A Risky Facility Analysis of Crime and Disorder in Parks: A Case Study of Kirklees

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Abstract

Parks are valuable to the well-being of society; however, they are also considered to be high-crime locations. There has been a growth of interest in studying micro-level crime concentrations and elements of environmental design at various facilities. However, there is limited research into park crime concentrations and few explanations for why crime occurs in park spaces. This study addresses this research gap by exploring how environmental design features may contribute to crime and disorder in parks. Building on existing research, this study asks how principles of Crime Prevention Through Environmental Design (CPTED) and guardianship can explain characteristics of spatial and temporal crime risk in parks.

This study included two phases: a secondary analysis of police crime data and a case study of two 'risky' parks. Phase 1 investigated the spatial distribution of recorded crime and police incidents and tested the effects of social disorganisation and park size. The analysis demonstrated that a small number of 'risky' parks are responsible for a large proportion of crime. The results also indicated that social disorganisation was not significantly associated with recorded crime, whereas park size was a contributory factor. Phase 2 explored the nature and temporal distribution of park crime, followed by site observations of environmental design and guardianship. When analysed together, the findings indicated that principles of CPTED and park usage patterns functioned to facilitate or prevent criminal opportunities in parks. This research concludes that environmental design and guardianship appear to be contributory factors in the spatial and temporal patterns of park crime. Due to the small sample size, findings cannot be generalised to all parks; however, it is recommended that this research informs the future design, management and policing of parks.

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Chapter One: Introduction

Public parks are "extraordinarily blight-prone, and how frequently, even when they are not smitten by physical decay, they are apt to be stagnant – a condition that precedes decay" (Jacobs, 2011, p.337). The words of Jacobs represent the perceived neglected and criminogenic function of many parks. It appears that parks are crime hotspots, experiencing heightened crime concentrations (Groff & McCord, 2011; Kimpton et al., 2016; McCord & Houser, 2015) and poor maintenance resulting from recurrent government budget cuts (Reeves, 2000; Unison, 2018). Conversely, some parks are the 'lungs' of a town or city (Jordan, 1994), regularly used by more than half of the UK (Heritage Fund, 2016). The Covid-19 pandemic has brought further awareness to the societal necessity for parks. Throughout 2020 and 2021, restrictions closed the hospitality and recreational sector to the public (Cabinet Office, 2021a). However, parks remained one of the only accessible locations resulting in a near 150% increase in usage (Geng et al., 2021). The UK remains within their third lockdown as this research begins. Therefore, in the current context of the heightened necessity for park space, addressing the criminogenic nature of parks is of increased importance.

According to environmental criminology, whether a park is a crime hotspot or a flourishing place for recreation is not random. Crime is concentrated in specific places (Weisburd, 2015) and facilities (Clarke & Eck, 2003; Eck et al., 2007) which provide criminal opportunities (Clarke, 2012; Felson & Clarke, 1998). There has been a growth of interest in studying micro-level crime concentrations, with studies primarily focusing on 'owned' facility types, such as licensed premises (Madensen & Eck, 2008), apartment buildings (Townsley et al., 2014) and various retail (Eck et al., 2007). Less research has focused on public spaces, such as parks. As notoriously high-crime facilities, parks present a unique location to expand knowledge of spatial crime risk and explore crime prevention.

The human-environment interaction (Reynald & Mihinjac, 2019) indicates that an individual's immediate surroundings can facilitate or prevent crime. Crime Prevention through Environmental Design (CPTED) (Jeffrey, 1971, cited in Reynald & Mihinjac, 2019) and guardianship (Cohen & Felson, 1979) are fundamental approaches to reducing criminal opportunities in the built environment, thoroughly studied in a residential context (Hollis-Peel et al., 2012; Hollis-Peel & Welsh, 2014; Reynald, 2009). In parks, Shehayeb (2008) identified a cyclic relationship between environmental design, levels of crime and disorder, fear of crime and park usage. Empirical studies have established

physical park features associated with guardianship (Groff & McCord, 2011; McCord & Houser, 2015; Taylor et al., 2019) and CPTED (Iqbal & Ceccato, 2016; Marzukhi et al., 2018) are related to reduced crime. To date, no research has examined the spatial and temporal distribution of park crime alongside environmental design in a UK context. Therefore, much uncertainty still exists about the relationship between parks, crime and environmental design.

1.1 Research Aim

This study aims to explore how the environmental design of parks contributes to crime and disorder. Specifically, this study will seek to explain the spatial and temporal patterns of park crime and disorder at the micro-scale by assessing features associated with guardianship and CPTED. In doing so, this study presents a novel opportunity to bridge the knowledge gap of how CPTED and guardianship function in a public space context. Limits to the research are noted from the outset. This research adopts an exploratory case study approach and does not seek to directly measure guardianship, deliver generalisable findings or identify features that are statistically related to crime. Instead, this study seeks to explain how environmental design features relate to crime opportunities in a park context, concentrating on high-crime parks in the metropolitan borough of Kirklees in the North of England. Despite lacking generalisability, this study may support future environmental design research and offer transferrable knowledge to other public spaces.

1.2 Research Contribution

This study will contribute to the growing knowledge of micro-level crime concentrations by exploring several understudied areas. Despite the high-crime nature of parks, minimal research has explored the association between environmental design and spatial crime risk. Due to the emphasis on understanding the context under study (Boessen & Hipp, 2018), the available American and Australian research may lack applicability to UK parks. In addition, CPTED (Cozens et al., 2005) and guardianship (Reynald, 2009) are mainly studied in private spaces. This research seeks to provide original knowledge by applying CPTED and exploring the unknown role of guardianship (Hollis-Peel et al., 2011) whilst immersed in the understudied context of public parks. As well as extending academic knowledge, these findings will deliver important theoretical and policy implications (Hollis-Peel et al., 2012; Hollis-Peel & Welsh, 2014; Moir et al., 2018). These findings will aid the reduction of park crime, identify novel forms of crime prevention (Cornish & Clarke, 2017), and offer improved police processes such as

tailoring place-based prevention strategies to local contexts (Mitchell & Huey, 2019). Moreover, identifying crime prevention opportunities will be of practical use in the current and future design of parks and policing strategies.

1.3 Overview of the Study

This thesis consists of five chapters. Chapter two outlines the current knowledge of park crime whilst integrating research regarding crime concentrations, CPTED and guardianship. This review demonstrates that park crime is not a random event and is instead facilitated by the physical environment. This exploration identifies gaps from which the research questions have been generated. Chapter three outlines and justifies the methods, including secondary crime data, a case study approach, and their underpinning philosophical foundations. This chapter also describes the research design and procedure, including the sampling and data analysis processes, before addressing the methodological limitations and ethical considerations. Chapter four documents the analysis stage, presenting the findings from the secondary crime data, which depicts the nature and factors of crime concentration, and site observations, a detailed description of the physical environment alongside visual images of the site. Chapter five contains the discussion, which combines the two datasets and critically considers the results alongside the literature identified in chapter two. Chapter six is the conclusion which directly addresses the research aim and questions alongside a reflective evaluation of the study, policy implications and avenues for future research.

Chapter Two: Literature Review

2.1 Introduction

This chapter provides a critical overview of distinct branches of literature relating to micro-level crime concentrations, park crime and environmental design, referring to theory and research evidence. This study has not explored the individual concepts in great depth; however, combining these branches of literature was afforded more importance to determine the existence of a relationship and form the basis of future studies. This chapter consists of four sections. The first section focuses on the concentration of crime at place. Ample research supports macro and meso crime concentrations (see Amemiya & Ohyama., 2019; Oliveira et al., 2017; Weisburd, 2015). Due to the remit of this research, this section seeks to explore the nature of micro-level crime concentrations in parks, including the application of the generator and attractor concepts and highlight the tendency to focus on 'problematic' facility types as opposed to specific 'risky' facilities. The second section seeks to apply the risky facility concept and critically explore the limited knowledge of park crime concentrations. The remainder of this section will discuss the effects of social disorganisation, land uses, and place management. The third section will briefly outline CPTED and guardianship, followed by a critical evaluation of the limited research which has applied these concepts in public space. Finally, this chapter will summarise the literature and recognise knowledge gaps that formed the research aim and questions.

2.2 The Criminogenic Park

Hilborn (2009) defines a park as a "bounded area of public open space that is maintained in a natural or semi-natural state and set aside for a designated purpose, usually to do with recreation" (p.4). Parks are inherently valuable to society supplying social, economic, and environmental benefits, such as enhanced health (Zhang et al., 2018), community cohesion (Peters et al., 2010; Weinstein et al., 2015), biodiversity (CABE Space, 2008) and increased house pricing (Trojanek et al., 2018). Parks are also considered high-crime locations, with many incurring some form of crime (Groff & McCord, 2011; McCord & Houser, 2015). Instead of exploring the complex biological, psychological, and social origins which may cause individuals to commit park crime, this study employed environmental criminology; a group of theories concerned with why crime occurs in specific places and how the environment influences the likelihood of offending (Wortley & Mazorelle, 2008). Felson and Clarke (1998) and later Clarke (2012) determined that all crime requires opportunity. Opportunity theories, including the rational choice perspective (Cornish and Clarke, 1985), routine activity (Cohen & Felson,

1979) and crime pattern theory (Brantingham and Brantingham 1993), have often been used to understand why crime concentrates at particular places. These theories are discussed throughout this chapter.

Crime concentrations are well-established in people: repeat victims and offenders (Everson, 2003; Curiel et al., 2018) and targets: hot products such as portable electronics (Wellsmith & Burrell, 2005). The focus of this study is the concentration of crime at place: such as hotspots (Sherman et al., 1989), crime attractors and generators (Brantingham & Brantingham, 1995) and risky facilities (Eck et al., 2007). One of the key concepts is the Law of Crime Concentration at Place (Weisburd, 2015) which proposes that crime is concentrated in space and time. From an analysis of crime incident data covering eight diverse cities, Weisburd found that large proportions of crime consistently occurred at a small proportion of micro-places; 50% of crime occurs between 2.1% - 6% of street segments, and 25% of crime occurs between 0.4% - 1.6%of street segments. Studies testing this law have corroborated these bandwidths (such as Chainey et al., 2019; Gill et al., 2017; Haberman et al., 2017), and further studies of crime and incident data at various geographic units have supported the more general notion that crime is concentrated at micro-places (Andresen et al., 2017; Curman et al., 2015; de Melo et al., 2015; Sherman et al., 1989; Weisburd et al., 2004, 2009). In a systematic review of 44 studies covering 1970-2015, Lee et al. (2017) found that just 10% of locations and known criminal locations accounted for 43% and 63% of crime. Therefore, the evidence suggests that crime is not dispersed but concentrated in a smallnumber of locations.

The Law of Crime Concentration implies consistency; however, other scholars have found that crime concentrations vary temporally across days and times (Amemiya & Ohyama et al., 2019; Favarin, 2018; Herrmann, 2015; Lee et al., 2017). Regardless, concentrations are not attributed to population sizes, crime count or rates (Chainey et al., 2019); therefore, specific characteristics of places must facilitate spatial and temporal crime concentrations. As well as wider geographic units, the formation of crimeconcentrations is connected to specific facility types. This was first recorded by Sherman et al. (1989), who found that facilities such as convenience stores, bars, and apartmentscoincided with crime concentration. This finding suggested that certain facilities may generate wider hotspots, defined by Eck et al. (2005, p.2) as "an area that has a greaterthan an average number of criminal or disorder events". Numerous studies have demonstrated that criminogenic facilities are causally related to crime concentrations. For instance, Groff and Lockwood (2013) found that crime levels were heightened in the street segments surrounding licensed premises, educational establishments and transport stations, and crime

decreased as the distance from the facilities increased.

The literature has suggested an association between parks and increased crime. Studies of 100 census tracts (Wilcox et al., 2004), 145 smaller block groups (Lockwood, 2007) and 295,306 street segments (Kim & Hipp, 2017) have found that the presence of parks significantly increases various crime types, including burglary, motor thefts, assaults, and robberies. Moreover, studies have found that crime levels decrease with distance from parks (Boessen & Hipp, 2017; Kim & Hipp, 2017; McCord & Houser, 2015); however, the pattern varies per location and crime type. Distance decay highly depends on the placement and effects of other nearby land uses (McCord & Houser, 2015); therefore, these inconsistent findings may be linked to other high-crime facilities and may not truly reflect the distance decay effect caused by parks. Nevertheless, research has established that parks have heightened crime levels. Boessen and Hipp's (2018) analysis of six violent and property crime types in nine US cities found that parks have 85-350% more crime than residential areas. However, as public spaces tend to have more footfall (Bowers, 2014), residential areas may not be an accurate comparison. Two studies of Philadelphia (N=249) (Groff & McCord, 2011) and Philadelphia and Louisville parks (N=249, 60) (McCord & Houser, 2015) better compared the density of park-crime to the overall city and randomly selected built-up street intersections. The studies found that in 65.1-70.3% of Philadelphia parks and 46.7-66.7% of Louisville parks, the density of disorder, violent and property crime was at least twice that of the crime density of Philadelphia and ranging between 3.8-18.3 times that of the crime density of Louisville, varying per crime type. These findings indicate that crime concentrates in and around parks. Additionally, the studies revealed a trend in the type of park crime whereby disorder was the most concentrated, followed by violent then property crime, suggesting that the park environment provides greater opportunities for specific crimes (Clarke, 2012; Felson & Clarke; 1998).

The criminal nature of parks can be attributed to their purpose. The 'recreational purpose' of parks creates a contested space (Groff & McCord, 2011) of users with subjective ideals of recreation. By way of illustration, graffiti is commonplace throughout public spaces and is typically associated with youth culture (Hedegaard, 2014). To some users, graffiti is socially corrosive and immoral (Pickard, 2014), whereas, to others, it represents creativity, self-identity, and history (Robinson, 2009). Such conflicts can make it challenging for users to decipher legitimate from illegitimate behaviour. As an open public space, parks tend to bring large numbers of people together, creating

criminal opportunities exploited by other park users, reflective of a crime generator (Brantingham & Brantingham, 1995). Finally, parks are typically accessible at all times, often secluded (Tower & Groff, 2014), prone to neglect, challenging to police (Hilborn, 2009) with no designated, consistent guardian or manager. Routine Activity Theory (Cohen & Felson, 1979) proposes that for a crime to occur, a motivated offender, a suitable target, and the absence of a capable guardian converge in space and time. If there is no appointed guardianship in parks, there are more suitable opportunities for victims and offenders to converge. In addition, parks may further operate like a crime attractor, enticing potential offenders to the known crime opportunities (Brantingham & Brantingham, 1995) offered by the seclusion and lack of guardianship. The attractor and generator concepts help explain the existence of high-crime parks; however, research has tended to focus on broad 'unpopular' facilities such as payday lending establishments (Wilcox & Eck, 2011) and large public facilities such as shopping malls. This neglects the significant contextual differences between facilities. For example, a city park is likely to have higher crime rates than a rural neighbourhood park. Therefore, rather than focusing on why crime concentrates at broad facility types, Blair et al. (2017) claim that research should focus on the variance between high and low-crime facilities. This variance coined 'risky facilities' was detected and theorised by Eck et al. (2007). This reminds us that, although the current evidence suggests that parks are generally high-crime locations, it must be not assumed that all parks experience heightened crime levels.

2.3 Risky Parks

Eck et al. (2007) identified that crime was not evenly distributed across a homogenous set of facilities. Specifically, a small proportion of 'risky facilities' are responsible for a large proportion of the crime. For instance, Madensen and Eck (2008) found that 20% of bars (n=199) were responsible for 75% of physical violence. Risky facilities is underpinned by the 80/20 rule, which suggests that (broadly) 80% of crime concentrates within 20% of facilities (Clarke & Eck, 2003), and when plotted, the crime distribution represents a J-Curve (Eck et al., 2007). The identification of specific risky facilities, instead of broad facility types, offers unique crime prevention opportunities, whereby the most considerable crime reductions can be achieved by targeting resources where crime is concentrated (Bowers, 2014; Flynn, 2018; Herrmann, 2015; Wilcox & Eck, 2007). This pattern has been confirmed in rigorous reviews across numerous facilities (Eck et al., 2007; Flynn, 2018), including apartments, bars, and schools. It seems that research has focused on commercial and residential facilities, with only three known studies appearing to have explored crime distribution across parks.

The evidence reviewed below have several methodological limitations. Research has used police recorded crime data. Despite being one of the only standardised data providing the specific details required for crime concentration analysis, it is restricted to reported crime, has issues with address matching and most significantly excludes zero-crime facilities. Such limitations may result in the under-representation of park crime, subsequently calculated concentrations and distorted J-curves (Eck et al., 2007). Moreover, all the studies utilised buffers. Although crime within this space may be park-related (Groff & McCord, 2011), and buffers minimise issues with address matching (Taylor et al., 2019), this method can include crime not related to or caused by the park environment; exaggerating or misrepresenting the nature of park crime concentrations. Though, these data and methods are commonly used throughout micro-spatial research.

Cumulative measures point towards the concentration of crime at specific parks. Initially, Groff and McCord (2011) found that 14-17% of parks accounted for 50% of crime and that the majority of parks (83-96%) accounted for 100% of crime, with slight variation between crime types. Similarly, in a small study of 12 US parks, Blair et al. (2017) found that just three parks (25%) were responsible for 63% of crime. Furthermore, in a more extensive study in 4625 Australian greenspaces, Kimpton et al. (2016) compellingly that 100% of violent, theft, public nuisance, drug, and property crime was concentrated between 6-17% of greenspaces. However, this study's sample included broader facility types such as gardens and greened thoroughfares. In comparison to parks, these facilities may generally be low crime, increasing the observed concentration of the whole sample. Although the concentration may not represent a sample of parks, these findings provide a broader evidence base for public spaces and are included here due to the small number of park studies. Overall, affirmative conclusions cannot be drawn from such a small evidence base; nonetheless, the evidence suggests that at specific levels, large proportions of crime are concentrated in a small number of parks. However, this concentration is less than the 80/20 rule, aside from Kimpton et al. (2016) or Weisburd's Law of Crime Concentration and findings varied per country of study and crime type, suggesting that context may influence park crime concentration.

There are numerous explanations for the risky facility pattern, such as disparities in reporting and recording behaviour (Eck et al., 2007). According to opportunity theories (Felson & Clarke, 1998; Clarke, 2012), it can be argued that crime must concentrate in parks with more criminal opportunities and per routine activity theory (Cohen & Felson,

1979), more convergences of victim and offenders without capable guardianship. Crime concentrations can be further linked to Crime Pattern Theory (Brantingham & Brantingham, 1993), whereby offenders' movements throughout their daily routines between nodes, such as home and work, along paths, form their awareness space, in which offenders are more likely to commit crime (Bernasco & Block, 2009; Smith et al., 2000; Vandeviver et al., 2015; Vandeviver & Bernasco, 2019; Wright & Decker, 1994). Therefore, crime concentrations may be formed when parks with many criminal opportunities exist within offenders overlapping awareness spaces. This study focuses on place-based differences relevant to park crime, including social disorganisation, place management, adjacent facilities and environmental design.

