bicycle theft. For example, in Sweden, only 1 percent of bicycle thefts are cleared by arrest.[13] One reason for this is that there typically exists little relationship between the victim and the offender, and hence it is difficult to identify suspects.[14] Bicycle theft is also largely a crime of stealth, or one that goes unnoticed or unchallenged.[15] A further problem is proof of ownership. As will be discussed below, even when crimes are reported to (and recorded by) the police, the majority of bicycle owners cannot supply sufficient details to assist in an investigation. As a consequence, even when an offender is detained for cycle theft, if the owner cannot provide proof of ownership for the retrieved cycle, then the suspect may be released without charge and may be given the stolen bike on release. Addressing the proof-of-ownership problem is important to alleviate storage costs for recovered bikes and improve the process of bicycle identification, recovery, and reunification with legitimate owners. Attempts to address this are documented in the "Responses" section below.

Offenders

Not all bicycles are stolen for financial gain. Some offenders may take a bicycle simply to get from one place to another, and then abandon it. Research suggests that the motivations of bicycle thieves can be categorized in the following way:[16]

- **To joyride** — those who steal any type of bicycle for transportation and/or enjoyment. These offenders generally abandon the stolen bicycle after use. Younger offenders (16 and under) typically fit this group.[17]
- **To trade for cash** — those who exploit easy opportunities to steal any type of bicycle and trade it for cash or goods (such as drugs).§
- **To fill a request** — those who steal specific types of bicycles to order.§§

Understanding what types of offenders steal bicycles in your area can inform your approach to crime prevention. Unfortunately, low clearance rates for this type of crime make it difficult to gather detailed information on active bicycle thieves. Available evidence does indicate, however, that the majority of offenders are male and below the age of 20.[18] Moreover, an examination of the frequency with which bicycles are abandoned can provide useful insights into offenders' motivations. For example, in a bicycle theft study in Ellensberg, Washington, police recovered 25 percent of stolen bicycles, suggesting that around 25 percent of bicycles were probably stolen by "joyrider" offenders.[19] In a Dayton, Ohio, police initiative, the problem was reversed, with approximately 80 percent of stolen bicycles being recovered, suggesting that many more offenses were committed for the purposes of transportation or enjoyment than for financial gain.[20]

§ Interviews with drug-addicted bicycle thieves in Holland found that bicycle theft is often a source of income for drug purchases (van Kesteren and Homburg 1995).

§§Interestingly, Nuttall (2001) suggests volume offenders are undeterred by bicycles locked together, and often will steal the attached bicycles and remove the chain later.

It is important to be aware that victims and offenders may not always represent distinct groups. For example, studies suggest that victims of bicycle theft sometimes either steal bicycles themselves to compensate for their loss, or knowingly buy bicycles that are themselves stolen.[21] This type of pattern illustrates a concept referred to as a *crime multiplier,* whereby one offense leads to the commission of several others. These offenses may include the fencing or receiving of stolen goods. Thus, a single bicycle theft does not necessarily equate to one offense, but may lead to a series of related crimes.

§See Problem Solving Tools Guide No. 6, *Understanding Risky Facilities.*

Recovery Rates

As noted above, not all stolen bicycles are sold for financial gain. The police recover many of them. Nonetheless, few recovered bicycles are returned to their rightful owners, often because of the proof-of-ownership problem. Surveys indicate that most cyclists do not know their bicycle serial number, nor can they provide legal evidence of bicycle ownership, such as a purchase receipt.[22] As a result, the police cannot return many recovered bikes to their owners and, instead, store them until they can be checked as roadworthy and donated to charity or sold at auction. This can occupy police time and storage facilities that could be better used.

Where Does Bicycle Theft Occur?

The location of bicycle theft varies, with each location requiring separate analysis to best inform your response. Common locations include the following:

- In and around the victim's home
- In and around the victim's workplace
- In public space, such as bicycle-parking facilities
- At risky facilities§ like university campuses and railway stations.[23]

Research indicates that most bicycles reported stolen are taken from on or near the premises of the victim's home (including garages and sheds),[24] or from outside of shops or recreational facilities.[25]

Bicycle theft is not limited to such locations and will vary across different locales. For example, a study conducted in Belgium reported that almost no bicycles were stolen from the victims' homes.[26] For this reason, careful analyses of bicycle theft locations are required to determine whether your local problem clusters around certain risky facilities.[27] Two such facilities often cited are university campuses and transit system hubs.[28] At university campuses, which often contain long-stay domiciliary parking, it is likely that there will be a large proportion of high-performance and expensive bicycles that attract bicycle thieves.[29] Railway stations, although less common in the United States than in Europe, have similarly been found to attract or generate bicycle-related crime. Data the British Transport Police collected showed that theft and damage to bicycles had risen by 67 percent between 1999 and 2005. All other forms of theft and criminal damage at railway stations had fallen over the same period, indicating that the growing problem of bicycle theft at these locations was not part of a more general trend.[30] This has potential implications concerning the public use of such transit systems, as research indicates that victimization and fear of crime are major detractors from the use of public transit.[31]

In the United States, other types of public transit terminals (e.g., subway stations) may equally attract bicycle theft, and riders should be alert to this possibility. Public transit nodes may merit particular attention simply because commuters' routine activities mean that they are likely to park cycles in or around such facilities for long periods throughout the working day, leaving them unattended and hence vulnerable

to theft. More generally, determining which sites account for a disproportionate amount of your local problem will allow you to better define your problem and implement a more targeted and effective response.

Repeat Victimization§

Unlike research concerned with other types of crime such as burglary,§§ few studies have considered the extent to which cycle-theft victims are repeatedly victimized. A Dutch survey[32] found that across a range of crime types, including burglary, assault, and bicycle theft, victimization rates were highest for bicycle theft, and prior victimization was associated with the likelihood of further incidents of bicycle theft. Data generated by a small survey conducted in Melbourne, Australia, are also informative.[33] A simple reanalysis of the data revealed that 30 percent of the bicycle-theft victims interviewed accounted for 60 percent of the crimes reported; that is, a small number of victims accounted for a large proportion of the problem.

When police identify repeat victimization as a problem in an area, they can usefully focus crime reduction efforts on those people who have recently been victimized a number of times. Determining why such people are repeatedly victimized can provide insight about your local problem and about possible solutions. Thus, collecting suitable data to enable you to identify repeat victimization will help you to understand your local problem better.

§See Problem-Solving Tools Guide No. 4, *Analyzing Repeat Victimization.*

§§See Problem-Specific Guide No. 15, *Burglary of Retail Establishments,* and No. 18, *Burglary of Single-Family Houses.*

§More details of this study are available from the authors upon request.

Extending this concept, research concerned with other types of crime such as burglary (in the United States and elsewhere) and vehicle crime shows that following a victimization at one location, not only is the same victim at an elevated risk in the near future, but so too are others nearby.[34] This research is important because it provides further insights into when and where crimes are likely to occur. In the absence of research of this kind concerned with bicycle theft, we conducted an analysis for this guide using police data for the county of Dorset, England. The results were consistent with those for burglary and vehicle crime, indicating that when a bicycle is stolen from one location, further incidents are more likely to occur nearby and up to a distance of about 450 yards for a period of around 3 to 5 weeks.§ Such findings, where they exist, can help inform crime prevention and detection strategies.