Scholars have attributed the emergence of crime concentrations to the surrounding social context. Social disorganisation theory (Shaw & Mckay, 1942 cited in Steenbeck & Hipp, 2011) posits that structural conditions of a neighbourhood, such as poverty, are linked to increased crime. This is true in the case of crimes such as motor theft (Suresh & Tewksbury, 2013) and street robberies (Smith et al., 2000) which concentrate in socially disorganised areas. The theory now consists of two distinct but related branches. In brief, Bursik and Grasmick's (1993) systemic model theorised that relationships between residents were essential to maintaining social ties and exerting informal social control. They found that residents were less able to protect space in areas of residential instability. Whereas Sampson et al. (1997) collective efficacy framework found that in 343 Chicago neighbourhoods, the ability of residents to control behaviour was significantly associated with violent crime regardless of factors of social disorganisation or resident characteristics. When collated, the evidence suggests that in neighbourhoods of high social disorganisation, residents have less social cohesion, shared values, and rules; therefore, informal social control is harder to exert, which increases the likelihood of crime and disorder.

In application to parks, research has found that park crime significantly increased by 12-29% per level of social disadvantage (Kimpton et al., 2016), was driven by nearby crime levels (Boessen & Hipp, 2018; Taylor et al., 2019) and was 24% higher in neighbourhoods with low social cohesion (Taylor et al., 2019). The weight of the evidence, albeit limited to a small number of studies, indicates that parks in socially disorganised neighbourhoods experienced heightened crime rates. The relationship between social disorganisation and risky facilities is less definitive. Whilst limited to two studies; the available research has found that high and low crime licensed premises co-existed in socially disorganised neighbourhoods (Block & Block, 1995; Madensen & Eck,

2008). Therefore, although studies indicate an association between park crime and social disorganisation, the limited risky facility research suggests that this would not extend to identifying or be a significant predictor of risky parks.

Conversely, parks can enhance social cohesion and trust (Wo, 2019). Bogar and Beyer's (2015) systematic review found a contention whereby parks are associated with increased or decreased crime levels in the wider area. It appears that this relationship is driven by factors related to social disorganisation, whereby parks decrease crime in low-income neighbourhoods and increase crime in high-income neighbourhoods (Boessen & Hipp, 2018; Kim & Kim, 2020). This suggests that park crime is not created by social disorganisation, reflective of the collective efficacy model. The findings more significantly imply that the direction of the park-crime relationship may depend on the area under study and, therefore, the design, maintenance and usage associated with different structural factors.

An overarching explanation for the clustering of crime in certain parks can be attributed to geographical juxtaposition (Newman, 1972); how the surrounding environment affects a park's crime risk. Cozen et al. (2019) further conceptualised that the level of crime in any location can be partly explained by the immediate and local environment, such as nearby facilities, and by distant and remote factors, such as the ability of offenders to sell goods stolen in parks via online markets. As this study explores the immediate environmental design of parks, this review will focus on micro and proximal-level factors, particularly how surrounding land uses affect park crime of which evidence is limited and contradictory. As discussed, the presence of known high-crime facilities contributes to the concentration ofcrime (Sherman et al., 1989). Similarly, research has found that park crime increased significantly alongside facilities such as off-site alcohol outlets (Stelzig, 1986) and schools (Kimpton et al., 2016). Specifically, Kimpton et al. (2016) found that each schoolsignificantly increased crime by 32-85%. Groff and McCord (2011) directly opposed, finding that parks with adjacent schools had significantly less disorder crime. The spatial connection between parks and schools remains unclear; however, the evidence broadly suggests that adjacent facilities may contribute to crime levels. For example, off-site alcohol outlets are significantly related to violent crime (Greunewald et al., 2006); therefore, parks with a nearby outlet may be used by a supply of intoxicated victims andoffenders in an environment without guardianship, which may lead to increased violent offences.

Adjacent facilities may also contribute to when offences occur. Studying adjacent facilities in conjunction with temporal crime shifts, such as days, times and seasons, can uncover how movement patterns create crime opportunities (Herrmann, 2015). This review identified a single study; Kimpton et al. (2016) found that park crime varies temporally. Most significantly, property crime increased at midday, drug crime increased over the weekend, and violent crime peaked at 3pm and 9pm. These patterns were not consistent and varied per greenspace type (amenity-rich, amenity-poor, sit or play and transport), suggesting that when crime occurs varies per crime type and depend on a park's amenities, associated usage and guardianship. Furthermore, violent crime concentrated after school hours within all greenspace types suggesting a further link to educational establishments, indicating a connection between park crime and young people. A similar finding was established by Boessen and Hipp (2018), as parks in neighbourhoods with higher concentrations of young people did experience higher rates of assaults. Theory dictates that limited guardianship enables the convergence of victim and offender (Cohen & Felson, 1979); therefore, young people may be both victims and offenders; however, this assumption was not statistically explored.

Finally, studies have found that differences in place management, such as property management and security personnel, can have crime controlling or facilitating effects (Eck & Guerette, 2012; Townsley et al., 2014). Different types of facilities have a specificset of behaviour patterns, referred to as ecological psychology (Barker, 1968); for example, in licensed premises, people drink alcohol. However, elements of place management further determine the behavioural norms and subsequent criminal opportunities that attract potential offenders (Madensen & Eck, 2008). By way of illustration, Franquez et al. (2013) found that the allowance of dark corners and isolated toilets in licensed premises was linked to increased crime. As discussed, public spaces lack defined behavioural norms, specific ownership and function (Eck et al., 2005). Therefore, the relevance of place management interventions in parks remains unknown.

The following sections will focus on environmental design. Although research has established that parks are high-crime facilities, very few studies have considered which environmental features might explain why crime concentrates in some parks (McCord & Houser, 2015). This study argues that criminal opportunities created by environmental design and park usage can explain the uneven distribution of park crime and disorder.

2.4 Environmental Design in Parks

One of the most recognised environmental crime prevention approaches is Crime Prevention Through Environmental Design (CPTED). Armitage (2013, p.23) defines CPTED

as "the design, manipulation and management of the built and sometimes natural environment to reduce crime and the fear of crime". Although different definitions exist, there appears to be some agreement that fear of crime refers to "an emotional responseof dread or anxiety to crime or symbols that a person associates with crime" (Ferraro, 1995, p.4). According to the rational choice perspective (Clarke & Cornish, 1985), CPTED functions by altering the risk-reward calculation of offenders. Research has established, albeit predominantly acquisitive, that offenders display elements of rationality when committing various crimes such as burglary (Bernasco & Nieuwbeerta, 2005; Roth & Roberts, 2015; Vandeviver et al., 2015; Wright & Decker, 1994) and other predatory crimes, such as sex offences (Beauregard & Leclerc, 2007). By operationalising the crime-reducing techniques of Situational Crime Prevention (Clarke, 2010); increasing perceived effort and risk, reducing perceived rewards, removing excuses (Clarke, 1997),and removing provocations (Cornish & Clarke, 2003), criminal opportunities in parks canbe reduced. CPTED consists of various interlinking principles, of which the number and names vary per author. This study has used Ekblom's (2011) seven principles: defensible space and territoriality, movement control, physical security, image and maintenance, activity support and surveillance.

Defensible space is the real or symbolic demarcation between private, semi-private and public space (Newman, 1973), such as fencing and changes in flooring, which relies on social influences and environmental design (Merry, 1981). Environmental design can increase sense of ownership and feelings of territoriality and intervention when witnessing a crime (Wortley & Mazerolle, 2008) thus, deterring offenders. Movement control regulates how people move into, within and out of space (Armitage, 2017), suchas key-card entry systems. Limited access to a place can deter the criminally inclined byincreasing the risk of detection and decreasing ease of escape. This is exemplified in thereduced crime rates of true culs-de-sacs (Armitage et al., 2011; Johnson & Bowers, 2010) and increased crime concentrations in park zones with more than one exit (Iqbal & Ceccato, 2016). Next, physical security protects a space using features that increase effort and detection risks (Armitage, 2017), such as locks and bolts. An example of this is the study carried out by Taylor et al. (2019), who found that security fencing reducedviolent crime by 34%. These features are often visible to alter risk-reward calculations and deter offenders. Equally, aesthetics can further determine legitimate or illegitimate usage (Jacobs, 2011). It appears that defensible space, movement control and physical security are somewhat tailored to protecting private property. Although Iqbal and Ceccato (2016) found that they can be adapted to parks, features often used for these principles restrict the activities of those suspected of having criminal inclinations; however, they further restrict the use, access, and enjoyment for legitimate users (Fennelly & Crowe, 2013; Wortley, 2010) conflicting

with the fundamental freedom of public space. Overall, these principles remain effective at crime reduction, although the park's purpose requires consideration.

Image and maintenance are underpinned by broken windows theory, which claims that visual signs of disorder, such as graffiti and litter, signal a lack of care and control and, therefore, greater tolerance for disorder and crime (Wilson & Kelling, 1982). New, visual methods have questioned the direction of the crime-disorder relationship (Sampson & Raudenbush, 1999), and in 72 parks, Tower and Groff (2014) found that disorder had no significant connection to further crime the following year. Instead of contributing to crime, it appears that image and maintenance are significant when considering the creation of criminal opportunities; for example, offenders use unmaintained foliage for concealment (Marzukhi et al., 2018; Michael et al., 2001; Thani et al., 2016) and more importantly, contributes to the cyclic relationship between fear of crime and park usage (Shehayeb, 2008). Specifically, disorder increases fear of crime (Ceccato & Hansson, 2013; Maruthaveeran & Bosh, 2015), increased fear of crime causes legitimate park users to withdraw (Monahan & Gemmell, 2015), enabling crime and disorder to occur without surveillance or guardianship which in turn significantly reduces levels of park visitation (Han et al., 2018; Marquet et al., 2019; Marquet et al., 2020; Stodolska et al.,2009). In summary, poor image and maintenance may not directly lead to further crime;instead, the aesthetic creates criminal opportunities, affects feelings of safety and park usage, and is connected to further crime and disorder opportunities.

Surveillance is enabled through environmental design features such as clear lines of sight and increased lighting. These features increase offender perceptions of observationand detection (Marzbali et al., 2012), reducing the attractiveness of a crime target and allowing legitimate users to observe the space. Improving surveillance opportunities provides an example of how CPTED principles can deliver mutually beneficial or adverse effects when applied in practice (Iqbal & Ceccato, 2016). By way of illustration, improved lighting can enhance natural surveillance (Cozens & Love, 2015) yet inadvertently highlight suitable targets (Davey & Wootton, 2017) and encourage criminal activity at night in parks (Atlas, 2008). Therefore, the functioning and effectiveness of CPTED features must be considered in conjunction with the behaviour of that micro-context. In parks, formal methods of surveillance such as CCTV (Surette & Stephenson, 2019) and policing (Hilborn, 2009) are less effective, whereas the crime reducing effects of informal surveillance delivered by routine use (Fennelly & Crowe, 2013) appear highly significant but heavily understudied (Cohen & Felson, 1979; Felson & Eckert, 2018). Levels of surveillance are improved in parks through the final principle, activity support. Activity support is the provision of amenities, such as dog parks and playgrounds, enabling 'eyes

on the street' (Jacobs, 2011) and reduced criminal opportunities. The principles ofsurveillance and activity support are linked with the provision of guardianship, discussed in the following sections.

Several studies have established the effectiveness of CPTED, including a thorough review (Cozens et al., 2005), various evaluations of residential properties built with and without CPTED (Armitage, 2000; Armitage & Monchuk, 2009) and crime rates pre-and post-intervention in commercial (Casteel & Peek-Asa, 2000) and educations settings (Vagi et al., 2018). This latter method fails to isolate the intervention effect; therefore, caution must be taken when attributing changes in crime rates to CPTED alone (Taylor, 2002). Due to the effectiveness in various contexts, researchers have argued that parks may benefit from implementing CPTED (Atlas, 2008; Ceccato & Hansson, 2013). However, unlike private properties, parks present a unique need to balance freedom, security (Nemeth & Schmidt, 2007) and aesthetics. Thus far, research has found that CPTED, recorded by a 54-measure checklist, was consistently related to police recorded crime concentrations (Iqbal & Ceccato, 2016), offered explanations for the presence of crime (Marzukhi et al., 2018) and improved users (N=128) feelings of safety (Thani et al., 2016). The weight of the evidence, albeit limited to a small number of studies, suggest that CPTED reduces crime and improves fear of crime in parks. CPTED has received criticism for displacing crime (Wortley, 2010); however, this was refuted by Guerette and Bowers (2009), who found that displacement affects only one-quarter of initiatives (n=102) and is consistently offset by the intervention benefits.

As well as environmental design, it appears that park usage and subsequent guardianship plays a significant role in park crime. Guardianship is "the presence of a human element which acts, whether intentionally or not, to deter the would-be offender from committing a crime against an available target" (Hollis et al., 2013, p.76). The guardianship concept, including definition and subsequent research measures, have evolved from proxies, such as single adult households and target hardening (Tseloni et al., 2004; Wilcox et al., 2007). These measures were criticised for providing approximations and not accurately capturing the direct human element (Reynald & Elffers, 2015). Guardianship is better captured by an observational measure, titled Guardianship in Action (GIA), covering four levels of guardianship: invisible, available, capable, and intervening (Reynald, 2009).It is known that guardianship has a powerful impact on crime (Felson & Clarke, 1998) evidenced by studies using sizeable samples in a residential context (Hollis-Peel & Welsh,2014; Reynald, 2009; Townsley et al., 2014) which have found that crime rates decrease incrementally as guardianship intensity increases. Guardianship remains the most under-researched element of the 'crime

triangle' (Hollis-Peel et al., 2011; Hollis- Peel & Welsh, 2014), and little is known about the temporal functioning of guardianship (Moir et al., 2017), especially in public spaces. Hilborn (2009) claims that people are lesslikely to be guardians over a public space with unclear ownership. Therefore, guardianship in parks tends to be through presence alone. Various studies and methods have indicated the effectiveness of guardianship presence. Burglars (Bernasco & Nieuwbeerta, 2005; Roth & Robert, 2015) and sex offenders (Beauregard et al., 2010) purposively select targets without guardians and experimental studies have found that guardianship deterred both incarcerated offenders and students (van Bavel, 2019; van Sintemaartensdijk et al., 2020) with minor increased effects for each level of guardianship (van Sintemaartensdijk et al., 2020). The weight of the evidence suggests an offender's decision-making was altered by both the presence of guardians and increased levels of guardianship. Therefore, regardless of their level of intervention, other park users may still function to deter offenders and disrupt the convergence of victim and offender (Cohen & Felson, 1979).

More importantly, guardianship research (Hollis-Peel et al., 2012; Hollis-Peel & Welsh, 2014; Reynald, 2009) has empirically revealed how CPTED and guardianship function together. These studies have found that increased guardianship intensity is significantly associated with increased surveillance opportunities, and decreased guardianship is associated with increased territorial definition. These findings indicate that ability to perform guardianship is enabled or facilitated by the built environment, and therefore, the two must be studied collectively. To this study's knowledge, there exists no similar research in a park context. It is known that specific park characteristics and features are significantly associated with reduced crime levels.

Two critical studies (Groff & McCord, 2011; McCord & Houser, 2015) analysed the association between crime and various park features (N=18, N=16) through a comparison of means. Overall, both studies found that more than half of the features identified were significantly related to park-crime levels, indicating a strong association between crime and environmental design. Most significantly, amenities that give rise to increased guardianship and surveillance, such as sports courts and athletic fields, significantly reduced violent, property and disorder crime in parks. These studies found that the effects of environmental features were not always consistent across crime types. Field lights equally reduced violent and disorder crime; however, they had no bearing on property crime. This suggests that the ability of park features to remove criminal opportunities varies per crime type. Moreover, the effects of park features were inconsistent across locations. Park adoption, in the form of neighbourhood watch, significantly decreased property crime in Louisville yet significantly increased property

crime in Philadelphia parks. This is further exemplified by Taylor et al. (2019), who, despite looking at 16 comparable park features in 249 parks, found only one significant association between security fencing and violent crime. Overall, these findings suggest that environmental design and guardianship play a significant role in park crime; however, the effects of park features vary per crime type and location; thus, further research is required to establish firmer conclusions.

Studies have empirically linked crime to activity support, with varying outcomes. Groff and McCord's (2011) correlational analysis found that violent, property and disorder crime significantly decreased as activity generators increased and that crime significantly decreased as park size increased. This evidence suggests that larger parks with more activity support, increased legitimate usage, and subsequent guardianship experience reduced crime levels. This notion is supported by further research depicting that a 25% increase in park usage, detected using cell phone trace data, reduced crime between 4.9-6.8% (Schertz et al., 2019) and in 856 observations, Payne and Reinhard (2016) found that planned park events, which increased usage, reduced the incidence of disorder crime. Although the findings would have been more convincing if the intervention effects were isolated using a comparison group, when collated, these studies evidence how guardianship may reduce crime in parks.

In direct contrast, Kimpton et al. (2016) found that crime was most concentrated in amenity-rich greenspace. There may be several explanations for this converse finding. The research denotes that activity support attracts guardians; however, in some parks, amenities may further attract potential victims and offenders and thus, create more criminal opportunities—for example, pickpocketing or providing young people with a place to congregate (Ekblom, 2011). This suggests that the function of activity support may vary depending on alternative factors such as environmental design or the area under study. Also, although not achieving statistical significance, studies of guardianship have found that activity level was a negative predictor of active guardianship (Reynald, 2009; Reynald, 2010a). It may be that as usage increases, people are less likely to perform guardianship. Overall, the current evidence is conflicting and uncertain and therefore, the link between park size, activity support and guardianship warrants further study.

It is apparent from the small number of studies examined that minimal research has explored the impact of environmental features on park crime; therefore, the current evidence is inadequate in driving design and policing changes. The evidence is limited by the discussed methodological issues of official crime data, potentially misrepresenting the

relationship between environmental design and crime or missing specific crime- related design features. Moreover, due to the importance of context, the available evidence from an American and Australian setting may not be representative or generalisable to the UK. Therefore, further research is needed to clarify the relationship between environmental design, guardianship, and crime in the UK - most effectively studied at the micro-level (Reynald, 2015).

2.5 Conclusion

This chapter has synthesised the existing, relevant literature on micro-level crime concentrations, park crime, and environmental design, highlighting several deficiencies. As demonstrated throughout, few studies have explored spatial crime distribution or environmental design in parks. Studies that exist are of limited generalisability due to context and, thus, differences in how amenities function and how parks are potentially designed and used. In order to advance this knowledge, this study will seek to explore the spatial and temporal patterns of park crime in conjunction with environmental design to develop a holistic understanding of the creation of criminal opportunities through routine activities, the functioning of guardianship and CPTED in the understudied, UK context. As a result, the following exploratory questions were formulated.

2.6 Research Questions

RQ1: Does crime concentrate in a small number of parks in line with broader observations of the spatial distribution of crime and risky facilities?

a) Does the extent of crime concentration vary per different types of crime?
b) Which parks can be distinguished as risky?
c) Is social disorganisation or the size of parks related to park crime distribution?

RQ2: What is the nature of park crime and how is this concentrated across time?

RQ3: How can factors associated with guardianship, CPTED and park usage be used to explain characteristics of spatial and temporal risk related to crime and disorder in parks?

Chapter Three: Methodology

3.1 Introduction

The literature review identified that crime in parks is a problematic, current issue yet, remains an underdeveloped area of study. This chapter outlines the methodological approach, discusses the selected research methods, sampling framework, and how the data were collected and analysed. This chapter consists of six sections. The chapter will begin by exploring the researcher's methodological stance, then examine and justify the selected two-phase research design and utilised methods, including phase one; secondary data analysis and phase two; a case study approach comprising secondary data and systematic site observations. The second and third sections, in turn, explored and justified the methods, sampling and representativeness of the research and data analysis methods, discussing how the study addressed each research question. The fourth section will outline the development and implementation of the site observation. Due to the intrusive nature of fieldwork (Bailey, 1996), the fifth section will consider ethical implications and researcher safety before concluding in the final section. This chapter will acknowledge specific issues that arose; however, section 5.5 will critically discuss the limitations of the research process and how these were managed or minimised.

3.2 Research Design

Researchers typically understand and study the social world from opposing positivist or interpretivist worldviews and employ a quantitative or qualitative methodology (Bryman, 2016). Instead, this study adopted a pragmatic perspective, whereby the methodology and methods were selected according to the needs of the research questions (Creswell & Creswell, 2018). This study sought to analyse multiple dimensions of the park crime phenomenon. Therefore, a comprehensive multi-methodology was utilised to explore the spatial and temporal concentrations of park crime and the functioning of environmental design. To achieve this, this study integrated secondary data analysis and primary data from systematic site observations (Sampson & Raudenbush, 1999) supported by the well-formulated theories of micro-level crime concentrations, CPTED and guardianship. The research questions and their associated methods are summarised in table 1.

Table 1: *Research Questions and Methods*

	Research Questions	**Methods Employed**
Phase 1	RQ1: Does crime concentrate in a small number of public parks in line with broader observations of the spatial distribution of crime and risky facilities? a) Does the extent of crime concentration vary per different types of crime? b) Which facilities can be distinguished as risky? c) Is social disorganisation or the size of parks related to park crime distribution?	Secondary Crime Data
Phase 2	RQ2: What is the nature of park crime and how is this concentrated across time?	Secondary Crime Data
	RQ3: How can factors associated with guardianship, CPTED and park usage be used to explain characteristics of spatial and temporal risk related to crime and disorder in parks?	Site Observation

The first phase of the study served three purposes: to measure the distribution of crime across parks, determine 'risky' parks for the case study phase and test the effects of social disorganisation and park size. Therefore, a quantitative methodology was implemented whereby the research viewed that park crime was observable and quantifiable (Singh, 2007) and park crime could be explained by exploring potential associations and patterns of cause and effect (Henn et al., 2009). From this initial analysis, two case study parks categorised as 'risky facilities' were selected (described below) to explore the association between park crime and environmental design.

Phase 2 was an exploratory, multiple case study (Lewis & McNaughton Nicholls, 2014) which utilised various data sources; firstly, secondary data analysis to explore the nature and temporal patterns of park crime followed by site observations of environmental design, guardianship and park usage to offer explanations for the observed crime patterns. Typically, case studies promote a mixed methodology to address multiple dimensions of a phenomenon (Thomas, 2016). Albeit, this study would have benefited from an additional qualitative element, such as semi-structured interviews, to have explored park user, offender and police perceptions. However, due to the focus on environmental design, the advantages of site observations and Covid-19 restrictions,

non-contact methods were deemed most suitable. Initially, this study aimed to perform a larger scale risky facility analysis of parks to isolate specific crime-related attributes (see Blair et al., 2017; Flynn, 2018; Wellsmith et al., 2007). A study of this kind required a large, generalisable sample beyond the constraints of this research yet, remains an avenue for future study. Instead, a case study approach; the intensive examination of a small number of cases was favoured over others to gain unique, unrestricted insights (Thomas, 2016) into the ambiguous relationship between CPTED, guardianship and crime in public parks. Although small sample sizes are criticised for reduced external validity (Gray, 2014; Bryman, 2016), scientific rigour and research quality (Yin, 2009), a case study approach enabled access to data which could lead to the generation of tentative theories (Thomas, 2016) or test and generalise a specific set of results to the broader theories (Yin, 2009) of CPTED and guardianship. Therefore, although these scientific requirements are of reduced importance, features of research quality are acknowledged throughout this chapter. This study strongly acknowledges that the findings are not generalisable to all parks or other locations. Instead, this exploratory study began to draw theoretical inferences and establish knowledge regarding the functioning of guardianship and CPTED in public parks, forming the basis for future research.

Due to the study's varied data sets and exploratory nature, different analytical approaches were adopted. Overall, a deductive approach was taken whereby existing theoretical ideas, namely opportunity theories and environmental design concepts, were empirically tested (Bryman, 2016). Moreover, as this study sought to test existing theory and concepts within the neglected park context, this study remained open to new interpretations suggested by the data (Thomas, 2016), reflective of an abductive approach.

3.3 Phase 1: Secondary Crime Data

Although the secondary data analysis is included across the first and second phases of this study, an overview is provided here to avoid repetitiveness. Secondary data analysis analyses existing data typically collected for a different purpose (Smith, 2008). Police recorded crime data were selected to measure park crime and disorder. This study used police recorded data: crimes notifiable to the Home Office and police incident data, including summary offences such as disorderly behaviour and minor criminal damage. Kirklees Council supplied crime data from March 2018 to March 2021, including 706 recorded crimes across 91 parks and 1410 police incidents across 60 parks. A corroborative relationship was established through informal discussions with the Council

and documents entailing the research purpose and outcomes (see appendix 1). Verbal permission was gained to name the Council and individual facilities. This study did not name the individual facilities as the study referred to the types and quantities of crime committed. However, the parks could be identified from the presented analysis. The original data included a list of parks within the council area, including 12 variables covering a crime reference, offence type, and details such as date, time, and location. These data were subject to statistical analysis as discussed below.

Secondary data were instrumental, enabling the case study sampling and the generation of hypotheses (Gray, 2014) regarding the nature and spatial and temporal distribution of park crime. This study selected official crime data to provide a standardised measure of crime trends (Davies et al., 2011), reflect police workload (ONS, 2021) and ensure comparability with previous research. This study depends on the accuracy of the data; therefore, limitations on reliability and validity were addressed. Police recorded crime is limited to reported or detected offences. Hence, data is skewed towards crimes that come to the attention of the police, notably those which are a police priority (ONS, 2021) or that society views as a crime (Williams, 2012), omitting many 'dark figure' crimes (Coleman & Moynihan, 1996). In addition, police crime data only accounts for facilities that have experienced crime, excluding zero crime facilities (Eck et al., 2007) from the analysis. It was impossible to identify all parks in this study as there existed no definitive list. However, not including zero-crime parks means that any observed crime concentrations are, at worst an underestimation, and hence, a sample of all parks would only produce better results. Finally, police recorded crime is often not accurately geotagged to a precise location (Iqbal & Ceccato, 2016); therefore, offences occurring in the park may be assigned to neighbouring streets. Previous studies have attempted to overcome this issue by utilising buffers (see Groff & McCord, 2011). Conversely, like Flynn (2018), this study limited the unit of analysis to the park boundary. Although offences incorrectly geotagged may be excluded, more importance was given to the assumption that crimes occurring on the surrounding streets cannot be directly attributed to the park and its environmental design. Due to the discussed shortcomings, secondary data is better combined with other methods (Smith, 2008); hence official crime data were supplemented with observational data to deliver a more comprehensive description of park crime (Davies et al., 2011).

3.3.1 Sampling

The study site was Kirklees, England, a metropolitan borough home to 438,727 residents, which spans 157 square miles and includes large rural areas and densely populated towns such as Huddersfield (Kirklees Council, 2019a). Kirklees was sampled

out of convenience, providing access to cases under the limited resources (Creswell & Creswell, 2018) of a master's study, and a research supervisor had pre-existing council relations enabling access to secondary crime data. According to various data sources (Kirklees Council, 2019a), the borough is considered ethnically diverse, consisting of three major groups: White British (76.7%), Indian (4.9%) and Pakistani (9.9%). Kirklees can be considered a disadvantaged borough compared to national averages with a higher population (12.2% vs 9.9%) living within 10% of the worst deprived areas, lower gross household incomes by £2165 and higher unemployment rates. Most significantly, Kirklees has problematic parks. Residents living in over half of Kirklees districts have inadequate access to parks and recreational grounds (Kirklees Council, 2016), suggesting a greater demand for parks. Moreover, the criminogenic nature of Kirklees parks is well-represented in the local and national media, such as stabbings (Azbar, 2016), rapes (Finnegan, 2020), muggings (Lavigueur, 2020), robberies (Abbiss, 2019) and murders (Pidd & Glendinning, 2008). Therefore, Kirklees represents an area where safe and accessible parks are required, and park crime needs to be addressed.

3.3.2 Analysis

The secondary data analysis was conducted on Microsoft Excel and SPSS, dependent upon the statistical test. Before analysis or sampling, the police crime data were cleaned, removing 21 recorded crimes prior to 2018, and one police incident opened in error. The initial sample was reduced by this study's definition of a park; as no agreed definition exists, this study used a combination of current academic definitions and government guidelines. For this study, a park is "a bounded area of public open space maintained in a natural or semi-natural state" (Hilborn, 2009, p.4), which contains one or more features (Manchester City Council, n.d). Requirements were determined using Google satellite imagery and park websites excluding facilities such as open fields and cricket grounds. The dataset was reduced to 559 recorded crimes across 56 parks and 1192 police incidents across 35 parks. Each park was assigned a specific number for analysis. This sample was used for the RQ1: to explore the spatial concentrations of park crime across Kirklees and form the basis for case study selection. The remainder of this chapter will address the data analysis for each research question and the subsequent case study approach. The following sections will outline each research question. Statistical tests and explanations of the analysis are explained in the results chapter.

In response to RQ1, descriptive statistics were used to explore the spatial distributions of crime. The nature of park crime was first explored by the distribution of offence types and broader crime categories. To not limit findings to any specific offence type, recorded crime data were categorised as violent, property and disorder (McCord & Houser, 2015),

outlined in appendix 2. The sample distribution was explored using tests of normality and the Gini Coefficient. Next, the degree of crime concentration was determined using J-Curves and cumulative crime concentrations for total recorded crime, police incidents and each crime category to observe any distinct spatial patterns. Finally, the mean number of crimes and police incidents were calculated, and parks classified as 'risky facilities' were identified as having two or three times the mean.

The final part of RQ1 used bivariate correlation to test the effects of social disorganisation and park size on park crime distribution. This additional analysis was purely exploratory and to aid future studies. The council provided data regarding park size. To test social disorganisation, a new variable was created derived from the Index of Multiple Deprivation (IMD): a measure of seven domains (income, employment, education, health, crime, barriers to services and housing and living environment) assigned to 32,844 small areas referred to as Lower Super Output Areas (LSOA) (Kirklees Council, 2019b). Using mapping data, the parks were assigned their LSOA rank (between 1-10 whereby, 1=10% most deprived areas and 10=10% least deprived areas in the UK) (Ministry of Housing, Communities & Local Government, 2019). Where parks crossed over LSOA boundaries, the code was selected in which the majority of the park visually resided or the lowest LSOA to reflect the most deprived community served. However, this approach has several limitations. Firstly, the approach does not take account of how the level of crime in parks may be influenced by the users, conditions and IMD deciles of surrounding areas. Secondly, social disorganisation is multifaceted, comprising collective efficacy and structural factors; therefore, it is a difficult concept to operationalise (Brager & Clarke, 2014) andbeyond the scope of this study. Although deprivation does not necessarily equate to social disorganisation, areas of socio-economic deprivation tend to possess structural factors such as residential instability and ethnic homogeneity (Shaw & McKay cited in Steenbeck & Hipp, 2011) and, therefore, was selected as an acceptable proxy.

3.4 Phase 2: Case Study Approach

The following sections will outline the case study approach, including secondary data analysis and site observation of two risky parks.

3.4.1 Sampling

The secondary crime data analysis, outlined for RQ1, was used to identify the case study parks. According to Yin (2009), a case study selects a case that generates data critical to answering the research aim. As this study aimed to analyse the environmental design of high-crime parks, identification was guided by absolute crime count and practicality outlined during the results chapter. Although the rate per hectare was considered,

regardless of size, high crime parks still disproportionately contributed to police demand and, therefore, most warranted exploration. Recorded crime and police incident data were analysed to represent temporal crime patterns. As this was not provided for all parks, only facilities possessing both datasets were included in the final sample (27 parks totalling 479 recorded crimes and 1164 police incidents) from which the two case studies were selected. Initially, parks were defined as risky if they possessed a total crime count three times the mean (Flynn, 2018). Due to the above data limitations and the reduced sample size, this definition was extended to two times the mean.

Two risky public parks were chosen for the case study. Aerial park views were obtained from Google Earth. The first location, Park 2 (figure 1), occupied 13.67-hectare and was approximately 0.5 miles from Huddersfield town centre. The park opened in 1884 and, in 2014, had undergone a four-year £3.5 million restoration project.

Figure 1: *Park 2 Aerial View*

The second location, Park 5 (figure 2), was approximately 1.13 miles from Huddersfield town centre. The park at 4.57-hectare is a donated former estate opened to the public in 1921. As shown in figures 1 and 2, the parks share some physical similarities. As well as being located close to Huddersfield town centre, the parks are adjacent to A-roads, which connect towns and cities and are bounded by entire road networks.

Figure 2: *Park 5 Aerial View*

3.4.2 Secondary Data Analysis

In response to RQ2, descriptive statistics were used to explore the nature of park crime, specifically, which types and when crime concentrate in parks. The case study data were cleaned and coded. The analysis outlined for RQ1 (section 3.3.2) was replicated for the case study parks to explore the distribution of offence types and crime categories. Next, the study explored the temporal patterns of recorded crime and police incidents using the distribution of crime counts and percentages across time. Several temporal variables were created and analysed using specific sources: annual (financial years), daylight versus darkness according to sunrise and sunset times to account for seasonal variations (UK weather cams, n.d.), day of the week, season using the meteorological measure (Met Office, n.d.) and hour of the day. For the hourly analysis, each offence was assigned an hour of occurrence. The original data contained both an incident start and end time, showing the duration of the offence or possible time parameters. The earliest time was selected to ensure consistency and create a single time point for analysis. For example, any crime that occurred between 13:00-13:59 was categorised as 13:00pm. Analysis of when crimes occur can reveal distinct temporal trends (Clarke & Eck, 2003), which were anticipated to relate to environmental design, guardianship and routine activities of users.

3.5 Site Observations

This study collected primary data using systematic site observations (SSO). SSO systematically record a phenomenon using pre-determined categories, permitting replication (Sampson & Raudenbush, 1999) and enhancing reliability (Yin, 2009). Observational methods were selected over other methods, such as interviews, to physically immerse the researcher within the park context (Yin, 2009), enabling the capture of visual constructs, such as disorder (Tower & Groff, 2014; Sampson & Raudenbush, 1999) and direct exploration of how environmental features, guardianship and usage function in parks (Groff & McCord, 2011; Marzukhi et al., 2018). Despite the clear benefits, observational methods have limitations. Although researcher bias was reduced through minimising contact with park users, presence alone may have altered the event under observation (Yin, 2009). Attempts to minimise this are discussed in section 3.6. Furthermore, the recording of specific park features may have entailed some elements of subjectivity that could affect validity and reliability (Gray, 2014). To minimise this issue, this study carried out a pilot (section 3.5.2) and considered the researcher's subjectivity. This reflexive approach, defined as an awareness of the researcher on the research process (Gray, 2014), is discussed in section 5.5.

3.5.1 Observation Design

The observation consisted of three key sections to capture data relating to (1) environmental features associated with CPTED and guardianship, (2) park usage and (3) social and physical disorder. There was space to note any additional comments. For construct validity, the observation was formed by merging appropriate existing measures (Gray, 2014) and considering the CPTED principles and their representative features established in the literature. There are available CPTED measures for private and public spaces (see Nemeth & Schmidt, 2007); however, this study employed an adapted and reformatted version of the 'Park Inspection Checklist' (Iqbal & Ceccato, 2016), which incorporated many of the features present throughout the literature, was explicitly designed for parks and incorporated distinct features significant to park crime. The original 'Park Inspection Checklist' (appendix 3) and the adapted version used in this study (appendix 4) are included at the end of this study.

Firstly, as CPTED measures tend to overlook the context surrounding the study site (Iqbal & Ceccato, 2016), external factors which may have driven park usage and potential crime, such as nearby land use (Kimpton et al., 2016) and weather (Cohen et al., 2009) were first recorded. This research aimed to explore the immediate park environment, therefore a thorough analysis of geographical juxtaposition is outside the scope and constraints of this study. Future research is advocated, to better explore this important concept. This should consider, and seek to separate the influence of, proximal,

meso and macro (Cozens et al., 2019) contexts that may contribute to park crime. By chance, the weather at each site observation was partly cloudy, unintentionally adding a layer of consistency to the subsequent findings. Following this, the first key section of the site observation was dedicated to identifying the frequency of 43 environmental design features categorised under the seven CPTED principles (Ekblom, 2011). There were several adjustments to the 'Park Inspection Checklist'. Previous studies have collected the presence of physical features; instead, the observation was adapted to measure frequency, providing more precise data about activity levels and guardianship (Groff & McCord, 2011) whilst still comparing presenceand absence with previous studies. In addition, there is no definitive list of CPTED features; therefore, the observation was extended to include five features prominent inbroader discussions. For example, territoriality included park adoption to indicate potential guardianship (Taylor et al., 2019). Duplicated measures were combined to streamline the observation. Activity support was restricted to park features, such as playgrounds, and the surveillance category remained centred around physical surveillance opportunities. Finally, in their evaluation, Beeler et al. (2011) noted the effects of cultural variations on the validity of CPTED measures. Hence, the observationwas adapted to the UK context, with scarce features, such as swimming pools, being removed.