Perpetrator Techniques

Offenders use a number of techniques to steal bicycles. The technique an offender uses will often be directly linked to the cyclist's locking practices (i.e., the type of lock the cyclist uses and the way he or she applies it). When the bike is unlocked or poorly secured, little skill is required. Some common perpetrator techniques used to steal locked bikes are described here. A one-page summary of these and the locking techniques that cyclists can use to counteract them can also be found at www.bikeoff.org.

Lifting—Thieves lift the bike and lock over the top of the post to which the bike is secured. If it is a signpost, then the thieves may remove the sign to lift the bicycle clear. Sometimes the post itself is not anchored securely and can be lifted clear of the bike and the lock
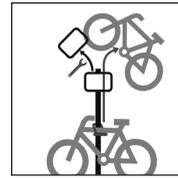
Levering—Thieves will use the gap between the stand and the bike left by a loosely fitted lock to insert tools such as jacks or bars to lever the lock apart. Thieves will even use the bike frame itself as a lever by rotating it against the stand or other stationary object to which it is locked. Either the bike or the lock will break. The thief doesn't mind which—after all, it's not his or her bike!
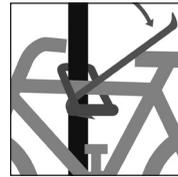
Striking—If a cyclist locks a bicycle leaving the chain or lock touching the ground, thieves may use a hammer and chisel to split the securing chain or lock.
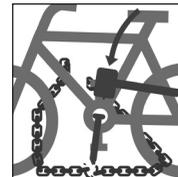
Unbolting—Thieves know how to undo bolts and quick-release mechanisms. If a cyclist locks a bike by the wheel alone, then it may be all that is left when the cyclist returns. If a cyclist locks only the frame, then a thief may remove a wheel or wheels. In this case, if a cyclist leaves a wheel-less bike with the intent of picking it up later, then the thief may return before the cyclist returns and remove the rest of the bike.
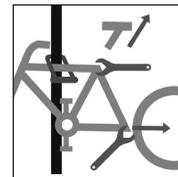
Cutting—Thieves are known to use tin snips, bolt cutters, hacksaws, and angle grinders to cut their way through locks and chains to steal bicycles.
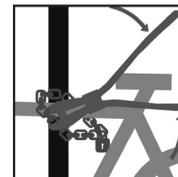
Picking—For locks requiring keys, thieves can insert tools into the keyhole itself and pick the lock open.

A consistent finding is that most stolen bicycles, regardless of theft location, are either not locked at all or are secured using a lock that requires little force to break or remove.[35] While it has been proposed that all locks can be overcome if the opportunity is present and the offender is suitably equipped,[36] it is clear that inadequate locking practices will create a situation conducive for the offender, and that observing more-secure locking practices should, at the very least, reduce opportunistic crime.§

§ Anecdotal evidence suggests that offenders use bolt cutters and nail guns, and some may even spray a solid lock with Freon, which essentially reduces it to a lump of ice that can be destroyed with the tap of a hammer (see Hendra 2001).

In cases where a cyclist locks only one part of the bicycle, an offender may exploit the opportunity to steal the rest of the bike (an example of such locking practice is shown below). At the University of Wisconsin (1991), for example, for 22 percent of cycle thefts, only the lock and secured wheel remained at the crime scene.[37] This is important to consider because research suggests that offenders often strip bikes for parts rather than sell them whole.[38] One offender reported that when selling stolen bicycles, he would get 10 percent of the list price for a whole bike, but 25 percent of the list price for individual parts.[39] So stealing only parts of a bike may require the least effort and, if the right parts are stolen, attract similar rewards to stealing the whole thing.

Shane Johnson

Example of a bicycle locked using only the front wheel.

Factors Contributing to Bicycle Theft

The following section outlines factors that contribute to bicycle theft. Understanding these factors will help you frame your local analysis questions, determine good effectiveness measures, recognize key intervention points, and select appropriate responses.

§*Bike Thief*, Neistat Brothers, New York, 2001.

The CRAVED Bicycle

Bicycle theft is a good example of an opportunistic crime. Some of the reasons for this are encapsulated by the acronym CRAVED, which outlines why bicycles are attractive targets for theft.[40] Bicycles are the following:

Concealable—Most thieves will look inconspicuous riding away on a stolen bicycle, which effectively makes the crime concealable. In addition, offenders steal many bikes from public places where passersby conceal the theft, as illustrated in the film Bike Thief, which explores cycle theft in New York City.§

Removable—If poorly locked, bicycles are easy to take and ride away. In other cases, quick-release features such as wheels or seat posts that are not appropriately secured require little effort to steal.

Available—Increased bicycle ownership and use provides more opportunities for theft and a greater demand for bicycles and replacement parts. In addition, poor locking practices by cyclists ensure a constant supply of available targets.

Valuable—Bicycles are not cheap. The average cost for a mountain bike ranges from $330 to $400,[41] with some costing thousands of dollars.[42] In the Ellensburg study, it was found that police were less likely to recover expensive bikes than to recover cheaper ones.[43]

Enjoyable—Many thieves steal a bike simply because they want one. This may be to replace one that was stolen from them, or just for pleasure. Analysis of British Crime Survey data showed that the risk of theft for "sporty" bicycles such as mountain bikes or BMXs was twice as high as that for "ordinary" bicycles.[44]

Disposable—Thieves can easily sell stolen bikes, either "whole" or "piecemeal," to a fence or through other outlets (such as online auctions). Evidence suggests many thieves want to sell stolen goods quickly to reap a financial profit.[45] Abundant "buyer's" markets for stolen bikes may therefore provide an incentive to steal. Regrettably little is known about the market for stolen bicycles, but the proof-of-ownership problem suggests few bicycles could easily be identified as stolen, which aids the sale of stolen bikes and reduces the risk of apprehension and identification. Moreover, offenders can disguise stolen bicycles by painting different parts, altering components, or scratching any property-marking etchings, making positive identification harder.[46] One prolific offender reported that bicycles or parts may be stolen to order, but systematic evidence of this is unavailable.[47]

Consideration of the CRAVED acronym can help to identify potential intervention points—particularly the mechanisms by which a proposed response is intended to work. This is discussed further in the "Responses" section.

Parking

The term "parking" refers to bicycles' being left unattended. The "parking" event is described by the following combination of factors which influence the risk of theft:

- Lock type (if any)
- Locking practice (how a cyclist applies a lock)
- Flyparking
- Parking furniture (what a bicycle is locked to)
- Parking environment (situational considerations relating to the site where the parking furniture is located).

Lock type. Research on motor vehicle theft[48] demonstrates the crime-reduction effects of improved locks, particularly immobilizers. While it is uncommon for security features to be integral to bicycle design (for a welcome exception, see the Puma bike below), locks may reduce the vulnerability of parked bikes. The type of lock a cyclist uses is paramount. Weak locks are unlikely to deter offenders, so it is important to determine whether the types of locks victims of bicycle theft typically use could be part of the problem. For example, as part of the work one of the authors is conducting, visual audits of a series of areas in the United Kingdom revealed that cyclists were using locks that were of very poor quality and easily removable.