Following the exploration of physical features, the site observation measured disorder. A measure of social and physical disorder variables (N=13) was created by combining existing studies (Garwood et al., 2000; Reynald, 2009; Sampson & Raudenbush, 1999; Tower & Groff, 2014) and literature (Hilborn, 2009). Each item was scored using an ordinal scale (0 = none, 1 = trace, 2 = some, 3 = heavy) (Tower & Groff, 2014) creating a total potential score of 18 for social disorder and 21 for physical disorder. Although not a conclusive method, sneaky measures (Garwood et al., 2000) supplemented the existing crime data by directly assessing disorder (Tower & Groff, 2014).

Finally, the observation explored several aspects of park usage. This measure was underpinned by the System for Observing Play and Recreation in Communities (SOPARC) (Cohen & Han, 2018). SOPARC was initially a tool used to calculate the rate and nature of park activity and explores the numbers and types of users, user characteristics and behaviour within the park. In this study, SOPARC was used as a framework for understanding the nature of park usage. As opposed to recording frequencies, scoring and grouping systems or open notes sections were created for each variable for ease and depth. By way of illustration, types of users were categorised as legitimate, illegitimate or police per Blair et al. (2017). It must be noted that these findings are not reflective of the complexity and various levels of guardianship as depicted by Guardianship in Action (Reynald, 2009); however, they enable an introductory explanation of temporal crime

patterns.

3.5.2 Pilot

Due to the above alterations of the site observation, a pilot study was conducted in May 2021, accompanied by a supervisor. The pilot study established the feasibility of the observation and enabled the adjustment of questions and formatting, improving the overall reliability and validity (Neuman, 2014). The pilot study found that the site observation required minor changes from recording the features to a series of questions; for example, counting the numbers of CCTV cameras was extended to record the camera visibility, types, and any signage. Research safety and the ethics of fieldwork are discussed in section 3.6.

3.5.3 Procedure

As facilities have distinct activity cycles that contribute to their crime problems, observations were conducted at various times (daytime and evening) and days of the week (weekday and weekend) (Clarke & Eck, 2003) in May 2021 (see Table 2). This reduced the likelihood of drawing inferences about behaviour that are valid at only specific time points (Bryman, 2016). The observations lasted between 26 minutes and 1 hour 34 minutes, with the initial observation being longer to record the frequency of park features. Observation times were conducted based upon temporal crime patterns, discussed later in the next chapter, to explore environmental explanations for varied crime levels. The researcher completed all data collection. Although it would have been advantageous to ensure consistency of the observation (inter-rater reliability) across multiple observers (Nemeth & Schmidt, 2007; Reynald, 2009), this was not possible under the time and resource constraints of a master's study. Instead, reliability was improved through repeated site visits (Nemeth & Schmidt, 2007). The site observation was completed four times in each park, totalling eight observations. Before commencing the observations, details of the location, date, start, and end time were collected for future replication and reliability (Yin, 2009).

Table 2: *Site Observation Timetable*

	Date	**Time**
Park 2	25/05/2021 (Tues)	10:28-12:00
	25/05/2021 (Tues)	15:00-16:15
	28/05/2021 (Fri)	21:55-22:21
	29/05/2021 (Sat)	13:45-14:51
Park 5	27/05/2021 (Thurs)	10:40-12:14
	27/05/2021 (Thurs)	16:24-17:27

28/05/2021 (Fri)	21:11-21:37
29/05/2021 (Sat)	12:30-13:23

To ensure that each location was reviewed systematically, the park perimeter was first inspected, followed by a complete assessment of the facility. Time was spent observing park usage and behaviour. Due to ethical constraints on researcher safety, the criminogenic night usage of parks (Payne & Reinhard, 2016; Kimpton et al., 2016) could not be explored; however, perimeter observations from a vehicle were conducted to account for lighting. Field notes were written up electronically immediately after observation to maintain accuracy, prevent memory decay, and avoid omitting crucial details (Gray, 2014). Alongside the observations, various other forms of data were collected. Satellite maps of the park sites were annotated with high physical and social disorder areas aiding the analysis of environmental features contributing to the crime geography. Furthermore, visual images (photographs) were collected to portray "a precise record of material reality" (Rose, 2016, p.310), support the observational findings by reducing subjectivity (Yin, 2009) and illustrate the park context to the reader.

3.5.4 Analysis

After the site observations, the data were written up formally onto a word document for analysis. Per Beeler et al. (2011), the principles of CPTED were analysed in turn and data were presented for each case individually. Next, social and physical disorder scores and park usage were presented at each time point, followed by an exploration of trends and patterns. In response to RQ3, the results were then used to explain the observed spatial and temporal crime trends, thus exploring the functioning of CPTED, guardianship, and park usage in parks. Although the study was exploratory, a research framework was formulated to support internal validity (Gray, 2014). Based on the current knowledge, it was assumed that CPTED and guardianship features would contribute to any observed crime patterns. To further increase validity, rival explanations were considered and eliminated (Yin, 2009) when reaching conclusions. The data from each park were integrated during the discussion chapter.

3.6 Ethical Considerations

This research was conducted following the British Society of Criminology's Code of Ethics (2015) and the General Data Protection Regulation (2018). Before commencing the study, ethical approval was obtained from the University of Huddersfield School Research Ethics and Integrity Committee (SREIC) (appendix 5).

As defined by Webster et al. (2014), informed consent is obtained by providing participants with adequate information regarding the study to enable advised, voluntary participation. For phase 1, permission to study was collected from Kirklees Council. It can be difficult to gain consent in fieldwork when participants cannot be predicted (Webster et al., 2014) and without disturbing the setting under observation (Gelinas et al., 2016). Hence, gaining consent from large numbers of park users would have been counterproductive, potentially resulting in the Hawthorne Effect, whereby behaviour is adjusted toward the known researcher presence (Spicker, 2007), threatening the study's validity (Gray, 2014). Moreover, as this research occurs within a public space setting, shared by community members (Madanipour, 2003) and where privacy is not guaranteed (Social Research Association, 2003), the requirement of consent to observe behaviour is reduced. Finally, park users were not recruited, and their behaviour and original activities were not disturbed or defined by this study. Therefore, Bailey (1996) proposes that such research has limited potential harm for participants. Thus, it was determined that informed consent was not required.

The fieldwork aimed to collect detailed data, requiring a closeness between researcher and participants (Thomas, 2016). Confidentiality and anonymity were implemented through the research to ensure that participants' identities were protected (Webster et al., 2014). To achieve this, no personally identifiable characteristics or behaviour was collected (Social Research Association, 2003) throughout the fieldwork. Moreover, victim and offender information were not requested, and it was removed before receiving the secondary crime data. As a result, the associated findings were wholly anonymous (Bailey, 1996), resulting in minimal intrusion on people's right to privacy (Gelinas et al., 2016), and participants were protected from any adverse research effects (Gray, 2014). As no data were associated with a specific participant, the study did not implement any further confidentiality measures or the right to withdraw.

According to the British Society of Criminology (2015), researchers are responsible for minimising harm to participants, including any psychological or physical effects, during and after the research. Harm was anticipated throughout the research (Gray, 2014); even though this study did not directly interact with human subjects, there remained potential for unexpected emotional distress to park users. To minimise this harm, data capture such as note-taking was discreet (Thomas, 2016), and the researcher carried an identification form (appendix 6) which included a summary of the research purpose and included reference to further external guidance (Matthews & Ross, 2010). Additionally, during the fieldwork, it was anticipated that crimes might occur. This study respected the conflict between collecting insightful findings and preventing participant harm (Gray,

2014; Webster et al., 2014) by discussing all findings anonymously. Data would have been shared in the two outlined circumstances; per the legislation, offences including terrorism, financial offences related to terrorism, money laundering, child abuse, and neglect (British Society of Criminology, 2015), or if the researcher deemed that members of the public were at significant risk of harm. These crimes would have been reported; however, this was not encountered.

Researcher safety is an overlooked aspect of ethics (Gray, 2014) and was a significant consideration in this study. A risk assessment (appendix 7) was conducted, which deemed that precautions were taken before, during and after the fieldwork (Webster et al., 2014). Specifically, the research was carried out accompanied by a nominated person (Gray, 2014) and abided by general safety precautions such as carrying a charged mobile telephone, disclosing the observation schedule (Thomas, 2016) and reporting safety to supervisors. Also, if witnessing a crime or distressing incident, support would be sought from supervisors and University services. Finally, data were protected through multiple measures. Before the research took place, an informal meeting was arranged between the researcher and council representative, outlining the provision, analysis, and data storage. Data were collected, stored, and handled according to the University's Data Protection Policy on password-protected devices and observation notes in a locked location. Data were solely used for this study's purpose (Thomas 2016), and data access was exclusively restricted to the researcher and noted supervisors (Webster et al., 2014). The data will be stored for the recommended period of 10 years (unless requested otherwise by Kirklees Council) to aid the transparency and integrity of research.

3.7 Conclusion

This chapter has aimed to guide the reader through the research purpose, presenting the pragmatic process of designing and implementing this two-phase study in response to the research questions. Throughout, this section has provided an overview and justified the choice of methodology and methods and outlined the method used for data analysis. This study presents an in-depth approach to researching the park crime phenomenon due to its focus on observational methods and access to specialised crime data. Therefore, this study synthesises the gap and add to the growing literature on micro-level crime concentrations, park crime, and environmental design by providing rich data exploring two risky parks. Whilst the sample is small and not generalisable, this study creates a foundation for further, large scale research whilst advancing the current knowledge of risky facilities and environmental design in parks. This chapter has acknowledged the additional measures taken to improve validity and reliability. Moreover, limitations of the research procedure and external factors have been identified

alongside evidence of how these issues were reduced or overcome. The next chapter presents the results of the data analysis.

Chapter Four: Results

4.1 Introduction

This chapter aims to present the analysis of the secondary crime data and primary data from site observations in response to the research questions. This chapter will address each research question in turn. The first section features a risky facility analysis of parks exploring the distribution of crime and extent of crime concentration, followed by an exploration of social disorganisation and park-size effects. The following two sections will focus on the case study parks (N=2). The second section will explore the nature and temporal patterns of park crime. The final section will detail the findings of the site observations, addressing each case in turn. Throughout, references will be made to the patterns of the secondary crime data to explore the potential functioning of environmental design and guardianship.

4.2 The Spatial Distribution of Park Crime

4.2.1 Crime Concentration

RQ1 aimed to explore the spatial distribution of park crime. As discussed, this analysis was conducted on the larger Kirklees sample consisting of 559 recorded crimes at 56 parks and 1192 police incidents at 35 parks. The recorded crime data included 12 offence types, categorised by the Home Office Counting Rules for Recorded Crime (Home Office, 2013). Figure 3 illustrates that violence against the person (VAP) was the most prevalent offence type, accounting for over one-third (34.35%, n=192) of the total crime in parks. Police incident data included a variety of offences, mostly comprising calls for nuisance (25.17%, n=300), concerns for safety (12.67%, n=151) and covid-19 breaches and related concerns (12.42%, n=148).

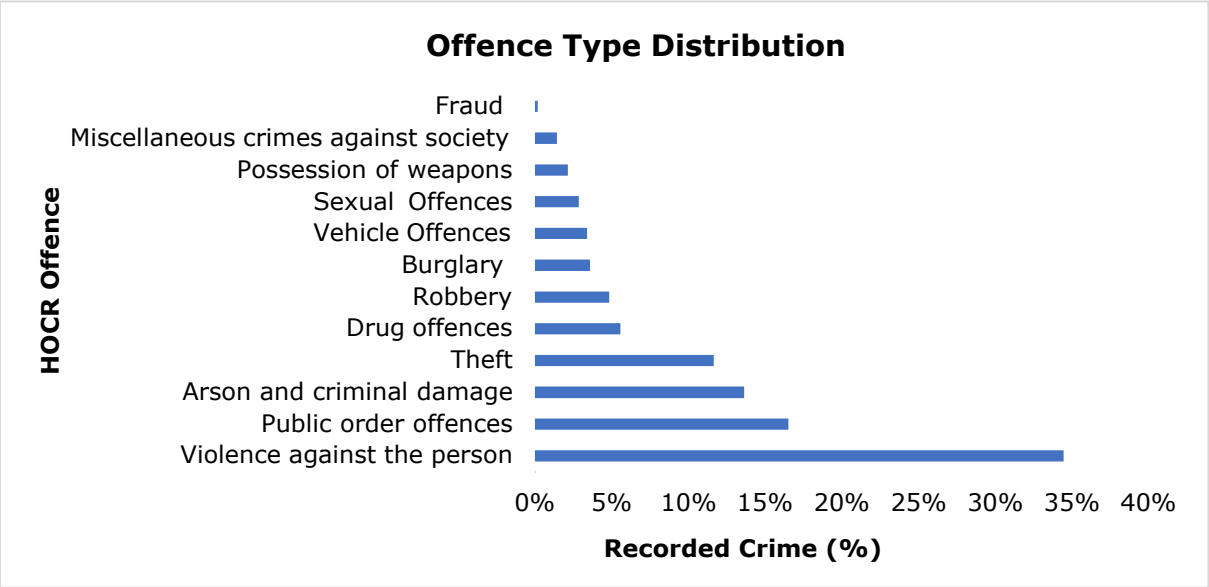

Figure 3: *HOCR Offence Type Distribution (n=559)*

Descriptive statistics presented in table 3 revealed that between 2018-2021, each park experienced on average 9.98 recorded crimes and 34.06 police incidents. Recorded crime ranged between 1 to 100 (SD=17.881), and incidents ranged between 1 to 230 (SD=61.688), which initially indicated that offences were not equally distributed across parks.

Table 3: *Descriptive statistics of Recorded Crime and Police Incident Count*

	Recorded Crime	**Police Incidents**
Number of Parks	56	35
Count	559	1192
Mean	9.98	34.06
Std. Deviation	17.881	61.688
Minimum	1	1
Maximum	100	230

In order to test the distribution of crime across parks, this study used a Kolmogorov-Smirnov[a] test. This non-parametric test calculated the distance between the hypothesised and normal distribution (Razali et al., 2012). The results demonstrated that

recorded crime and police incidents significantly differed from a normal distribution ($p<0.001$), whereby data were distributed symmetrically around the mean in a 'bell' curve (Matthews & Ross, 2010). This significant finding indicated that a subset of parks in the sample accounted for a large proportion of crime.

The Gini coefficient (Fox & Tracy, 1998) was calculated to explore this further. The Gini coefficient statistically measures the sample concentration by quantifying the degree of inequality, whereby a coefficient of 0 = perfect equality and 1 = perfect inequality (Curiel et al., 2018). In other words, a Gini coefficient of 0 would mean every park had an equal share of crime, whereas a coefficient of 1 would mean all crime occurred in one park. As performed by Flynn (2018), the Gini coefficient (G) was calculated using Xu's (2004) formula:

$$G = 1 - \sum_{k=1}^{n} (X_k - X_{k-1})(Y_k + Y_{k-1i})$$

For recorded crime, the calculated G was 0.659756, and for police incidents was 0.713087. According to Flynn (2018), there is no defined threshold; however, in previous uses, a score above 0.4 (excluding zero-crime facilities) is considered in keeping with the literature on distribution and can be taken as evidence of crime concentration. These findings demonstrated a highly unequal distribution of recorded crime and police incidents across parks. These results have indicated that crime is concentrated in a small number of parks.

Next, the specific distribution was determined through J-curves and cumulative crime concentrations. Figures 4 and 5 revealed that when ranked and plotted, the distribution of recorded crime and police incident counts follow that of a J-curve, consistent with the concept of risky facilities. Albeit, recorded crime is more of a distinct 'J', potentially attributed to the larger sample size

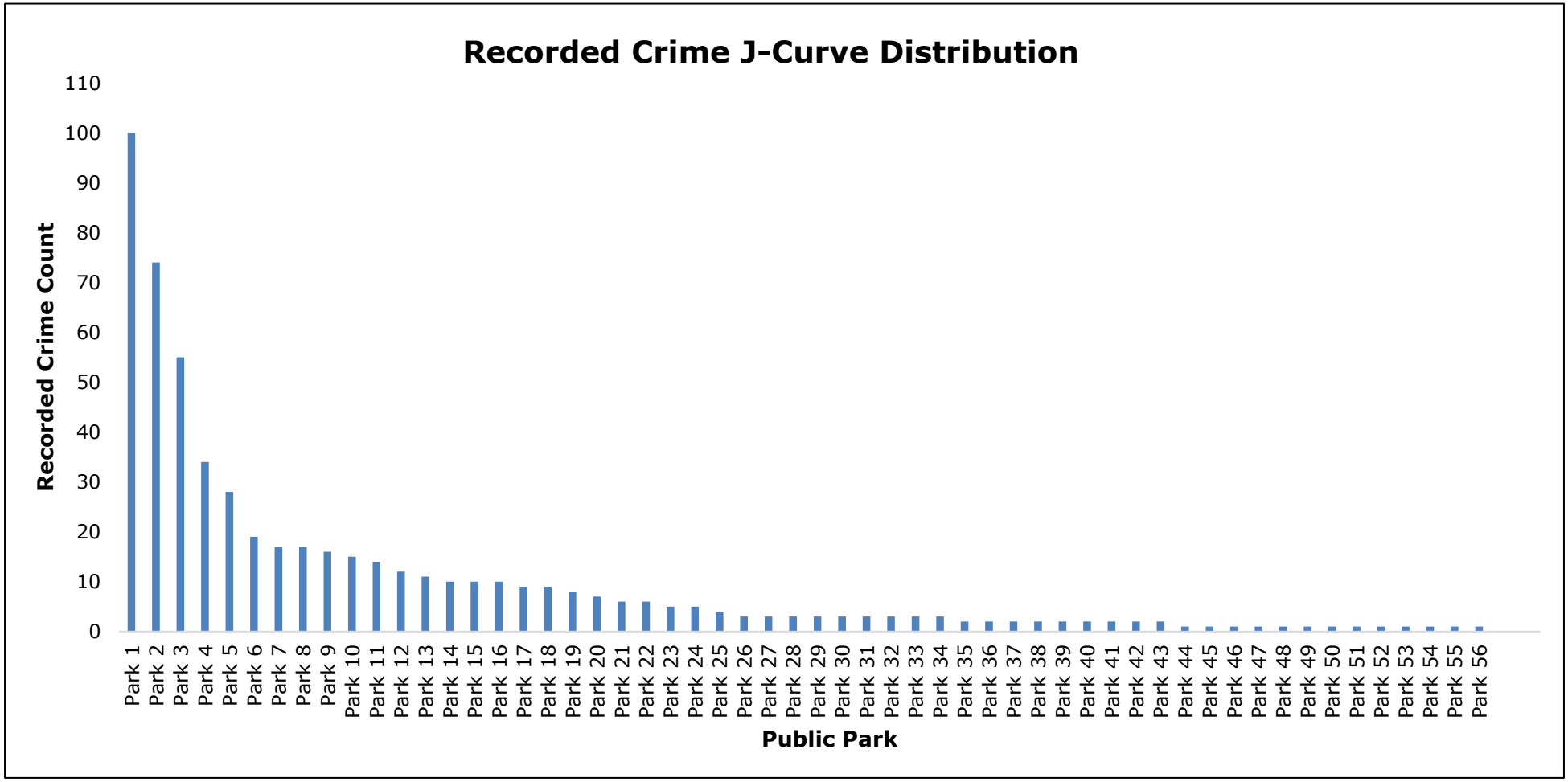

Figure 4: *Recorded Crime J-Curve (N=559)*

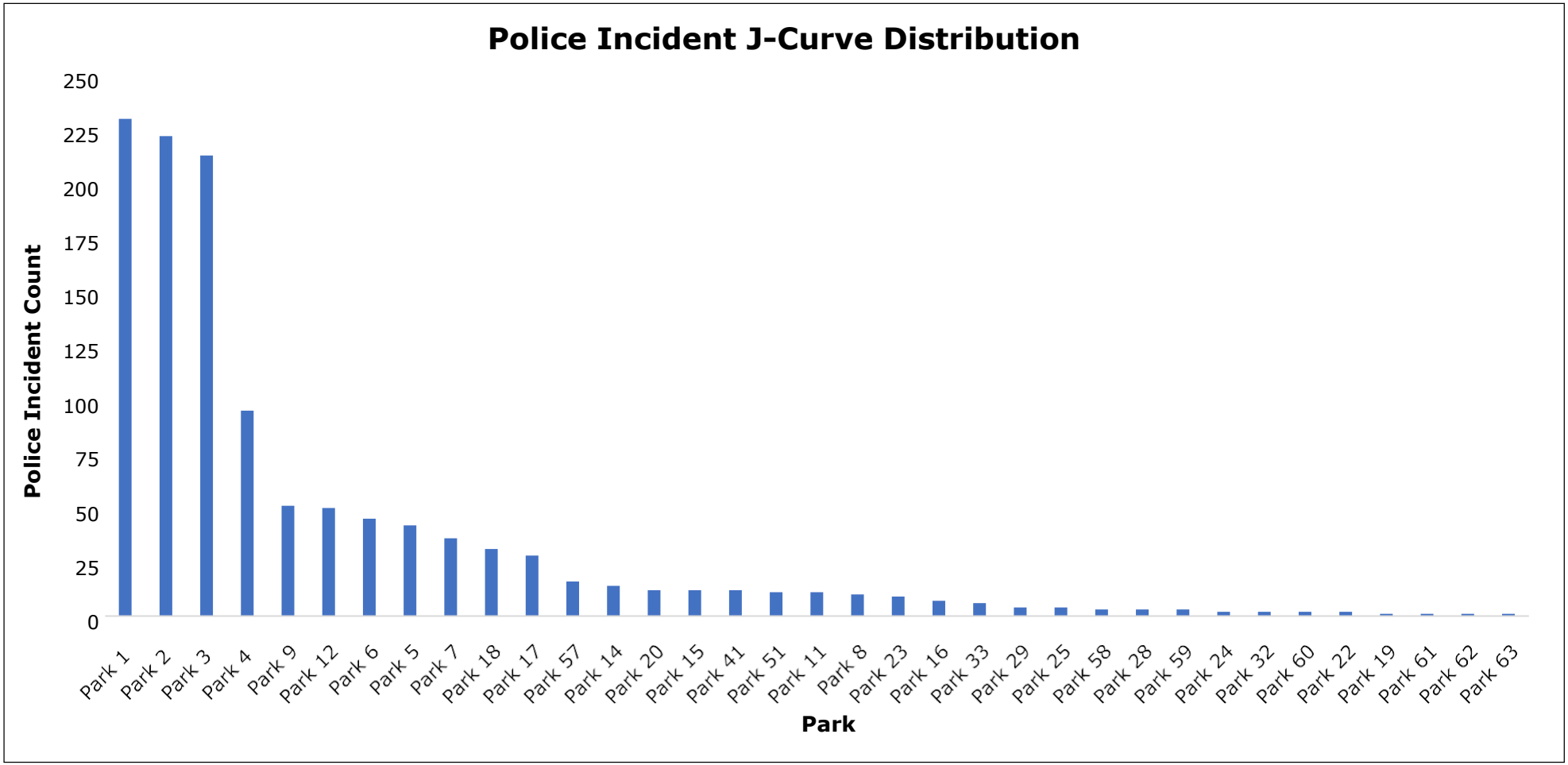

Figure 5: *Police Incidents J-Curve (N=1192)*

Next, the cumulative crime concentrations displayed the extent of crime concentration in parks. Following the risky facility literature, specifically, the 80/20 rule and Weisburd's (2015) Law of Crime Concentration, the tables below present the percentage of premises contributing 25%, 50%, and 80% of recorded crime and police incidents to the nearest possible percentage.

Table 4: *Cumulative Recorded Crime Contribution*

Park (N=56)	Total Crime Count (N)	Cumulative Crime Count (N)	Cumulative % of Crime	Cumulative % of parks
Park 1	100	100	17.89	1.79
Park 2	74	174	31.13	3.58
Park 3	55	229	40.97	5.36
Park 4	34	263	47.05	7.15
Park 5	28	291	52.06	8.93
Park 6	19	310	55.46	10.72
Park 7	17	327	58.50	12.50
Park 8	17	344	61.54	14.29
Park 9	16	360	64.40	16.08
Park 10	15	375	67.08	17.86
Park 11	14	389	69.59	19.65
Park 12	12	401	71.74	21.43
Park 13	11	412	73.70	23.22
Park 14	10	422	75.49	25.00
Park 15	10	432	77.28	26.79
Park 16	10	442	79.07	28.58
Park 17	9	451	80.68	30.36

Table 5: *Cumulative Police Incident Contribution*[1]

Park (N=35)	Count of Police Incidents (N)	Cumulative Police Incidents (N)	Cumulative % of Police Incidents	Cumulative % of Parks
Park 1	230	230	19.30	2.86
Park 2	222	452	37.92	5.71
Park 3	213	665	55.79	8.57
Park 4	95	760	63.76	11.43
Park 9	51	811	68.04	14.29
Park 12	50	861	72.23	17.14
Park 6	45	906	76.01	20.00
Park 5	42	948	79.53	22.86
Park 7	36	984	82.55	25.71

[1] The number of parks equating to 80% of crime was less for police incidents hence the reduced number of parks in this table.

Table 4 shows that 3.58% (n=2) of parks contributed 31.13% of crime, 8.93% (n=5) of parks contributed 52.06% of crime, and 30.36% (n=17) of parks contributed 80.68% of crime. Table 5 displays the cumulative distribution of police incidents. Results shows that 2.86% (n=1) of parks contributed 19.30% of incidents, 8.57% (n=3) of parks contributed 55.79% of incidents and 25.71% (n=9) of parks contributed 82.55% of incidents. In summary, the results suggest that a small proportion of parks are responsible for a large proportion of recorded crime and police incidents, consistent with the concept of risky facilities.

To further analyse crime distribution, three crime categories: violent, disorder and property, were compared to observe if specific crime types tended to be more unequally distributed or presented unique patterns. When crime categories were grouped, a contrasting crime type distribution was observed compared to individual offence types (figure 3). Figure 6 reveals that disorder crime occupies the greatest proportion of offences (39.18%, n=219), closely followed by violent crime (37.21%, n=208) then property (23.61%, n=132).

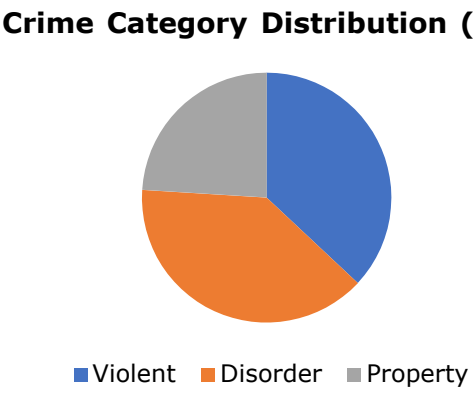

Figure 6: *Crime Distribution Per Category*

J-curves (presented in appendix 8) and cumulative concentrations were produced for each crime category at 25, 50 and 80% (to the nearest percentage). Each crime category produced a J-curve distribution demonstrating that violent, disorder and property crime were individually concentrated in a small number of parks.

Table 6: *Cumulative Crime Concentration Per Crime Category*

	25%	**50%**	**80%**
Property	25.76% in 1.78% (n=1)	50% in 3.57% (n=2)	81.06% in 16.07% (n=9)
Violent	23.08% in 3.57% (n=2)	50% in 12.5% (n=7)	81.25% in 35.71% (n=20)
Disorder	28.77% in 3.57% (n=2)	51.60% in 8.92% (n=5)	80.82% in 25% (n=14)

Table 6 reveals that the intensity of crime concentration varies. It appears that property crime was most concentrated at the 25, 50 and 80% levels, followed by disorder then violent crime. This analysis found that 81.06% of property crime was concentrated in just 16.07% (n=9) of parks, whereas 81.25% of violent crime was concentrated in 35.71% (n=20) of parks. This finding indicates that property crime is concentrated in fewer parks, whereas violent and disorder crimes are more distributed throughout the sample. It would have been advantageous to calculate Gini coefficients per crime category; however, this was not possible due to the small sample size.

4.1.2 Identifying Risky Facilities

There are many methods to identify 'risky facilities', such as facilities that contribute a certain proportion of crime or simply the top 5 ranked facilities. This study determined risky facilities using multiples (two and three times) of the mean. According to Flynn (2018), three times the mean is optimum, enabling the capture of a large proportion of crime for a relatively small proportion of facilities. This study extended the threshold to two times the mean due to the small sample size and the need to identify two case study parks within a size range suitable for site observations (deemed less than 15 hectares). Table 7 presents the results of the mean calculations.

Table 7: *Risky Facility Means*

	Parks (N)	**Count (N)**	**Mean (N)**	**2x mean (N)**	**3x mean (N)**
Recorded Crime	56	559	9.98	19.96	29.94

Recorded crime has a mean of 9.98; therefore, parks with a minimum of 19.96 crimes (2x the mean) or preferably 29.94 (3x the mean) were classified as risky facilities. As shown in Table 4, the first four parks had three times the mean, plus Park 5 when utilising two times the mean. As Parks 1, 3 and 4 exceeded 15 hectares, Parks 2 and 5 were selected as case studies used for Phase 2 data collection and analysis.

4.1.3 Testing Social Disorganisation and the Park-Size Hypotheses

To offer some explanation for the risky facility pattern, this study explored whether social disorganisation and park size were related to the spatial distribution of park crime. Due to the established non-parametricity of the sample, Spearman-Rho was used to test the significance of any association. First, correlational analysis indicated the strength and direction of the association between the two sets of variables (Bryman & Cramer, 2011). The association between recorded crime counts and IMD Decile was established visually using scatter graphs (Greasley, 2007). As predicted, figure 7 reveals a weak (R^2=0.021) negative association. Therefore, crime count increases as the IMD decile decreases (becomes more deprived). This correlation suggests that more crime occurs in parks that are situated within deprived neighbourhoods however, this association was weak and did not reach statistical significance (rho = -.170, p= .211). Therefore, there was no apparent association between factors of social deprivation, which contribute to social disorganisation, and recorded crime count in parks.

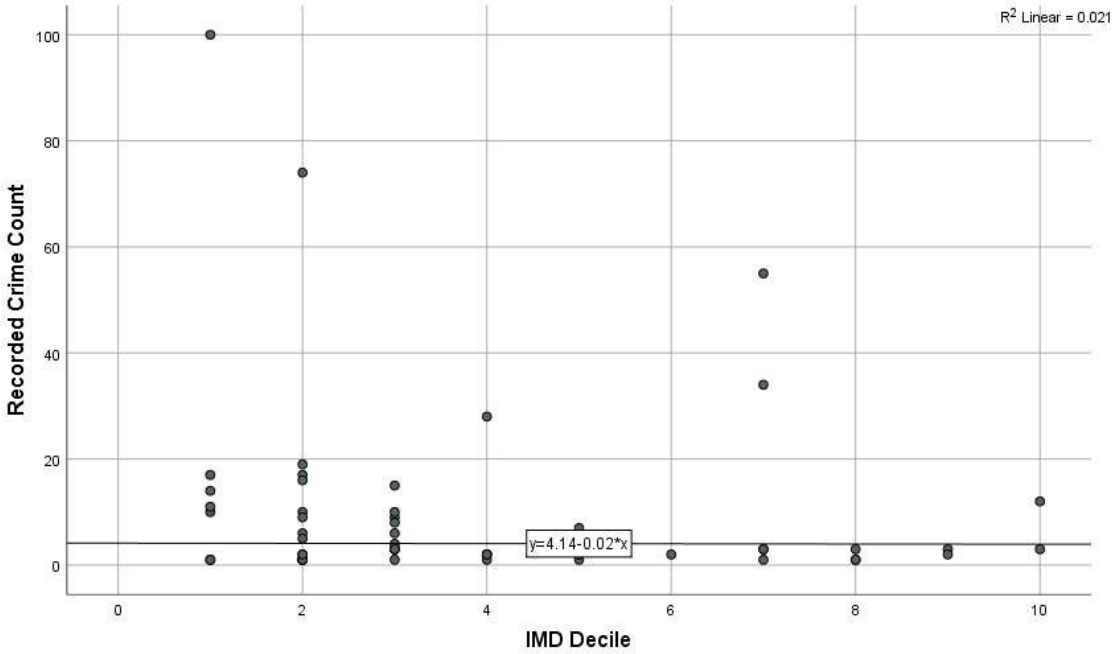

Figure 7: *Correlation between Recorded Crime Count and IMD Decile (n=56)*

The same procedure was repeated to explore the association between recorded crime count and park size, represented as hectares.

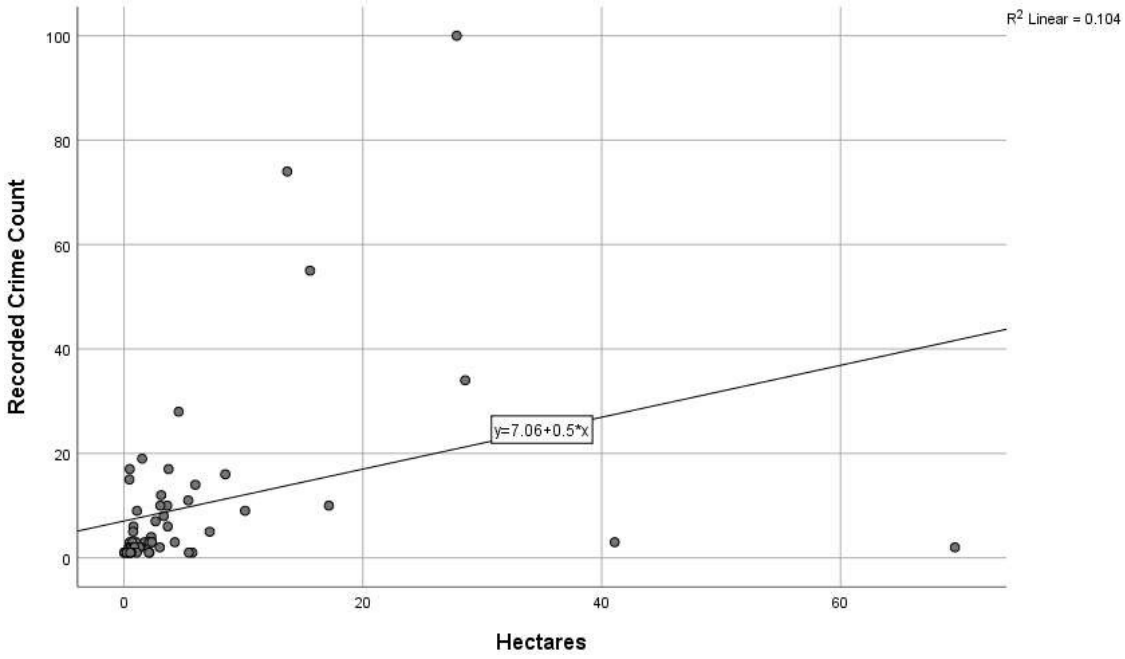

Figure 8: *Correlation between Recorded Crime Count and Park Hectares (n=56)*

Figure 8 demonstrates a weak (R^2=0.104) positive correlation between hectares and recorded crime count, which was statistically significant (rho = .539, p= < .001). These findings suggest that larger parks are more likely to experience crime; therefore, park size may offer some explanation for heightened crime rates and the creation of risky facilities.

4.3 Nature of Crime – Case Study Parks

Descriptive analyses were used to explore the nature and temporal patterns of crime in the two case study parks. Park 2, at 13.67-hectare, experienced 74 recorded crimes (9.84% of the whole sample) and 222 reported incidents (17.87%). Moreover, when split by crime type, the park was responsible for 25.76% of property crime, 11.87% of disorder crime, and 7.69% of violent crime. Park 5, at 4.56-hectare, experienced 28 recorded crimes (5.01%) and 42 police incidents (3.02%). When split by crime types, the park was responsible for 3.03% of property crime, 5.48% of disorder crime and 5.77% of violent crime. Despite the varying crime counts per size, the parks possess a similar rate of recorded crimes per hectare, at 5.49 in Park 2 and 6.56 in Park 5, and thus, present two case studies of similar criminality. The rates of police incidents vastly

differ, at 16.2 in Park 2 and 9.4 in Park 5. The site observations may help explain this and the variance across crime types.

Figure 9 reveals several key findings. The parks differed in their most prevalent crime. In line with the Kirklees data, the most prevalent crime in Park 5 was violence against a person (42.86%, n=12). Whereas, in Park 2, the most significant proportion was theft offences (27.03%, n=20). As expected, drug and public order offences also make up a substantial and similar proportion of crime in both parks.