§Designed by Adam Thorpe, Joe Hunter, and Jens Martin Skibsted, the Puma bicycle has two integral features that facilitate secure parking. First, the bicycle can be folded, allowing both wheels and the frame to be secured. Second, the diagonal section of the bicycle frame is made from steel wire rather than metal tubing. This is so the wire can be detached from the upper part of the frame, threaded through the wheels, and then locked to secure the bike. If cut, the bicycle's structural integrity is compromised, rendering the bicycle unusable.

Puma bike with integrated lock.§

By current standards, a lock is considered "secure" if it can withstand an attack lasting 3 minutes or more by a thief using readily available hand tools.§ Some robust locks are sold with insurance guarantees for the bicycles they secure. Different types of locks are vulnerable to different theft-perpetrator techniques. For maximum security, cyclists are advised to use two locks of different types. This means that a would-be thief must use two different tools to "break" the locks, thereby increasing the associated effort. Determining whether cyclists in your area use poor locks may inform intervention approaches. Appendix B lists several generic lock types that are readily available and currently in use.

§Evaluation of lock security is available online at www.soldsecure.com.

Locking practice. Research has shown that there are 180 possible locking configurations to secure a traditional two-wheeled bicycle to a standard Sheffield or "∩" shaped bicycle stand (a design commonly used).[49] Defining "secure locking" as the application of an appropriate lock or locks to secure a bicycle's wheels and frame to a stand, the researchers found that 109 of these combinations were categorized as "bad" or insecure, 48 as "OK" or semisecure, and just 23 as "good" or secure.

In the same study, observations of around 8,500 London bicycle-locking events found that in 87 percent of cases, cyclists used only one lock, 19 percent locked only their frame to the stand, and just 20 percent locked them in a way considered "secure." Similar results have been reported elsewhere.[50] Such findings indicate that the use of adequate locks *alone* may be insufficient to prevent bicycle theft if application of those locks is generally inadequate. It is hence wise to conduct visual audits of cyclists' locking practices to see if they are locking their bikes appropriately.

§Note that not all cycle stands are designed the same way, so care needs to be taken when selecting street furniture.

Flyparking. Bicycles may be "flyparked," the term coined by Adam Thorpe to describe the securing of bicycles to street furniture not intended for that purpose. Cyclists may flypark bicycles to railings, lampposts, parking meters, benches, street signs, and even trees.[51] Flyparking is important for understanding your local problem, for several reasons. First, street furniture not designed for bicycle parking will not be fit for the purpose. For example, if a cyclist locks a bicycle to a signpost, it is likely that he or she will secure only one part of the bicycle, and in many cases the bicycle will therefore be easily *removable*. Flyparked bicycles may therefore be at greater risk than those secured to street furniture designed with crime prevention in mind.§ Indeed, in Camden, London, local police data indicate that of all bicycles reported stolen between 2004 and 2005, 72 percent were flyparked.[52]

Flyparking may be seen as an indicator of insufficient or inadequate bicycle parking provision. Provision, however, should not be thought of solely in terms of the number of parking spaces available. Research suggests that if parking is more than 150 feet from the destination it is intended to serve, then it is more likely to be underused.[53]

Examples of flyparking taken from <u>www.bikeoff.org</u>.

Further to the design and location of bicycle parking, maintenance is important. Research suggests that damaged or abandoned bikes or locks left around stands may signal offenders as to where it is safe to steal (the broken bike effect).§,54 Cyclists are also less likely to park their bicycle near damaged or abandoned bicycles or stands, which can lead to an increase in proximate flyparking. For these reasons, it is worth reviewing bicycle parking facilities in your area to see if they are being properly maintained. Where they are not may suggest a point for intervention.

§This refers to the similar effect proposed in the broken windows theory (Kelling and Wilson 1982).

Parking furniture. In public spaces, cyclists may park bicycles against a bicycle stand designed and provided for that purpose. These stands typically offer greater security. There are numerous stand designs available for installation. Choosing the appropriate type of bicycle-parking furniture requires accurate understanding of the local context of *use* and *abuse*. When considering parking facilities or reviewing the adequacy of those currently provided, there are many factors that you should consider (e.g., type and design of stand, provisions for short- and long-stay users, location, and interstand spacing). Instead of listing here all the factors that you might consider, the authors recommend interested readers review a series of standards that summarize what current research suggests are important, available at www.bikeoff.org.

§Zhang, Messner, and Liu (2007) found a lack of guardianship around the home significantly increased the risk of bicycle theft in urban China.

Parking environment. Parking environment describes the context surrounding the bike-parking furniture provided, including considerations such as the following:

- Access
- Length of stay
- Lighting
- Surveillance
- Guardianship§
- Signage regarding appropriate use of the facility and locking practices
- Maintenance and servicing.

Bicycle theft-prevention measures may include alterations or adaptations to any of these features of the wider parking environment. Routine Activity Theory[55] and the associated crime triangle, which consider how the convergence in time and space of motivated offenders, suitable targets, and the absence of capable guardians influence the likelihood of crime, may provide a useful framework for analyzing the likely contribution of these different factors and how you could manipulate them.

For example, ensuring that supply of bicycle parking meets demand (in terms of location, number of spaces, and level of security) means that suitable targets may be reduced (e.g., fewer flyparked bicycles), and police agencies can better target crime-prevention measures and promote good locking practice (as well as potentially save time removing bikes that are parked where they shouldn't be!). The provision of appropriate bicycle parking does not rest solely with the police, but rather with town planners, architects, and related agencies. Planning for the provision and installation of bicycle parking therefore requires consultation with such parties.

Policy Changes

Policy changes (government or otherwise) can affect cycle use and the opportunities for bicycle theft. For example, to encourage cycling in New York City, around 500 bike racks are being installed per year as part of the city's plan to have 600 kilometers of bike lanes operational by 2009.[56] Policy-driven measures such as traffic congestion fees, recently implemented in London to reduce the number of cars on the road, may increase cycle use and hence the population at risk of theft. Such measures are currently being discussed as possibilities for use in U.S. cities.[57]

As a different kind of example, a U.K. rail provider has prohibited bicycles from being taken on board trains, which may result in an increase in cycle parking (including flyparking, if demand outstrips provision) at train stations, and hence increased opportunities for cycle theft. Conversely, certain buses are now fitted with bicycle racks to encourage the use of cycles along with bus transport. Moreover, many communities have invested heavily in bicycle paths to promote cycling and reduce automobile dependency.[58] Awareness of such measures and anticipation of the potential effects on crime may assist in proactive bicycle-theft prevention.

Seasonal Effects

Bicycle use and bicycle theft can exhibit strong seasonal patterns, depending on the particular area and users.[59] In the United States, bicycle theft generally peaks during the warmer months of June, July, and August, with usage in August almost doubling that in December.[60] It is important, however, to be aware of local differences in understanding your local problem. For example, the university town of Cambridge, England, where cycling is very popular, witnessed a large peak in bicycle theft in October, which exceeded that expected on the basis of general seasonal trends.[61] This rise coincided with the start of term for students at the University of Cambridge. Similar patterns are observed at U.S. universities.[62] You can gain knowledge of the disproportionate rate of bicycle theft in different months and places by analyzing local police data, and then can better frame an effective response in terms of where and when to implement a crime reduction scheme.

Understanding Your Local Problem

The information provided above is only a generalized description of bicycle theft. You must combine the basic facts with a more specific understanding of your local problem. To enable you to design an effective response, you will likely need to analyze local data carefully.

Your local bicycle theft problem can take many forms, and you will need to determine the specific nature of the problem to produce an effective response. It may be limited to, or a combination of, thefts from in or around victims' homes; thefts from public spaces; or thefts from particular areas such as university campuses or transit hubs.

Knowledge of the location, facilities available, and types of bicycles stolen will aid in identifying conditions that might contribute to the problem. Clues as to how thieves steal bikes may be apparent from locks found at the scene of thefts, CCTV footage, and related offenses.

This knowledge can also help you identify who is committing the offenses, and why. For example, where the quantity of stolen cycles recovered is high, a high proportion of offenders are probably joyriders. Preventive efforts for such offenders will differ from those for offenders who sell bicycles on (acquisitive/volume offenders). Such analyses may be possible only if you systematically collect data (for example, it may be necessary to distinguish between burglaries in which bicycles are stolen and those in which they are not). Ensuring the systematic recording of bicycle thefts will allow for better analysis and subsequently better targeted

responses to your local problem. Alternatively, you may need to collect or identify new data sources. For example, alongside observational research, consulting with bicycle theft victims may help to reveal specific problems that you would not otherwise identify.

Stakeholders

In addition to criminal justice agencies, the following groups have an interest in the bicycle theft problem and should be considered for the contribution they might make to gathering information about the problem and responding to it:

• Elected and appointed local government officials
• Community planning organizations
• Traffic engineering departments
• Street-furniture designers
• Bicycle clubs and networks (including bicycle theft victims)
• Bicycle and bicycle-part retailers
• Insurance companies
• Large employers
• Transport providers
• Large educational establishments.

Asking the Right Questions

The following are some critical questions you should ask when analyzing your particular bicycle theft problem, even if the answers are not always readily available. Your answers to these and other questions will help you define your local problem and choose the most appropriate set of responses later on.

The Nature of Bicycle Theft

- Are bicycle theft data recorded in a way that aids analysis of your local problem?
- What are the type and quality of locks being used?
- Had bicycles been locked when stolen? If so, how?
- Does locking practice vary by location (e.g., at home and public spaces)?
- To what are bicycles locked? Are bicycles stolen from residential locations secured to anything at all?
- What happens to bicycles once they are stolen? Are they sold illegally? If so, who is buying them? Are they stripped for parts? Are they abandoned?
- What perpetrator techniques are common? Do they differ across locations?
- What current preventive measures are ineffective? (See "Measuring Your Effectiveness" below).
- How soon are recovered bicycles found?
- How damaged are recovered bicycles?
- How many bicycle thefts are unreported, and why?
- How concerned is the local community about stolen bicycles?
- What types of bicycles are thieves stealing (a standard typology such as the one below may help in answering this)?

A typology of bicycles (www.bikeoff.org).

Locations and Times

§For example, at London's Walthamstow train station, secure cycle-parking facilities were installed on a site on the opposite side of the train track to the ticket office. This was accessible only via a bridge and resulted in commuters' continuing to flypark their bicycles to railings outside the ticket office entrance, with the new facility being underused.

§§ Zhang, Messner, and Liu (2007) found that in the Chinese city of Tianjin, people living in row houses were less likely to be bike theft victims than those living in apartment buildings.

- Where is your local bicycle theft problem located? In the victims' homes? Workplaces? Certain streets? On-street versus off-street parking? Risky facilities? General hot spots (such as downtown areas)?
- Where hot spots are identified, why are these locations at high risk of bicycle theft? Lack of secure parking? High levels of flyparking? A lack of capable guardians informed and empowered to act?
- Which places in particularly risky areas are at the greatest risk? On a university campus, for example, is it the gym? Library? Dormitories? Particular classroom buildings?
- How prevalent is flyparking at different locations? Are parking facilities sufficient for cyclist demand? Are parking facilities located in the wrong places?§
- What types of houses or apartment buildings do thieves target for bicycle theft? Detached or row homes? One-story, or two-story? Large or small apartment buildings? (Visual surveys of victimized houses and apartments will help you answer these and other questions.)§§
- Do theft rates vary across cycle-parking facilities? If so, how, and what factors might contribute?
- Which groups are the principal users of the facilities? Workers? Shoppers? Young people? Students?
- Is lack of natural surveillance (guardianship) a factor?
- Where are recovered bicycles found?
- When do thefts mainly occur (time of day, day of week, month)?
- Are there local seasonal variations in bicycle theft?

Offenders§

- What kinds of offenders are involved? Joyriders? Acquisitive/drug addicts? Professionals?
- What do you know about the offenders? Are they local?
- Do offenders tend to work alone? Does this differ by offender category?
- Do bike thieves know their victims?
- Do bike thieves operate in the same location?
- Are stolen bicycles being sold in your local area?

§See Problem-Solving Tool Guide No. 3, *Using Offender Interviews To Inform Police Problem-Solving.*

Victims

- Whom does bicycle theft harm (e.g., cyclists, business owners)?
- What is known about bicycle theft victims (e.g., their routine activities, demographics, cycle use, prior victimization)? What forums are available to glean this information and engage with victims?
- What form of transportation do victims use after thieves steal their bicycles? Do they buy a new bicycle? Use a different form of transportation?
- Does victimization change a victim's cycle-related behavior? Locking practice? Parking location?
- Do cyclists see publicity regarding secure cycle practice? If so, where? Do they think current publicity is useful?
- Under what circumstances do thefts occur? Is victim behavior a contributory factor, such as leaving bicycles unsecured and visible/accessible?

Current Responses

- What types of bicycle-parking facilities are available? Are they maintained?
- Is there an active bicycle registration procedure? What percentage of reported stolen bicycles are registered?
- Is anything being done about abandoned bicycles (the "broken bike effect")?
- Is anything being done about flyparked bicycles?
- What proportion of stolen bicycles are recovered?
- What proportion of recovered bicycles are returned to their rightful owners?
- What proportion of offenses result in an arrest?
- What are the typical legal consequences for convicted bicycle thieves?

Measuring Your Effectiveness

Measurement allows you to determine to what degree your efforts have succeeded, and suggests how you might modify your responses if they are not producing the intended results. You should take measures of your problem *before* you implement responses, to determine how serious the problem is, and *after* you implement them, to determine whether they have been effective. All measures should be taken in both the target area and the surrounding area to provide you with control data against which to compare your intervention data. For more detailed guidance on measuring effectiveness, see the Problem-Solving Tools Series guide, *Assessing Responses to Problems: An Introductory Guide for Police Problem-Solvers.*

The types of measures considered will depend on the particular problem to be tackled and the type of intervention to be implemented. For example, if part of the aim of an intervention is to change cyclists' locking practices, then in addition to measuring what was implemented (process measures) and any changes in bike theft rates (outcome measures), a useful intermediate measure would be the degree to which cyclists' locking practices have changed as a result of intervention. If the locking practices do not change over time, then you cannot attribute any reduction in crime observed to locking practices. Only by measuring changes in this type of behavior would you be able to come to such conclusions and understand what it was that led to the (un)desired outcomes.