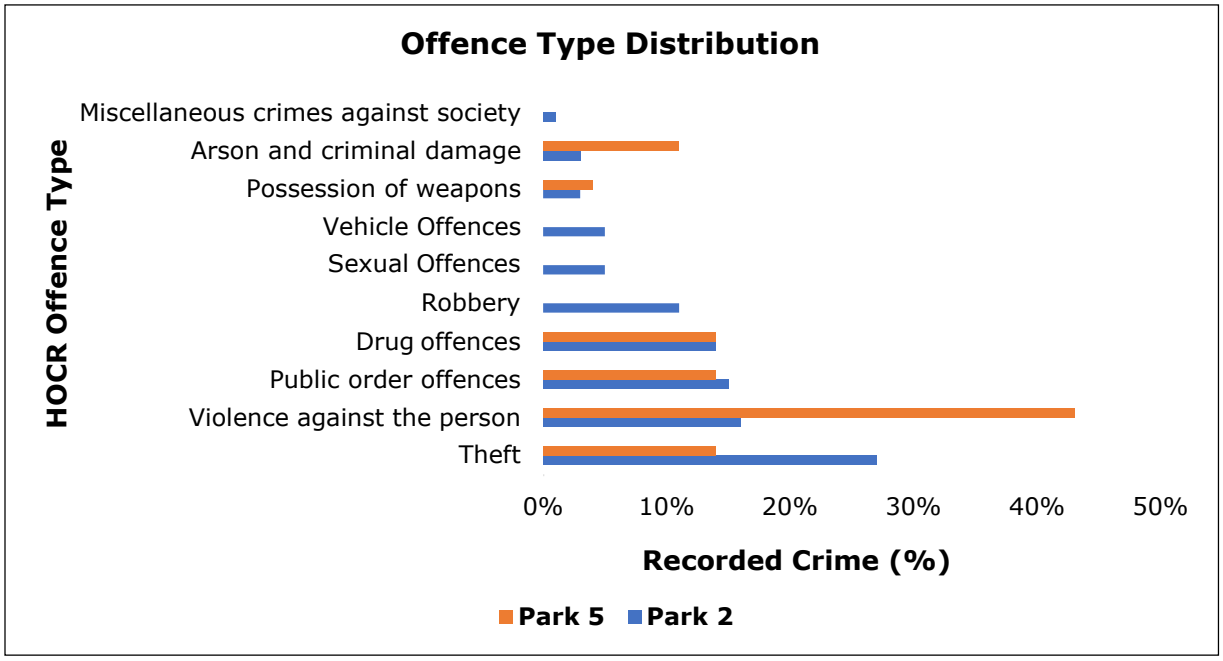

Figure 9: *Offence Type Distribution by Park*

Again, the parks showed distinct patterns when considering crime categories. As shown in figure 10 of the total crime in Park 2, the majority (43.24%, n=32) was property closely followed by disorder (35.14%, n=26) and then violent (21.62%, n=16). Following the broader Kirklees patterns, Park 5 had equal proportions of violent and disorder crime (42.86%, n=12), whereas property made up a much smaller proportion at 14.29% (n=4). Despite some more minor similarities in crime distribution, the data suggest that the nature of crime in Park 2 and 5 is dissimilar, indicating that the parks provide distinct locations for specific crime opportunities.

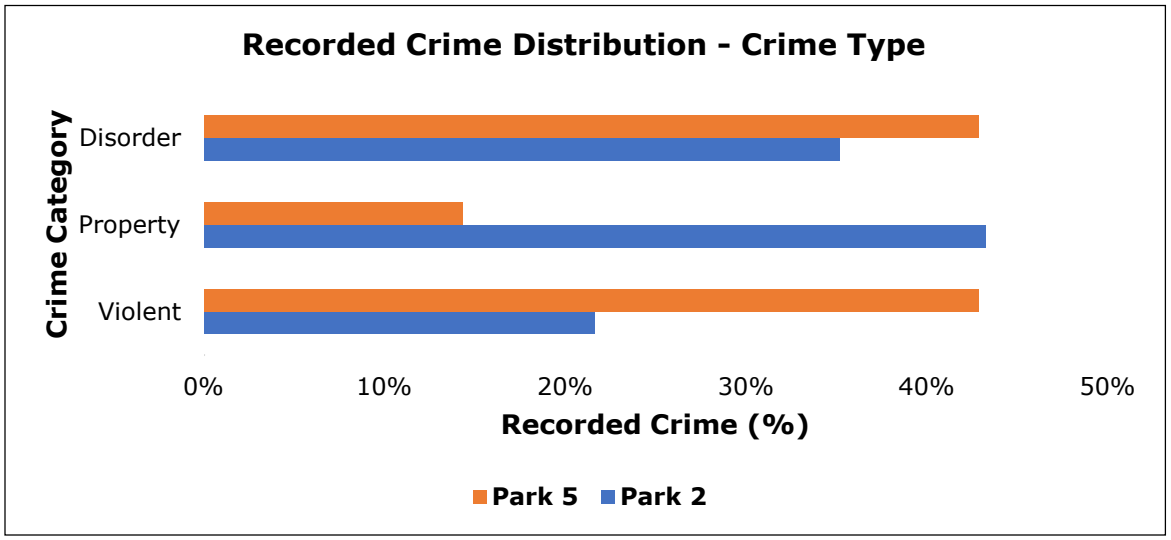

Figure 10: *Crime Category Distribution by Park*

4.3.1 Temporal Crime Patterns

This section presents the temporal concentration of crime in parks. Annual trends in the parks (figure 11) demonstrate that crime was noticeably greater in 2019/20.

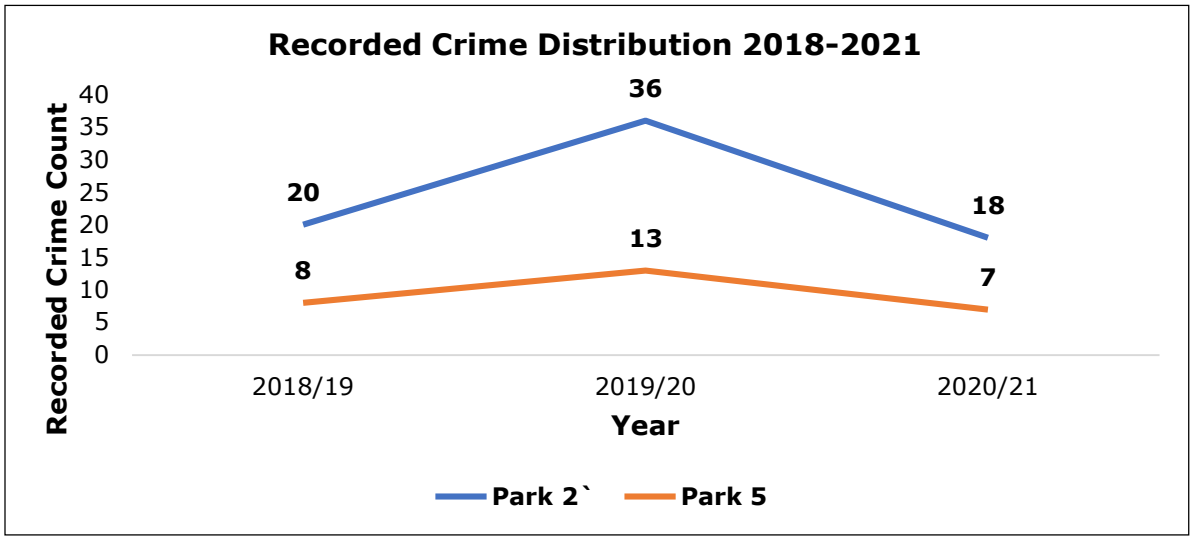

Figure 11: *Recorded Crime Distribution Per Year*

In contrast, the annual trends of police incidents display a different pattern. As shown in figure 11, police incidents have increased yearly. This study cannot accurately comment on the overall crime trends due to the small sample size split annually and without longer-term data. There are many potential explanations for the change in crime levels beyond the exploration of this study. Changes may be due to (1) national crime trends,

(2) the effects of Covid-19 restrictions and subsequent changes in usage, guardianship and reporting behaviour and (3) the introduction of a Public Space Protection Order (see Kirklees Council, n.d.) in 2019 and its potential deterrent effects and increased public vigilance. These areas require consideration for future research into the nature of park crime.

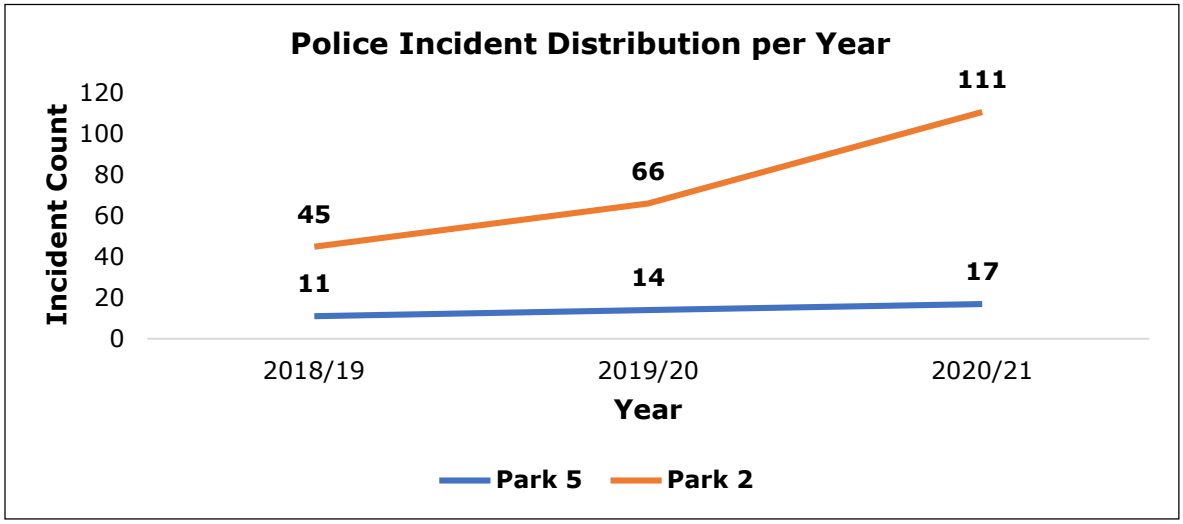

Figure 12: *Police Incident Distribution Per Year*

For the analysis of temporal patterns, it would have been advantageous to split the data by crime categories; however, the small sample sizes made it challenging to detect patterns and may have misrepresented the temporal patterns of offending. The distribution of total recorded crime and police incidents were compared across different time bands, presented in table 8.

Table 8: *Percentage of Recorded Crime and Police Incidents Across Time*

		Park 2		Park 5	
		Recorded Crime	**Police Incidents**	**Recorded Crime**	**Police Incidents**
Daylight vs Darkness	**Daylight**	70.27	73.87	57.14	61.90
	Darkness	29.73	26.58	42.86	38.10
Weekday vs Weekend	**Weekend**	31.08	28.83	17.86	11.90
	Weekday	68.92	71.17	82.14	88.10
School Day vs Non-School Day	**Non-School Day**	48.65	50.90	32.14	42.86
	School Day	51.35	49.10	67.86	57.14
Season	**Autumn**	25.68	18.92	17.86	21.43
	Spring	27.03	31.98	42.86	33.33
	Summer	37.84	29.28	25.00	26.19
	Winter	9.46	19.82	14.29	19.05

Firstly, this study explored the proportions of crime occurring during daylight and darkness. Derekscope (n.d.) states that the UK is in daylight 51% and darkness 49% in one year; anything above this was classified as disproportionate. This analysis found that a disproportionate amount of recorded crime and police incidents occurred during daylight hours. Specifically, in Park 2, just under three-quarters of recorded crime (70.27, n=52) and police incidents (73.87%, n=164) and in Park 5, over half of recorded crime (57.14%, n=16) and just under two-thirds of police incidents (61.90%, n=26) occurred during daylight. In addition, the site observations found that Park 2 was closed during the night (discussed in section 4.4.1). Although this was uncovered after the secondary data analysis, additional analysis was conducted and reported here for ease and expediency. Analysis of the times of offences found that 20.27% (n=15) of recorded crimes and 21.62% (n=48) of police incidents occurred after the park's hours of operation.

Secondly, this study explored the temporal patterns of crime between weekends and weekdays. Weekend days occupy a smaller proportion of the week at 29% and weekdays at 71%. This analysis found that in Park 2, just above two-thirds of recorded crime (68.92%, n=51) and police incidents (71.17%, n=158) and in Park 5, over four-

fifths of recorded crime (82.14%, n=23) and police incidents (88.1%, n=37) occurred on weekdays (Monday-Friday). Therefore, in Park 5, a disproportionate amount of crime occurred on weekdays whereas, in Park 2, the temporal concentrations of park crime aligned with the expected proportions. Further analysis of days of the week (table 9) interestingly revealed that in Park 5, over one-fifth of recorded crime occurred on Tuesday and Thursday (21.43%, n=6), yet only 3.57% (n=1) of recorded crime and 2.38% (n=1) of police incidents occurred on Sundays. In Park 2, recorded crime and police incidents are more evenly spread, ranging between 9.46-18.92 and 10.81-18.02. These findings suggest differences between the crime opportunities presented by the facilities on various days of the week. However, when split by days of the week, the sample size becomes small to draw affirmative conclusions.

Table 9: *Percentage of Recorded Crime and Police Incidents Per Day*

	Park 2		**Park 5**	
Day	**Recorded Crime (%)**	**Police Incidents (%)**	**Recorded Crime (%)**	**Police Incidents (%)**
Monday	16.22	14.41	14.29	11.90
Tuesday	10.81	10.81	21.43	19.05
Wednesday	9.46	11.71	10.71	23.81
Thursday	17.57	18.02	21.43	23.81
Friday	14.86	16.22	14.29	9.52
Saturday	12.16	17.12	14.29	9.52
Sunday	18.92	11.71	3.57	2.38

Next, this study utilised meteorological seasons whereby each season occupied 25% of the year. Analysis of seasonal concentration revealed that, as expected, recorded crime and police incidents were clustered during the Summer and Spring months and reduced during the Autumn and Winter. Specifically, Park 2 experiences most of the recorded crime in Summer (37.84%, n=28) and police incidents in Spring (31.98%, n=71). Furthermore, Park 5 experiences most of the recorded crime (42.86%, n=12) and police incidents (33.33%, n=14) during the Spring months. As there are more daylight hours during the Spring and Summer months, this finding may help explain the crime distribution between daylight and darkness.

Finally, following the grouped categories, recorded crime and police incidents were plotted to obtain a 24-hour pattern of offending. This analysis was purely exploratory. Overall, from figures 13 and 14, a distinct crime pattern can be observed. Recorded crime and police incidents similarly increase between the hours of 12pm till 8pm, albeit the pattern is less evident in Park 5. Site observations were carried out on weekday mornings and afternoons, and weekends to explore these patterns.

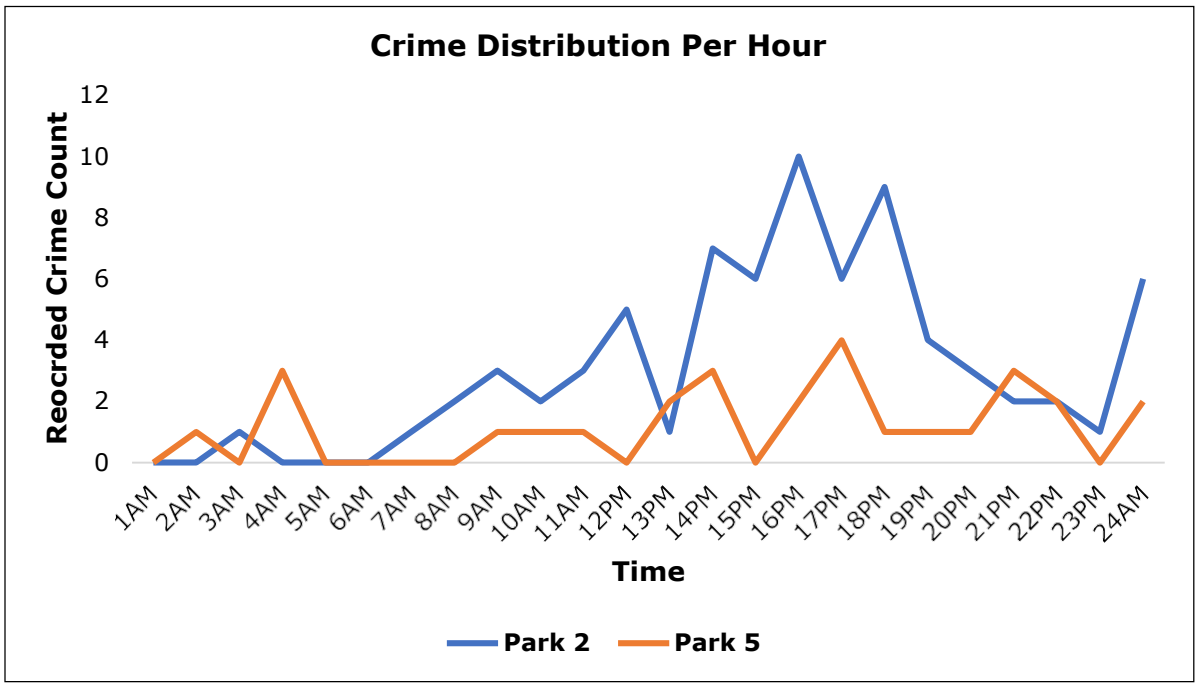

Figure 13: *Recorded Crime Distribution Per Hour*

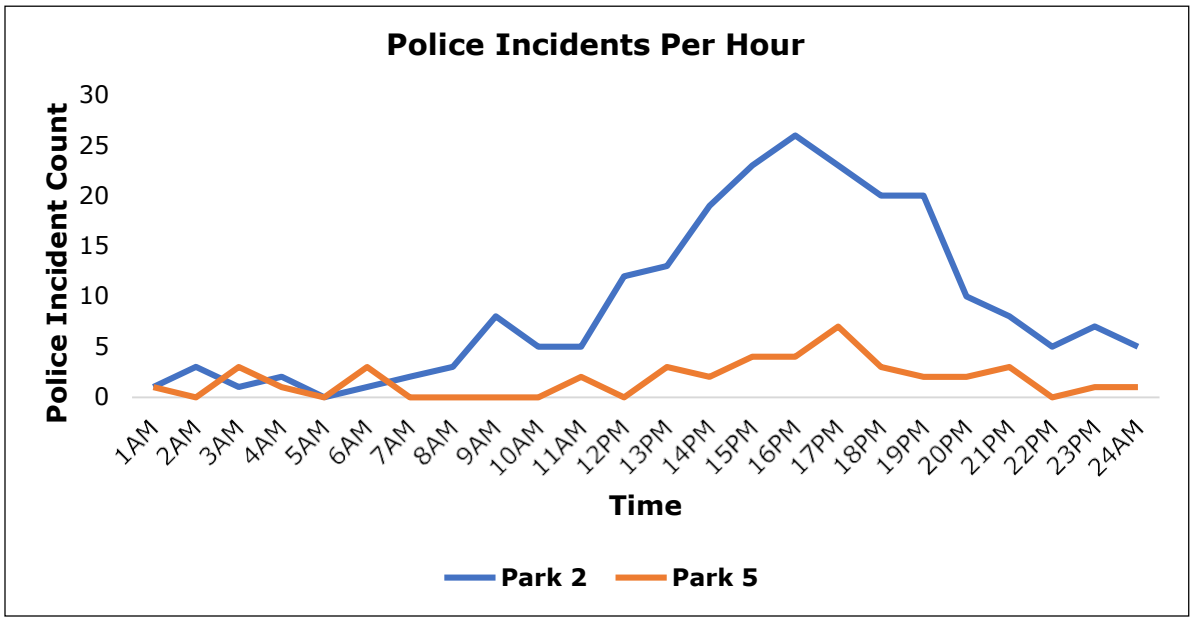

Figure 14: *Police Incident Distribution Per Hour*

4.4 Systematic Site Observations

The following section presents the findings of the site observations. The findings from each park are presented in turn, organised by CPTED principles alongside photographs collected by the author.