To measure potential success, you should establish the following measures.

Process Measures

- What was implemented?
- Where was it implemented?
- When was it implemented, and with what intensity (e.g., how many stands were installed, or how many bicycles registered with a registration scheme)?
- Which stakeholders were involved in implementation? Did they achieve their specified objectives?
- If publicity was used (e.g., to encourage cyclists to lock their bikes more securely), then how was the information communicated (e.g., posters, news articles, radio broadcasts)? How widely was it distributed?

Intermediate Outcome Measures

- Increased use of bike-parking facilities
- Degree to which any publicity used reached the target audience (e.g., measured by a cyclist survey relating to the implemented response)
- Improvements in cyclists' locking practices
- Reductions in flyparking
- Reductions in the number of unoccupied stands in public places
- Reductions in the number of abandoned bikes found in parking facilities
- Reductions in the number of calls to remove damaged or abandoned bikes
- Reductions in the number of damaged, abandoned locks
- Increased reporting of thefts to police (if bicycle theft is heavily underreported)
- Changes in perpetrator techniques
- Some types of intervention may encourage cycle retailers to report useful information, and so you should consider changes in information flow when relevant. Although there may be no legal duty for retailers to contact the police about damaged or stolen cycles, they may be able to provide a rich source of data concerning your local problem, including who is stealing the bicycles or why they may be targeting particular types of bike.

Ultimate Outcome Measures

- Reduced theft reports to police
- Reduced theft reports to place managers (e.g., university officials or apartment managers)
- More favorable perceptions of safety/security among bike users
- Reductions in repeat victimization
- Increases in the number of bicycles recovered
- Increases in the number of recovered bicycles that are returned to their rightful owners
- Increases or reductions in the number of bicycles stolen in nearby areas (Bicycle theft may be displaced, causing a rise in nearby areas or facilities or, conversely, a diffusion of benefits may occur, whereby bicycle theft is reduced in surrounding areas or facilities)
- Improvements in victim perception of police handling of bicycle theft (measured by victim surveys in relation to implemented responses)
- Reduced value of reported stolen bicycles (which might indicate that more-valuable bicycles are being better protected).

One potential problem with using crimes reported to the police as a measure of the effectiveness of interventions concerns the underreporting discussed earlier. For example, it is possible that following police intervention or a publicity campaign, victims will be more likely to report crimes to the police. On the one hand, this is a good thing and will facilitate a better understanding of the crime problem. On the other, it may create the illusion that bicycle theft has increased, when the reality may be that it has not (it may even have decreased). Instead, the intervention activity has led to an increase in victims' willingness and likelihood to report crimes to the police. Two ways of examining this issue are as follows:

1. Ask victims who report bicycle theft if they are aware of any interventions. If they are, ask if they would have reported the crime if they had not been. While imperfect, this approach may provide some indication of the extent to which an intervention has influenced reporting levels.
2. Try to identify potential parallel reporting measures. For example, for some time before intervention (to establish a baseline reporting rate), it may be possible to conduct surveys in local bicycle shops to find out how frequently customers have mentioned that their bicycles (or cycle components) have been stolen. If you ask bicycle shop staff to record such information, then you may persuade them to keep details of reports made. Such an exercise may be beneficial for reasons other than the evaluation of interventions. For instance, it may provide useful intelligence on related criminal activity and, by demonstrating that police consider bike theft an important issue, enhance community relations.

Responses to the Problem of Bicycle Theft

Analysis of your local problem should give you a better understanding of the factors contributing to it. Once you have analyzed your local problem and established a baseline for measuring effectiveness, you should consider possible responses to address the problem.

The following response strategies provide a foundation of ideas for addressing your particular problem. These strategies are drawn from a variety of research studies and police reports. Several of these strategies may apply to your community's problem. It is critical that you tailor responses to local circumstances, and that you can justify each response based on reliable data analysis. In most cases, an effective strategy will involve implementing several different responses. Law enforcement responses alone are seldom effective in reducing or solving the problem. Do not limit yourself to considering solely what the police can do; carefully consider whether others in your community share responsibility for the problem and can help police better respond to it. (For more detailed information on shifting and sharing responsibility, see Response Guide No. 3, *Shifting and Sharing Responsibility for Public Safety Problems.*)

What follows is intended to provide an overview of the types of intervention that have been implemented to reduce bicycle theft, the crime reduction mechanisms through which they could operate, and the lessons associated with their implementation. This should help you consider what might be appropriate in your area and help identify some of the issues associated with the implementation of such interventions. In some cases, the responses discussed may not have been subjected to rigorous evaluation, but are included to illustrate the range of tactics possible.

Locks and Locking Practices

§See Response Guide No. 5, *Crime Prevention Publicity Campaigns.*

1. **Educating the public about the use of effective bicycle locks and locking practices.** Of paramount importance for any strategy to reduce bicycle theft is increasing the awareness of, and providing the opportunity for, secure locking practice, whereby cyclists lock a bicycle's wheels and frame to appropriate parking furniture. It is important to ensure cyclists know what types of locks are available, which of those are recommended, and why. The security offered by different locks depends on how the lock is used, what it is locked to, and whether bicycle components are secured with quick-release fittings. It is recommended that cyclists use two locks of different types (and secure each to a wheel and the frame), as this will defend the secured bicycle against multiple theft techniques. For example, if a cyclist uses both a D lock and a chain lock, then a thief must apply both "levering" and "cutting" or "striking" to free the secured bicycle. Engaging with local cycle retailers and other relevant stakeholders can alert cyclists to which locks are best, where to get them, and how to use them effectively. In addition, the use of publicity at parking facilities may have a beneficial effect.§

A number of initiatives have been implemented that include publicity campaigns as part of a range of activities designed to reduce bicycle theft. For example, in response to a large bicycle-theft problem in Leuven, Belgium, a multitactic initiative was implemented in a collaboration among the police, university, and relevant municipal authorities. One element of this initiative involved publicity designed to educate cyclists. In particular, a *targeted publicity* campaign titled "Lock it or lose it" involved attaching cards to inadequately locked bikes, informing cyclists of how best to secure them. Leuven authorities claimed that, compared with the previous year, there was a 19 percent reduction in recorded bicycle theft during the first 6 months of the program.[63]

In a more recent study, researchers analyzed the effect of (directly targeted) publicity alone on cyclists' behavior. Between March and July 2006, cyclists' locking practices were observed at five bicycle parking sites across central London.[64] The observations focused on what types of locks were used, what parts of the bicycle were secured (one wheel, two wheels, frame, etc.), and what the bicycles were locked to (e.g., cycle stands, other street furniture). To evaluate cyclists' locking practices before the introduction of publicity, a typology of bad, OK, and good locking practice was devised. Cyclists' locking practices were then observed and logged at each site once a week for 3 weeks in March 2006.

In the first week of April, stickers that promoted secure (good) locking practices were placed in prominent positions on every bike stand at four of the sites. Placing the stickers on the stands themselves meant that cyclists would be likely to see the advice exactly at the point of securing their bicycles. Stickers were not used at the fifth site, so that any changes in locking practices where stickers were not used could be compared with those at places where they were.

The stickers used were brightly colored to attract cyclists' attention and, in addition to a short advisory tag line, contained a clear illustration of good locking practice. Depending on your local area, the use of illustrations may be more effective given that the intended audience may not necessarily all be able to read the same language.§ Moreover, a carefully designed image may convey the intended message more powerfully. The sticker used is shown below.

§For a broader discussion of language barriers and police practice, see Shah, Rahman, and Khashu (2007).
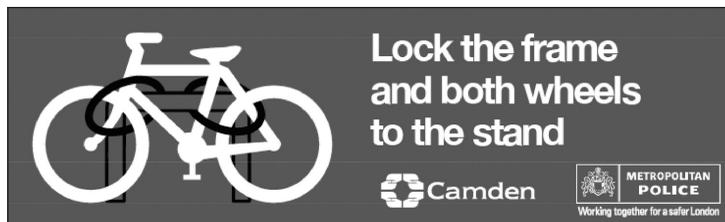
A secure-locking-advice sticker used in London (www.bikeoff.org).

Following the introduction of the stickers, researchers again observed locking practices at the five sites. The follow-up observations indicated that, compared with changes in locking practices at the control site, at those sites where stickers were used, bad locking practices decreased while good locking practices increased. While this intervention's impact on bicycle theft is unknown, the study indicates that publicity can influence cyclists' behavior, and this represents an intermediate outcome of a program that is inexpensive and easy to implement.

If analysis of your local problem indicates that the victims are a particular group, such as university students or schoolchildren, then any publicity campaign needs to be tailored to reach, and be applicable to, that group. In South Australia, for example, a police education program was set up in local schools and youth groups warning them of the increased risks associated with leaving bicycles unsecured. To inform adults, however, police used current Neighborhood Watch programs to raise awareness of the same risks.[65] Similarly, the University of Minnesota Police Department (UMPD) used a series of online media sources to best reach their intended audience, university students.[66]

Parking Facilities

2. **Reducing flyparking.** Flyparking (e.g., locking cycles to trees or street furniture) is common and can contribute to your local crime problem simply because flyparked bicycles are generally less secure than those locked to purpose-built facilities. Reducing flyparking can be achieved by adding additional appropriate facilities (see next section), but in some cases other effort may be required.

At the University of Minnesota, flyparking was identified as an issue, and a "booting" intervention was implemented to tackle the problem. Coordinated by the UMPD, during the first 2 weeks of May, police and two student security monitors issue warnings to cyclists who flypark bicycles. Thereafter, they fine owners of flyparked bicycles $34. Then they "boot"—lock with a bright orange U-lock—flyparked bicycles, and instruct their owners to contact a student monitor so that they can pay a fine to have the lock removed. The UMPD suggests that bicycle theft has fallen from around 350 incidents per year before intervention to fewer than 150 per year for the 2-year period afterward.[67]

John Kleberg

An example of a bicycle flyparked to a tree.

Further benefits of patrolling the campus this way are that student monitors act as capable guardians against crime, and actively engage with potential victims whose current parking practice is increasing their risk of bicycle theft victimization. Moreover, if abandoned bikes can be identified and removed as part of a strategy of this kind, it can reduce unwanted environmental signals that may encourage offending and discourage cycle use.

3. **Improving parking furniture.** The design and type of bicycle-parking furniture used is important not only from the perspective of how secure it is, but also because it can influence cyclists' locking practices. For example, for cyclists with only one lock, the design of the common Sheffield stand does not encourage them to lock the frame and both wheels (as recommended). An alternative, designed with secure locking practice in mind, is the M stand. The M design removes the opportunity for cyclists to lock the crossbar to the stand, forcing the user to apply a more effective locking practice, such as securing both the wheels and frame.

A recent evaluation examined the impact of bicycle stands such as those shown above on cyclists' locking practices.[68] Before intervention, researchers observed locking practices for 6 months at one site in central London. During this time, the only stands to which cyclists could lock their bicycles were of the traditional Sheffield design. After establishing a profile of locking practice before intervention, six new prototype stands, each designed to promote more-secure locking practices, were installed at the site. Following installation, researchers again observed locking practices. Analysis revealed that locking practices were significantly better for the new stands compared with the Sheffield stands (e.g., cyclists were more likely to lock the frame and both wheels), irrespective of the particular designs, although some designs appeared to encourage better locking practice more than others. Researchers did not measure this intervention's impact on bicycle theft, but the study clearly indicates that changes in the parking environment can influence cyclists' behavior in a way that increases the effort associated with bicycle theft. This represents an intermediate outcome of the scheme.

John Kleberg

Sheffield stands make it difficult to lock the frame and both wheels with one lock.

M stand, which encourages secure locking practice (www.bikeoff.org).

The design or type of bicycle-parking furniture will be a particular issue in towns and cities where improvements in cycling facilities are under way, but is unlikely to be the responsibility of the police alone. It is therefore essential to work alongside stakeholders who have the necessary capacity to install appropriate bicycle-parking furniture, if the response to the local problem requires it.

4. **Increasing guardianship.** While natural surveillance may increase the visibility of bicycle theft, intervention by passersby is not guaranteed. Similarly, CCTV does not guarantee bikes' security, nor will it necessarily act as a suitable deterrent (for more information on CCTV generally, see Response Guide No. 4, *Video Surveillance of Public Places*).§ Informed, empowered, and motivated guardians such as security guards or other people with an ownership claim to the facility may provide effective guardianship, however.

For example, bike-rental facilities§§ or bicycle repair shops may be located at parking sites that would benefit from increased guardianship. Such facilities exist in several European cities (e.g., Leiden, Holland), although no published data are available to demonstrate their impact on bicycle theft. In Sint-Niklass, Belgium, a supervised bicycle shed was put up at the train station, and cyclists must subscribe to use the facility. A report suggests that over a 1-year period, no one has stolen a cycle from the facility, but there is, of course, an ongoing financial cost to staff this program.[69]

§In a project conducted in London, Thorpe (2007) found that on a site covered by three separate CCTV cameras, on average, thieves stole one bicycle per week. Moreover, over a 6-month period, police apprehended no thieves using this footage.

§§ Mayor Richard Daley is reportedly considering implementing a bike-rental system in Chicago similar to the self-service programs found in Paris (www.citymayors.com/news/metronews_americas.html).

Registration and Recovery

5. Using traditional bicycle-registration programs.
Bicycle registration schemes could reduce cycle theft in several ways. Cycle registration would make it easier to identify stolen bikes and to identify their rightful owners. It may also serve to deter bike thieves by making registered bikes harder to dispose of (e.g., sell).§

§ Car registration has been mandatory in most countries for some time, so a consideration of car registration's effectiveness may be instructive. In reviewing the evidence, Webb (2005) concludes that registration programs' potential effects on crime have been hampered by problems that include database inaccuracies and inadequate enforcement. It is possible that bicycle registration programs could experience similar problems without adequate consideration given to their implementation. Important to this kind of program are coverage and continuity. If records are not maintained or coverage is limited, then such programs are unlikely to have positive effects.