4.4.1 Case Study: Park 2

Park 2 is a 13.67-hectare facility located within the densely populated, urban area of Huddersfield. The park was bounded by residential streets of mostly detached housing and several adjacent businesses, including a pharmacy, café and care homes. South of the park was a sixth-form college for students aged 16-18 and northwest, a licensed premise.

Movement Control

A well-maintained 5.55ft – 6.5ft metal fence distinguished a perimeter boundary, which provided movement control in and out of the park from the surrounding streets. Most notably, the fencing design, shown in figure 15, prohibited or increased the difficulty for offenders to climb into or out of the park space and further ensured that users were compelled to move into and out of the park through designated points of entry.

Figure 15: *Perimeter Fencing*

As expected, the public could access the park through a high number of available entrances (n=8) consisting of well-defined, maintained metal gates. As discovered by the park signage, access was limited to daylight hours, opening at 7am each day and closed from 6-10pm according to season, which was displayed clearly on each entry point. This was an interesting finding considering that around 20% of recorded crime and police incidents occurred after the park's opening hours. Information and details of facility usage were displayed on signage throughout the park. In addition, movement was controlled with wide concrete pathways; however, some degree of freedom was preserved with multiple routes, as expected of open public park.

Defensible Space

The observations found that despite being an open public space, the park adhered to the concept of defensible space. The park had a defined perimeter, enabling users to determine park space from the surrounding residential streets. Signs were displayed at each entrance and throughout the park, outlining park, facility usage rules and park adoption (see figure 16). Territoriality was established with park adoption. Users were consistently reminded of the park ownership with signs from an independent voluntary group placed around the park. Finally, transitional space was commonly signified using natural features such as hedges, symbolic using park signs and changes in flooring and most commonly, physical using fencing and stone walls.

Figure 16: *Park Adoption*

Activity Support

Next, the researcher observed the provision of amenities. Of the listed amenities, the park featured just over two-thirds (n=11), including multiples such as three playgrounds and six tennis courts. Also, the park featured additional amenities beyond the site observation, such as a mini railway, lake and paddling pool. Most were freely accessible to all park users; however, several featured prescribed usage or rules—for example, a playground was restricted to children below five. Through observations, the placement of amenities was studied to consider conflicts of usage. The amenities were dispersed throughout the park, with the sports amenities (located east) and playgrounds (located centrally) separated by a large greenspace. It was recorded that the café and restaurant had specified opening hours; between 9–3pm on weekdays and 10–4pm on weekends.

Physical Security

Physical security frequently appeared throughout the park. Upon entry, the park had lockable entrance and exit points, locked security fencing and bollards to prevent vehicle access. Other typical forms of security were applied to the park buildings, such as alarms, roller shutters and window bars. Despite the park featuring many forms of physical security, it did not seem to impede the park's aesthetic. For example, features were matched to the colour schemes of park buildings or foliage was used to hide security fencing. In addition, CCTV was not present; therefore, surveillance was dependent upon park users, park staff or opportunistic patrols by the police. Finally, the park was covered by a Public Space Protection Order (PSPO) which prohibits anti-social activities deemed to have a "detrimental effect on the quality of life of those in the locality" and enables officers the power to issue fixed penalty notices (Local Government Association, 2018, p.3). Again, the presence of the PSPO was enforced by frequent signage.

Surveillance

For most of the park, landscaping and environmental design supported clear sightlines and natural surveillance of amenities and pathways. Other features were ineffective or directly obstructed surveillance. Firstly, in places, the natural landscaping and environmental design impaired surveillance. Park foliage was placed around the perimeter and did not interfere with natural surveillance within the park. However, as demonstrated in figure 17, foliage impaired surveillance opportunities and potential guardianship from the surrounding residences. Nevertheless, at eye level, the style of perimeter fencing enabled surveillance from the surrounding pavement; therefore, passers-by could observe park activity.

Figure 17: *Perimeter Foliage*

In addition, the design of some amenities provided concealment. For example, the lake pavilion in figure 18 was covered on three sides, which created darkness and blocked surveillance opportunities. Furthermore, minimal lighting was present. The park featured four tall Victorian lights situated around the park plus small wall lightings on amenities. The night perimeter observation revealed that these lights were non-functional. As the park was closed at night, lighting may have been redundant. This finding was interesting considering the disproportionate amount of crime during hours of darkness. Finally, due to the expansive park size, building placement, and natural landscaping, other areas were blocked from view.

Figure 18: *Lake Pavilion*

Image & Maintenance

This section gives an overview of the park's image and maintenance whilst a detailed exploration of disorder is discussed later. Possibly attributed to the recent renovation, Park 2 and its amenities were observed to be broadly well-maintained, featuring very low in graffiti, vandalism, or damage. The park appeared well-cared for, evidenced by the visible attempts to remove graffiti. The foliage was well-maintained, albeit taller than prescribed by the site observation, and there were no large overgrown areas. However, it was noted that in places, the foliage was problematic. By way of illustration, as displayed in figure 19, the natural aesthetic often resulted in darkened areas, and low-level foliage created blind corners creating areas for entrapment and of limited surveillance.

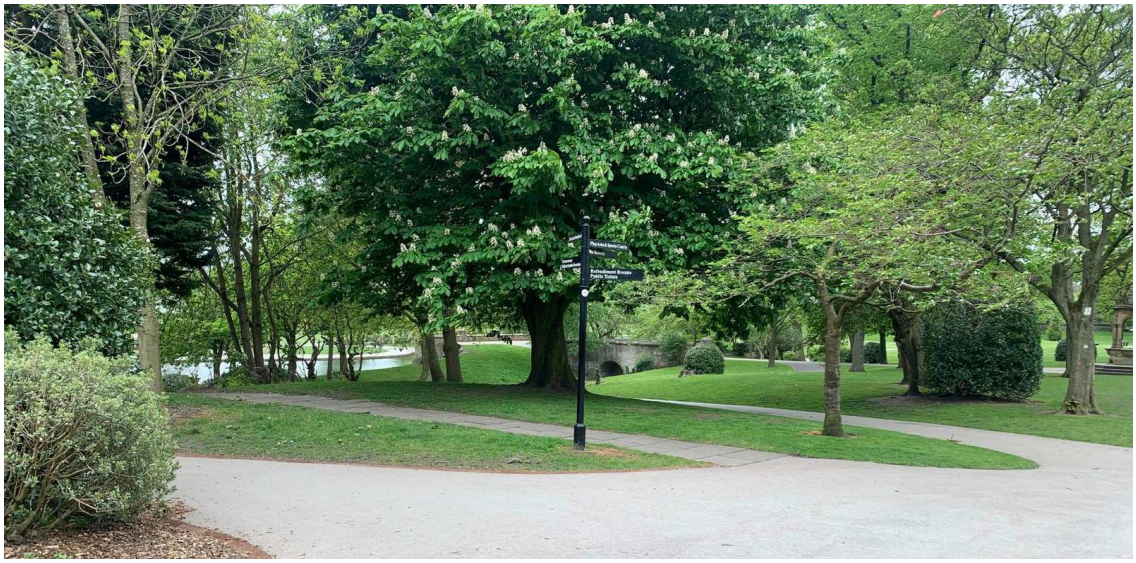

Figure 19: *Foliage*

Disorder

Table 10 presents social and physical disorder scores recorded at each site observation. The following paragraph offers a detailed exploration, discussing relevant findings and trends.

Table 10: *Park 2 Disorder Scores*

		Morning (10:24-12:00)	Afternoon (15:00-16:15)	Weekend (13:45-14:51)
Social	Loitering	1	2	2
	Alcohol Consumption	0	0	2
	Presumed Drug Sales	0	0	0
	Groups of Young People	0	2	3
	Observed Drug Use	1	0	0
	Sexual Activity	0	1	0
	Total	**2**	**5**	**7**
Physical	Vandalism	0	0	0
	Graffiti	2	2	2
	Litter	1	1	2
	Evidence of Drug Use	0	1	2
	Broken Lights	0	0	0
	Broken Windows	0	0	0
	Dog Fouling	1	0	1
	Total	**4**	**4**	**7**

Overall, scores were low across all three site observations, reaching the highest score of 7 for social and physical disorder. Most disorders were rated as either trace or some, suggesting that disorder was generally minimal and infrequent. Disorder appeared to change over time. The disorders observed were either consistently present or emerged at specific times. For example, loitering and graffiti were present at all three time points. Whereas there was an increase in some disorders. By way of illustration, groups of young people increased in the afternoon and peaked at the weekend observation, expected with the closure of educational establishments. This finding suggests that specific behaviours are facilitated at varying times. When considered alongside the peak of crime during afternoon hours (2-7pm) this finding may indicate an association between changes in usage and crime. Much of young people's usage accorded was

legitimate; however, there were instances of illegitimate and non-intended usage. For example, a group of young people were observed congregating underneath the skate park ramps, and a motorised vehicle was driven through the park in breach of the Road Traffic Act 1988. Finally, it was observed that disorder was concentrated in specific amenities, such as the skatepark, lake pavilion, bandstand and tunnels, as demonstrated by the graffiti and litter presented in the skatepark (figure 20).

Figure 20: *Park 2 Skatepark*

Park Usage

Park usage was determined at all three observations. At each, park users were primarily legitimate. Interestingly, the types of usage and levels of activity changed across time. Firstly, the morning site observations observed a moderately busy park comprising mostly older users, dog walkers and sole parents with children and two formal users were noted: one police officer and one park employee. Park usage was concentrated at mostly passive amenities such as park benches and cafes and some active amenities such as playgrounds and bowling greens. The afternoon displayed a different, distinct pattern of usage. The park remained moderately busy; however, users tended to be young of mixed genders and families with school-aged children. Rather than passive, usage tended to be active, including the sports amenities, skateparks and playgrounds. Furthermore, many college-aged children passed through the park after the closure of educational establishments. These changes in usage between the observations

interestingly coincide with the increase of crime between 2-7pm, indicating the role of users in creating criminal opportunities. Finally, on the weekend observation, usage was further distinct. The park was busy with diverse usage, with visibly equal proportions of young, elderly and families throughout the park space. Again, the observation recorded one member of park staff and one patrolling police van. Most amenities were used at this observation, but there was clear congestion around playgrounds and sports facilities. Specific amenities were used in contrast to their intended purpose; for example, users played football on the bowling greens despite the displayed signs.

4.4.2 Case Study: Park 5

Park 5, a 4.67-hectare park, was also located within the densely populated, urban area of Huddersfield. The park was bounded by residential streets of terraced and semi-detached properties, and there were several adjacent business premises, including two driving schools and building services.

Movement Control

Park 5 similarly featured a perimeter boundary; however, it was much less defined. The main boundary was part stone wall varying between 3.5ft – 6.12ft, and at its lowest point (to the West), users could easily access the park by climbing over. To the North of the park, running adjacent to the A-road, was metal fencing approximately 4.10ft. This fencing would have better-controlled movement; though, a large section was missing, enabling easy entry and escape.

Figure 21: *Incomplete Park Boundary*

As expected, the public could access the park through many available entrances (n=10) consisting of breaks in the stonewalling, one well-defined vehicle entrance, one within the metal fencing and the other a historic door entrance. Unlike Park 2, Park 5 was freely accessible with no prescribed hours of usage; therefore, the park was open during the night. In addition, throughout the park, there was signage outlining usage rules; however, as exemplified by the graffiti and damage in figure 22, signs were often poorly maintained or vandalised.

Figure 22: *Park Sign*

Finally, movement control was promoted with concrete pathways between amenities and around the museum grounds. In places, users had created dirt foot trails, referred to as desires lines (Rogers, 1987) through features designed to restrict movement (figure 23).

Figure 23: *Desire Lines*

Defensible Space

The environmental design of the park weakened the defensible space. As discussed, the park featured a problematic perimeter boundary, blurring the border between the adjacent public and park space. Signs were often dilapidated and did little to reinforce rules. Defensible space was established with an independent voluntary group. However, this ownership was presented with a single sign displayed on the park notice board; thus, park adoption was unclear to park users, including potential offenders. Finally, transitional space was signified using natural features such as hedges and most often, physical features of fencing and stone walls. However, these defining features were often minimal or damaged; the football field and skate park lacked defined borders, and as they were situated directly adjacent to the infant playground, they contributed to creating a contested space.

Activity Support

Like Park 2, Park 5 featured high activity support, with just over two-thirds (n=11) of the listed amenities and others such as an adult-only outdoor gym and museum.
The museum (located centrally) was surrounded by a car park to the North, large grassy areas to the East and West and the active recreational amenities were clustered to the South. Most amenities were freely accessible to all park users, though several amenities featured prescribed usage or rules—for example, the adult-only gym was restricted to users over the age of 14. Finally, the Memorial Museum had specific hours of operation; open daily 11-5 pm and closed Monday and Friday. Therefore, activity was only supported during these hours.

Physical Security

Physical security was also frequent through the park. Park 5 shared many physical security features with Park 2, plus the museum featured five CCTV cameras, signs warning of CCTV, anti-climb paint, and anti-climb spikes on drainpipes and adjacent residential walls. Therefore, physical security in Park 5 was overt and evident to users, as shown in figure 24. Such measures may have been intentional to deter potential offenders; however, they may have negatively impeded the park aesthetic. Moreover, the researcher observed park users trespassing regardless of these security measures. Similarly, a PSPO was in force; there were minimal confirmatory signs, and those that existed were in poor condition due to vandalism or deterioration.

Figure 24: *Anti-Climb Spikes & CCTV Signs*

Surveillance

Landscaping and environmental design mostly supported clear sightlines and natural surveillance of amenities and pathways. However, the observations revealed that surveillance opportunities were limited by the park's natural aesthetic and expansive space. Firstly, the park featured clear surveillance opportunities from three sides, yet the foliage placed along the North of the park impaired surveillance opportunities and potential guardianship from the surrounding residences. Moreover, the high-stone wall along the East blocked surveillance opportunities from surrounding residential bungalows. In this area, the high stone wall and clustering of foliage created a hidden, narrow pathway and concealment. Otherwise, the foliage was well maintained to allow surveillance with minimal border trees and low hedging. In addition, the design of some

amenities was problematic, including enclosed park pavilions. Surveillance opportunities were supported by five tall lights (one visibly broken), two basketball floodlights and small building wall lights. The night perimeter observation again revealed that these lights were non-functional. As the park was accessible during the night, the lack of lighting resulted in an expansive area of darkness and concealment. Moreover, crime is disproportionately concentrated during hours of daylight in both parks; therefore, when collated, these finding suggests that accessibility to a dark, unlit park may not necessarily create crime. Alternatively, the darkness limits park users from witnessing and reporting offences. Finally, due to the museum placement and downwards landscaping when the researcher stood in one area, surveillance was limited across the park.

Image & Maintenance

The park featured evidence of poor maintenance. Albeit there were amenities such as the bowling greens and memorial garden that were well-kept, most of the park amenities were vandalised, broken and dilapidated, demonstrated by the park bench in figure 25. Besides the perimeter trees, the park featured minimal foliage, which was well-maintained, and there were no large overgrown areas.

Figure 25: *Park Bench*

Disorder

Table 11 presents the site observation scores for social and physical disorders.

Table 11: *Park 5 Disorder Scores*

		Morning (10:40-12:14)	**Afternoon (16:24-17:27)**	**Weekend (12:30-13:23)**
Social	**Loitering**	0	0	0
	Alcohol Consumption	2	2	2
	Presumed Drug Sales	0	0	0
	Groups of Young People	0	2	2
	Observed Drug Use	0	0	0
	Sexual Activity	0	0	0
	Total	**2**	**4**	**4**
Physical	**Vandalism**	2	2	2
	Graffiti	3	3	3
	Litter	3	3	3
	Evidence of Drug Use	0	0	1
	Broken Lights	1	1	1
	Broken Windows	1	1	1
	Dog Fouling	1	1	1
	Total	**11**	**11**	**12**

In Park 5, the observations revealed a high level of physical disorder, reaching a maximum score of 12 with heavy graffiti, litter and vandalism throughout the park. Social disorder was low with a maximum score of 3. When considered alongside the overall dilapidated park features, the data collected may not truly represent the park's disorder but instead represent poor maintenance. Regardless, the disorder was visible and impaired the park aesthetic. In addition, the observations similarly noted an increase in groups of young people during the afternoon and weekend, coinciding with the closure of educational establishments, yet their presence remained minimal. Again, this finding is interesting considering the increase of crime during the hours of 2-7pm. Furthermore, the observations detected that despite the implementation and signage displaying the PSPO, social disorder continued with the remains of cracker fireworks and evidence of fires. Finally, the disorder was widespread throughout the facility; however, the observations noted that, like Park 2, disorder was concentrated in specific park zones, such as the graffiti in the skatepark (figure 26).

Figure 26: *Park 5 Skatepark*

Park Usage

The distinct usage patterns across the site observations found in park 2 were similarly observed in park 5. In summary, the morning observation was moderately busy, with mostly older users partaking in active and passive recreational amenities before changing in the afternoon to young and families mainly using active amenities. Finally, on the weekend observation, usage was diverse and notably increased. Although usage tended to be legitimate, amenities were not being used for their intended purpose, including the adult outdoor gym used by dog walkers and children. Alongside the secondary data analysis, these changes in usage, and potential guardianship, may guide explanations for increased crime during 2-7pm and the disproportionate amount of crime on weekdays.

4.5 Conclusion

This section has outlined the results of the secondary data analysis and site observations. The results above demonstrated that the risky facility pattern is present for recorded crime and police incidents in this sample of parks, and this pattern holds across violent, property, and disorder crime. Therefore, a small number of parks account for a large proportion of crime. Furthermore, the findings indicate that factors of social deprivation (contributing to social disorganisation) were not significantly associated with

crime and, thus, risky public parks. In contrast, park size was significantly associated with crime and may offer some explanation. Next, analysis of the case studies established that the parks were distinct crime settings with varied crime problems. Specifically, Park 2 incurred high volumes of property crime, whereas Park 5 followed the broader Kirklees pattern, with high volumes of violent and disorder crime. Moreover, the results demonstrated that crime concentration varied temporally, and these patterns varied between facilities, though the small sample size limited some conclusions. The findings of the site observations detected that environmental design features might function to prevent or facilitate criminal opportunities. The results have also demonstrated that parks may experience consistent park usage patterns; specifically, the type and volume of users appear to change consistently across observations. The significance of these findings come to fruition during the following chapter, where the observational findings from each case study are integrated alongside the spatial and temporal crime data. The next chapter discusses these findings alongside the established literature to conclude and draw practical and theoretical implications.