In Appleton, Wisconsin, a registration program was implemented as early as 1972. A total of 17,000 bikes were registered, and the police adopted an enforcement strategy that involved constructing a "hot" bike list and monitoring the serial numbers of bicycles parked in racks at junior high schools. They recovered 10 stolen bikes in this way and gained 15 convictions. Unfortunately, it is unclear from the published report over what period active enforcement took place, how intense it was, and whether there was an impact on bicycle theft.[70]

In Portsmouth, England, a problem-oriented policing project titled "Operation Mullion" aimed to reduce, among other things, bicycle thefts at a local school.[71] In conjunction with the local media and council, a bicycle-marking program was implemented at the school and in the surrounding area in the form of road shows. Bicycles were marked using ultraviolet pens or acid etchings, and a 24/7 telephone database was launched to enable cyclists to log details about themselves and their bikes. Though such measures were part of a package of responses, assessment indicated that reported cycle thefts at the school decreased by 39 percent in the year following the marking program. In addition, there was anecdotal evidence of a *diffusion of benefits*, whereby schoolchildren were taking the ultraviolet pens home and marking other property.

At Tufts University (Massachusetts), police implemented a sting operation to try to catch offenders involved in what was thought to be an organized bicycle-theft group. The operation resulted in four arrests.[72] These arrests were possible only because the police could identify the stolen bicycles' rightful owners.

In Dayton, 5,000 cycles were registered in 1998. Compared with the 2 previous years, police returned around twice as many recovered bicycles (38 percent) to their owners. Similarly, in Eugene, Oregon, police recovered 14 percent of stolen bikes that had been marked, compared with 5 percent of those stolen unmarked. In Cambridge, of the approximate 1,500 cycles police recover annually, they return about 300 to their owners. To increase the recovery rate, police post pictures of recovered cycles on a police web site.[73]

These reports suggest that registration programs may particularly help in returning recovered bicycles to their rightful owners. This can be useful for several reasons: it can reduce the number of recovered bikes that police must store (and investigate); it may reduce the cost of crime to the victims, as they will not have to replace recovered bicycles (unless they are damaged); and it can be a good public relations exercise in that the community can see that the police are doing something about the problem.

A potential shortcoming with cycle registration programs is that they are unlikely to prevent theft *from* cycles, as only the bicycle's frame is typically marked. Thus, if your local problem is not theft of bicycles, then cycle registration programs are unlikely to help. In addition, bicycle theft will be prevented only if offenders are aware of the program. Offenders will usually be in a hurry to steal a bike, and may consequently fail to notice bike markings that indicate the owner has registered

it. The overt marking of registered bicycles, therefore, is important if the aim of the intervention is to *prevent* cycle theft in addition to aiding the recovery and return of stolen cycles.

6. **Implementing an electronic tagging program**. A more recent example of a cycle marking and registration program that may make such strategies simpler to implement uses Radio Frequency Identification Devices (RFID), which are also widely used in the retail sector for tracing stolen goods and deterring thieves. At Ohio State University, a program called Bug-a-Bike™ provides cyclists with the opportunity to have a small RFID tag securely installed in the seat post of their bicycle, or fixed to the frame.[74] Striking labels are also fixed to the "bugged" bicycles to warn would-be offenders. Participating cyclists are required to submit their details to a web-based registry system linked to their unique RFID tag. This enables the bike to be registered to the owner, and if stolen, the police can identify the bicycle using an RFID reader.

Installing an RFID on bicycle frames is an important recent development that allows the bikes to be easily scanned and compared with a "hot list" of stolen bicycles; when RFID tags are installed in the seat post, the seat must be removed before scanning, which is likely to substantially reduce the practicality of the approach.[75] To date, Ohio State University's program has been successful in the sense that 547 cyclists have registered their cycles, recovered bicycles have been returned to their owners, and students seem to like it.§ The latter is important, as registration programs' effectiveness will be partly determined by their uptake.§§ A similar RFID program in Southend, England, has taken this approach one step further by implementing a stolen-

market-reduction initiative.[76] In this case, police provided RFID readers to local bicycle dealers who had agreed to check whether bicycles brought to them for sale or repair had been reported as stolen.[77] Although a systematic assessment of this intervention's impact on bicycle theft was unavailable at the time of writing,§ it illustrates the potential for new technology to enhance existing strategies. Potential problems with such interventions are that they depend on a reasonable degree of implementation to be effective, and that they are unlikely to affect the sale of stolen bicycle parts.

§ The authors of this work claim that, in one area, of the 2,600 bicycles tagged, only 7 have so far been stolen. However, they make no comparison with untagged cycles, so it is difficult to determine whether the intervention has had an impact beyond what one would otherwise have expected.

Offender Detection

7. **Setting traps to catch bicycle thieves.** In an attempt to detect bicycle thieves in the act, bicycles have also been used as "bait." In programs implemented in Spokane, Washington; in Gloucester, England; in Wirral, England; and at the University of Toronto, police fit a bicycle with a covert tracking system and leave it (insecurely) locked at a prominent location. If the bicycle is moved, local police officers are alerted and can track the stolen bicycle with the aim of catching the offender. This type of initiative can also aid in intelligence-gathering. For example, tracking the signal could provide insight regarding the offender's movements after the theft and potential locations of stolen goods and markets. Anecdotal evidence suggests that such interventions may increase arrest rates.[78]

Early feedback from practitioners involved in the Wirral program suggests that those caught stealing the bait bike are often prolific offenders wanted for more-serious offenses such as burglary. If this finding is generalizable, then the use of bait bikes may be a way to target prolific offenders through self-selection.[79] To elaborate, it is generally acknowledged that the most committed offenders are quite versatile in their

§ See Response Guide No. 6, *Sting Operations*.

offending, and hence commit a mixture of both minor and serious crimes. The utility of the self-selection approach is that the successful detection of less-serious crimes (in this case, the theft of a bait bike) may require minimal effort (police involved in the Wirral scheme report that they make at least one arrest every day that they use their bait bike), but can bring to police attention offenders who may be involved in more-serious offenses. These may be offenders of whom the police were not previously aware. The approach is thus one way of identifying potentially serious offenders, who select themselves for police attention as a consequence of their own behavior, averting the complications of targeting particular offenders using more ethically dubious methods of, say, offender profiling.

Consultation with government agencies may be necessary before adopting a bait-bike intervention because Belgium officials, for example, were particularly concerned with supporting what they saw as an incitement to theft.[80] Implementing such a program also requires thought about the evidential process. For example, would finding a person who had a bait bike be sufficient to convict him or her? It may be necessary to capture an offender on CCTV to show that he or she actually stole the bicycle rather than simply finding it abandoned, in which case the bicycle's location must be in clear view of operational CCTV or reliable witnesses. Finally, such a response has to follow in-depth scanning and analysis of your local problem, as implementing a bicycle trap may be less effective if your problem is theft *from* bicycles, or is unlikely to be the work of prolific offenders.§

Appendix A:
Summary of Responses to Bicycle Theft

The table below summarizes the responses to bicycle theft, the mechanism by which they are intended to work, the conditions under which they ought to work best, and some factors you should consider before implementing a particular response. It is critical that you tailor responses to local circumstances, and that you can justify each response based on reliable analysis. In most cases, an effective strategy will involve implementing several different responses. Law enforcement responses alone are seldom effective in reducing or solving the problem.

Response No.	Page No.	Response	How It Works	Works Best If…	Considerations
Locks and Locking Practices					
1	34	Educating the public about the use of effective bicycle locks and locking practices.	Informs cyclists about effective locks and how to use them properly.	…cyclists are not currently using secure locks or are not using locks properly. Cyclists should be encouraged to use two or more different types of locks and secure both the frame and wheels.	Information needs to be practical and clearly communicated directly to users and other relevant stakeholders. Carefully designed graphics on bike stands and products may grab cyclist attention and work better than text. This type of publicity should be specifically user-targeted.
Parking Facilities					
2	37	Reducing flyparking	Improves the location of existing public bike parking on the street; encourages cyclists to use secure street furniture rather than flypark.	… cyclists are flyparking many bicycles to street furniture or trees that do not provide adequate security.	Any relocation should meet cyclists' demands, but not inconvenience other users of the space who could act as guardians against crime.

Response No.	Page No.	Response	How It Works	Works Best If…	Considerations
3	39	Improving parking furniture.	Some facilities do not encourage or allow appropriate locking practices. If such facilities are replaced or altered, then locking practices should improve.	… it is combined with educational and promotional activities to inform users about secure locking practices.	May require the cooperation of other stakeholders, facility owners. Changes may affect other users of the space. At locations where large numbers of cycles may be left for long periods, such as transit hubs or universities, and where surveillance is not possible, enclosed bike- parking facilities may be advisable. Access to enclosed facilities should be restricted to registered cyclists, facilities should be simple to use and regularly maintained, and efforts should be made to limit potential misuse.
4	41	Increasing guardianship	Increasing formal guardianship may have a deterrent effect.	… it occurs in locations where guardianship is currently inadequate, and guardians with a sense of ownership of the area (e.g., security guards) are empowered and motivated to act.	Guardianship's deterrent effect cannot be guaranteed. For example, increasing natural surveillance and/or installing CCTV may not guarantee bicycle security or have a deterrent effect. Alternatives such as locating bicycle repair shops (for example) at the entry to parking facilities may be worth considering.

Response No.	Page No.	Response	How It Works	Works Best If…	Considerations
Registration and Recovery					
5	42	Using traditional bicycle-registration schemes.	Cyclists register bicycles to establish proof of ownership so that stolen bikes can be identified, thieves deterred, and recovered bikes returned to their owners. Police can search for stolen registered cycles	…registration is mandatory and secondhand goods outlets ask for proof of ownership before buying bikes, or if police enforcement is possible. Optimum effectiveness is more likely if bicycles are registered at the point of sale, and thieves cannot remove registration marks.	Is unlikely to work if bikes are stripped for parts, as only the frame is typically registered. As an enforcement strategy, this is likely to require intensive policing unless the problem is highly geographically concentrated or other agencies get involved. Databases need to be maintained and cover a wide geographical area, and partners need to coordinate action. It may not prevent theft if offenders are unaware of the program. The marking method may affect subscription (e.g., some cyclists may fear that stamping the frame could damage their bike).
6	44	Implementing an electronic tagging program.	Cycles are fitted with unique Radio Frequency Identification Devices (RFID), and the owners' details are recorded in a database to establish proof of ownership. Police can search for stolen bicycles using an RFID reader.	…RFID tags are installed in the bicycle frame, rather than in the seat post, which must be removed first to allow easy scanning using an RFID reader, and if secondhand goods stores in the area also use RFID readers to determine the status of bicycles brought to them.	See above.

Response No.	Page No.	Response	How It Works	Works Best If…	Considerations
Offender Detection					
7	45	Setting traps to catch bicycle thieves	Police leave a cycle fitted with a tracking device (e.g., GPS) unsecured at a prominent location. If the bike is moved, then police will be alerted and can trace the bicycle with the aim of catching the thief or gathering intelligence on stolen bike markets.	…a small proportion of offenders are responsible for the majority of local problems, and operational CCTV covers the location where the cycle is left so that the offender can be caught on camera. Cleaning fingerprints off the bike before putting it out also increases the likelihood of identifying forensic evidence that could aid in an investigation. Moreover, police should place the bike in a hot spot on days and at times when bicycle theft is most likely. To reduce the likelihood that offenders will get wise to the intervention, the bike should not be used in the same locations all the time. For the same reason, if the police are to use the intervention for a prolonged period, then they should regularly change the bike used or its appearance.	The bicycle may be sold on quickly, so any response should be swift, which may require dedicated police resources (if only temporarily). Check that local laws permit this type of strategy.

Appendix B: Types of Locks

The types of locks and how cyclists use them can contribute to your local bicycle theft problem. Currently, a wide range of bicycle locks are available, each differing in (for example) material, intended use, and mechanism by which they are supposed to prevent bicycle theft. The term "secure" is relative, as security against bicycle theft depends not only on the lock, but also on the bicycle-parking furniture and the broader parking environment, as well as on who is trying to steal a bicycle, and with what resources. Hereafter, "secure" refers to a *lock that can withstand an attack lasting 3 minutes or more by a thief using readily available hand tools*. Some robust locks are sold with an insurance guarantee for the bicycle they secure. The user must register the bike for the insurance to be valid.

It is recommended that cyclists use two locks of different types because this will defend the secured bicycle against multiple perpetrator techniques (e.g., if a cyclist uses a D lock and a chain lock, then a thief must apply both "levering" and "cutting" or "striking" to free the secured bicycle).

D or U lock

Cable or coil lock

Chain and padlock

Armored cable lock

D or U lock—a D- or U-shaped steel bar that is closed at one end, with a removable section that a key can lock. The lock's strength depends on materials and quality. Such locks can be vulnerable to levering but are resistant to cutting.

Cable or coil lock—a many-stranded steel cable enclosed in a plastic casing, with an integrated lock or looped end through which the user secures the shank of an additional lock. The cables come in various thicknesses. These locks are vulnerable to cutting, and thieves can easily sever them using available hand tools.

Chain lock—a length of chain (often fabric- or plastic-coated) combined with a securing padlock or mini-D lock. Chains can be very robust, though the lock's strength depends on materials and quality. These locks are vulnerable to striking if applied incorrectly. Poor-quality chain locks are also vulnerable to cutting with bolt croppers and pneumatic cutting tools.

Armored cable lock—a steel cable core covered with a series of rotating metal tube sections to protect the cable against cutting. Armored cable locks usually have an integrated locking device. Armored cables can be very robust, though the lock's strength depends on materials and quality. These locks can be vulnerable to cutting with bolt croppers and pneumatic cutting tools.

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