Chapter Five: Discussion

5.1 Introduction

To the author's knowledge, this thesis is the first exploration of the micro-spatial crime concentrations of parks and assessment of environmental design and guardianship on levels of crime and disorder in a UK context. The results chapter has highlighted an interlinked relationship between crime, environmental design, and guardianship. This chapter seeks to outline these key findings, integrate the crime and observational data and further ground these findings by critically synthesising the results of each research question (see section 2.6) alongside the literature and research evidence. This chapter begins by outlining the results of the micro-spatial analysis of crime concentrations in parks. The following two sections present the case studies by first outlining the nature and temporal patterns of park crime. In the third section, these findings are discussed alongside the results of the site observations to offer explanations for the spatial and temporal patterns of park crime. This section discusses each CPTED principle, yet the sections overlap due to their interlinking nature. The final section examines the effectiveness of this research in meeting the research aims whilst highlighting potential areas for future research before briefly concluding.

5.2 Large Proportion of Crime in a Small Number of Parks

The first research question evaluated the spatial concentration of park crime. This study found that a large proportion of recorded crime and police incidents were concentrated in a small number of parks at the 25, 50 and 80% levels. The analysis found that a large proportion of crime was concentrated in a small number of public parks. In summary, the results indicated that 30% of parks accounted for 80% of recorded crime, varying between 16-35% dependent on crime type, 26% of parks accounted for 83% of police incidents, and when plotted, crime in parks represented a shape indicative of a J-curve (Eck et al., 2007). These findings build on the existing evidence (Blair et al., 2017; Groff & McCord, 2011; Kimpton et al., 2016; McCord & Houser, 2015), which indicates that a subset of parks had significant crime problems and provide general support for the concept of risky facilities (Eck et al., 2007) and the Law of Crime Concentration (Weisburd, 2015).

However, it must be noted that apart from property crime, the extent of concentration was lower than theorised by the 80/20 rule (Clarke & Eck, 2003) and concentrations found in street segments (Weisburd, 2015) and other facilities (Flynn, 2018). This disparity may be related to sampling whereby lower concentrations were found in

smaller sample sizes (Flynn, 2018); therefore, the smaller sample size in this study likely impacted the extent of concentration. Alternatively, these results confirm research suggesting that the risky facility concept applies differently to crime types (Flynn, 2018). In this case, property crime is the most concentrated; thus, it can be inferred that a small number of parks possessed the right conditions for property crime, whereas violent and disorder crimes were more dispersed and commonplace throughout parks. Although these findings must be taken with caution due to the small sample sizes when separated by crime type, this study has extended knowledge regarding the nature of park crime concentrations. Overall, this study has established that a large proportion of crime is concentrated in a small number of parks, extending the current knowledge of micro-level concentrations to a UK park context. These findings support the targeting of police and crime prevention resources at facilities where crime is concentrated (Bowers, 2014; Flynn, 2018; Herrmann, 2015; Wilcox & Eck, 2007) instead of all parks.

The first research question further explored the effects of social disorganisation and park size. As outlined in the literature review, a few previous studies have found that park crime significantly increased alongside factors related to social disorganisation (Boessen & Hipp, 2018; Kimpton et al., 2016; Taylor et al., 2019). In contrast, this analysis found a non-significant correlation between factors representative of deprivation and recorded crime levels, suggesting that risky parks are not driven by or isolated to socially disorganised neighbourhoods. As discussed in the methodology, measuring social disorganisation is problematic; therefore, this study tentatively rejects the association between social disorganisation and park crime, yet, this relationship warrants further study. Despite these methodological difficulties, these results do not fit with social disorganisation theory (Shaw & Mckay, 1942 cited in Steenbeck & Hipp, 2011) and instead builds on the smaller evidence base that social disorganisation is not a significant predictor of risky facilities (Block & Block, 1995; Madensen & Eck., 2008).

Next, this study assessed the effects of park size on recorded crime. Previous research has found that as park size increased, crime significantly decreased (Groff & McCord, 2011) due to the increased numbers of amenities that attract increased usage or' eyes on the street' (Jacobs, 2011). This differs from the findings reported here, which confirmed a significant positive association between park size and recorded crime, suggesting larger parks experience more crime. Although the results cannot explain why this association exists, based on Groff and McCord's (2011) claim, it is possible to argue that the increased usage of larger parks may not always translate to guardianship capable of preventing the convergence of victim and offender (Cohen & Felson, 1979).

These contradictory results could be attributed to various factors. As Groff and McCord's (2011) study was conducted in the US, context may impact park usage; however, no evidence supports this notion. Alternatively, their sample was limited to 10-acre parks, equating to 4.4 hectares whereas, this study ranged between 0.017 and 69.575 hectares with an average of 5.88 hectares. Therefore, the negative size-crime relationship may exist up to a certain point. It is possible that in smaller parks, amenities may be spatially close enough to enable users to provide guardianship and surveillance. Once parks become expansive, the physical distance between amenities may impair this. This hypothesis was not tested due to the small sample size and remains an avenue for future research. Overall, these findings have extended the explanations for park crime, suggesting that park size may be a factor in why some parks experience more crime than others. However, as the available evidence is minimal and conflicting, further research is recommended.

5.3 The Nature of Park Crime

The second research question explored the nature and temporal patterns of park crime in two 'risky' public parks. The findings are discussed here and in greater depth in section 5.3 alongside the results of the site observations, research evidence and theory. This study found that each park featured specific crime problems. Analysis revealed that Park 5 reflects the broader park-crime pattern of Kirklees whereby violent and disorder crime was the most prevalent, each occupying 40% of offences. Analysis of Park 2 revealed an issue with property crime which occupied the greatest proportion of offences at 40%. These results seem consistent with other research, which found that individual facilities are different behaviour settings, presenting specific crime opportunities and concentrations (Kimpton et al., 2016). However, the parks also presented with consistency. The top four offences in both parks were theft, violence against a person, public order, and drug offences. These findings reflect ecological psychology, whereby places are assigned a specific set of behaviour patterns (Barker, 1968), facilitating specific criminal opportunities (Clarke, 2012; Felson & Clarke, 1998). For example, 19% of violent incidents occurred in and around licensed premises where strangers are likely to meet (ONS, 2015), which may similarly facilitate criminal opportunities in parks. This data contributes a clearer understanding of how the nature of park crime may relate to the criminal opportunities created by the behaviour promoted within parks.

Consistent with the literature, this research has found that park crime concentrations vary across days and times (Amemiya & Ohyama et al., 2019; Favarin, 2018; Herrmann, 2015; Lee et al., 2017). Analysis of the temporal patterns of park crime found that a disproportionate amount of crime occurred during daylight hours, and crime peaked between 2-7pm. Equally, this study found difference; in Park 5, a disproportionate amount of crime occurred on weekdays whereas, in Park 2, crime appeared more evenly distributed across days of the week. Overall, these crime patterns are somewhat contrary to Kimpton et al. (2016), who found that significantly more crime occurred on the weekend (from 6pm Friday to 6am Monday) and during the night (5pm-5am) yet align with their 24-hour visual aid which found that crime tended to increase between 3pm-8pm; as similarly found by the data in this study. The reason for the difference in temporal patterns is unclear, but it might relate to how and when parks are used at varying locations and contexts. Moreover, the different coding and categorisations of time may have hindered comparability, therefore, future research should employ consistent time categories to build a clearer picture of park crime. Regardless, these findings provide a basis to explore environmental design. In summary, while preliminary, this study's findings suggest that, at times, parks are high-crime places and, therefore, may aid the police decision-making to local contexts (Mitchell & Huey, 2019), specifically, when, in which parks and what crime types to focus resources.

5.4 Interrelation of Environmental Design, Guardianship and Crime

The third research question assessed how factors associated with CPTED and guardianship could explain spatial and temporal risk characteristics related to crime and disorder in parks. The observations indicated that, in general, the parks had various features aligned with the seven CPTED principles that will have been acting to reduce crime. However, according to opportunity theories, these 'risky' parks must also provide greater criminal opportunities (Clarke, 2012; Felson & Clarke, 1998). The following section explores how each CPTED principle, in turn, may have contributed to crime in parks.

Movement Control

Controlling who, what, when and how users can enter a space can prevent crime. This study found that the parks featured high numbers of entry and exit points, ranging between eight and ten. According to the rational choice perspective (Cornish & Clarke, 1985), this poor control of accessibility may have enabled the criminally inclined to easily access, encounter and escape from criminal opportunities, resulting in increased crime and disorder levels. Alternatively, accessibility is arguably necessary to attract and allow entry to legitimate park users who can provide surveillance or 'eyes on the street'

(Jacobs, 2011). This finding exemplifies the tensions between research demonstrating that controlling access reduces crime (Armitage et al., 2011; Davison & Smith, 2003; Iqbal & Ceccato, 2016; Johnson & Bowers, 2010) and the, albeit smaller, body of work that has found increasing access and throughput, thus available guardians, can reduce crime (see Hillier, 2004; Hillier & Sahbaz, 2009). On balance, multiple access and egress points likely facilitate the commission of crime and disorder within parks, and these parks in particular, which have high numbers of such points. However, as the nature of parks means there is a desire to create ease of access to all potential park users (Atlas, 2008; Iqbal & Ceccato, 2016; Shebayeh, 2008), reducing access points, especially for larger parks, may not be feasible in restricting criminal opportunities. Therefore, these findings question the functioning of movement control in parks, indicating that movement cannot simply be restricted like private spaces. Instead, attention needs to be paid to increasing the effectiveness of the increased guardianship created by the ease of access, a factor that deserves further study.

Although the exact functioning of movement control is difficult to determine, it may further offer explanations for when crime occurs. This study found disproportionately fewer recorded crimes and police incidents occurred during hours of darkness; therefore, more crimes occurred during daylight hours. Interestingly, the parks differed in their approaches to night usage. During darkness hours, Park 2 featured restricted access and a lower proportion of crime (29.73%) whereas, Park 5 featured 24/7 accessibility and a higher proportion of crime (42.86%). Although this study did not seek to compare the case studies, this data contributes a clearer understanding of how restricting access into parks may reduce crime. This finding corroborates the limited park (Iqbal & Ceccato, 2016) and broader residential research (Armitage et al., 2011; Johnson & Bowers, 2010) that movement control may be a factor reducing crime in a park context. However, further analysis found that in Park 2, around one-fifth of crime occurred after opening hours. Although this study's methods could not identify the exact cause, users may access the park after hours and offend, possibly by trespassing or poor place management and late closure of the physical barriers. Therefore, rather than undermining the effectiveness of movement control, this finding may instead reflect how place management can create criminal opportunities (Eck & Guerette, 2012; Madensen & Eck, 2008) in a public park context. These results should be considered when determining prevention techniques and how these should be implemented to prevent problematic night crime in parks (Kimpton et al., 2016; Payne & Reinhard, 2016). Alternatively, it could be argued that during the night, there are fewer 'eyes on the street' (Jacobs, 2011) capable of witnessing and reporting crimes; hence, crime and disorder levels appear reduced or as the proportion of darkness hours changes with

seasons, the increased crime during daylight hours may be more related to heightened park usage than darkness itself. Therefore, the observed statistics may also reflect public reporting behaviour or data analysis methods instead of simply representing crime patterns.

Alternatively, minimal crime at night may be related to lighting; a feature used to enhance surveillance at night. This study found that lighting was present yet, non-functional in the parks. Although the mechanism by which lighting reduces crime is contested; either via surveillance opportunities (Fotios et al., 2021) or the created community investment and informal social control, it is well-established that lighting significantly reduces crime in various contexts (Welsh & Farrington, 2003) including parks (Groff & McCord, 2011; McCord & Houser, 2015). It would be therefore expected that parks without lighting may experience more crime. As this study found a low level of crime at night and limited lighting, these results do not fit with the established literature. Instead, these findings may reflect the effectiveness of the 'dark out' tactic (Atlas, 2008), whereby the absence of light is used as a psychological deterrent (McCormick & Holland, 2013), reducing the likelihood that victim and offender converge (Cohen & Felson, 1979). Alternatively, the reduced crime at night may reflect usage patterns whereby, during the night, users are likely to be at home. These findings, while preliminary, suggests that regardless of movement control or lighting, crime in parks may shift alongside the routine activities of users (Felson & Eckert, 2018). Therefore, crime is more likely to occur during daylight hours due to the presented criminal opportunities when users congregate in a park environment, building on the existing evidence that parks function as crime generators (Brantingham & Brantingham, 1993; Groff & McCord, 2011).

Defensible Space and Territoriality

Consistent with the literature, this research noted the interlinking nature of CPTED principles in a park context. This study found that where the park features may have failed to control movement, such as incomplete boundaries and vandalised signage in Park 5, this may have further reduced the defensibility of space (Ekblom, 2011; Newman, 1973). This poor territorial reinforcement may have resulted in users perceiving that the park space is ill-defined and managed. Therefore, users are less able to act upon their feelings of territoriality as legitimate and illegitimate users are unsure where defence begins (Ekblom, 2011), and offenders may perceive that their actions go undetected and, if observed, not acted upon, reducing the perceived risk to rational offenders (Cornish & Clarke, 1985).

Alternatively, this study found that Park 2 had physical and symbolic features of defensible space, including fenced amenities, park adoption and frequent signage, yet similarly experienced heightened crime levels, specifically, property crime. Overall, these features may have reduced crime in Park 2. Although the association between crime and park features was not isolated, these results may reflect the relationship between signs of park adoption and significantly higher levels of property crime (Groff &McCord, 2011; McCord & Houser, 2015). This is distinct from evaluations (n=18) of neighbourhood watch, which has found no evidence of increased crime (Bennett et al., 2008). The results of this study cannot explain this contradiction. It may be that in observable park spaces, users may not perform the required surveillance or guardianship to prevent crime (Shebayeb, 2008), or they are unable to perform territoriality in a shared, collective space where they cannot identify legitimate from illegitimate park users (Iqbal & Ceccato, 2016). Whereas, in a residential context, people have an automatic responsibility and need to defend their property (Blomley, 2004). Alternatively, signs of park adoption may increase awareness of crime, and thus, crime levels appear to increase; however, this was not explicitly tested. Overall, these findings contribute a clearer understanding of how defensible space and guardianship may function in parks and how the challenges of diverse usage may enable the convergence of victim and offender (Cohen & Felson, 1979) regardless of defensibility (Ekblom, 2011). The present study raises that prevention techniques cannot be replicated in different contexts and produce the same results (Tilley, 1993). These findings raise unanswered questions of why park adoption, a feature aiming to promote defensible space, may instead result in increased crime in a park context.

Surveillance

Even when park users were willing to provide surveillance, this study identified several distinct features that may have minimised their ability to observe suspicious activity. Although this study did not directly ascertain the location and concentration of crimes within the parks, the concentration of disorder may indicate problematic park areas. This research found that disorder was recorded in and around features such as high stone walls, tunnels, and enclosed pavilions. These areas were prime examples of broken windows theory (Wilson & Kelling, 1982), including graffiti, litter, and evidence of alcohol use. These findings reflect previous park research which suggests that areas of limited surveillance create criminal opportunities (Marzukhi et al., 2018; Michael et al., 2001; Thani et al., 2016) and can be linked to crime concentrations (Iqbal & Ceccato, 2016; Payne & Reinhard, 2016). Therefore, by limiting surveillance and the ability of guardianship, the environment may create criminal opportunities. This finding generally

supports routine activity theory (Cohen & Felson, 1979) and the association between environmental design, guardianship, and crime (Hollis-Peel et al., 2012; Hollis-Peel & Welsh, 2014; Reynald, 2009) in a park context.

Some of the issues emerging from these findings relate to fear of crime. These findings may reflect the cyclic relationship between crime, fear of crime and park usage (Shehayeb, 2008). Isolated, concealed park areas (Blobaum & Hunecke, 2005; Maruthaveeran & Bosh, 2015) and signs of physical and disorder (Ceccato & Hannson, 2013) incite fear of crime which causes users to withdraw (Monahan & Gemmell, 2015), resulting in increased crime levels and park decline. This finding raises two implications. Firstly, improving fear of crime is equally important as improving actual crime (National Recreational and Park Association, 2018). Secondly, crime prevention resources may be better targeted at problematic park features instead of the entire park. This study could not identify the exact location of crimes due to data limitations, so this remains an avenue for future research.

In addition, this study observed that in places, the natural state of the parks limited surveillance opportunities within the park, but most notably, perimeter foliage prevented surveillance from surrounding residents. These results reflect those of Iqbal and Ceccato (2016), who found that park topography and features such as dense foliage often restricted surveillance opportunities and created areas of concealment. These findings may reflect the contention between the public need for natural park space (Communities and Local Government Committee, 2017) and the creation of concealed areas and criminal opportunities. In this case, perimeter trees may have been selected to create a natural park space whilst prioritising guardianship from within the park at the expense of the propriety offered by surrounding residents (Blomley, 2004). Therefore, the design and maintenance of parks need to balance attracting usage and perceptions of safety with the criminal opportunities created by a natural aesthetic.

Image and Maintenance

The aesthetic of a park holds meaning to both legitimate and illegitimate users. This study found that the parks varied in their nature and physical and social disorder patterns. Park 2 generally presented with low levels of disorder. These findings challenge the broken windows theory (Wilson & Kelling, 1982), which would expect a high crime park to feature high levels of disorder and instead, these findings may add to the existing evidence that disorder has no causal connection to crime (Sampson & Raudenbush, 1999; Tower & Groff, 2014). This study did not directly test this association; therefore, future research should examine the disorder-crime connection in

UK parks. In Park 2, this study found that disorder notably increased at the weekend observation alongside increasing usage levels. This collated finding provides evidence that disorder coincides with the user's routine activities (Cohen & Felson, 1979), suggesting that disorder is a by-product of park usage. This finding suggests that social and physical disorders are more likely when the park is busy. However, the exact time of physical disorder was unknown; therefore, firm conclusions cannot be drawn.

In Park 5, this study found consistently low levels of social disorder yet high physical disorder. As discussed, visible signs of disorder, such as graffiti, vandalism and litter, can represent an unsafe park and reduce feelings of safety which is likely to decrease usage. This finding contributes to a clearer understanding of how disorder may feed into the cyclic relationship between crime, fear of crime, and park usage (Shehayeb, 2008) and exacerbate disorder problems and create further criminal opportunities. The different extent of disorder found in each park may be related to crime types. The high physical disorder in Park 5 may reflect the violent crime-disorder connection, whereby violent crime was found to be the only crime type to create further disorder (Tower & Groff, 2014) and significantly reduce park visitation long-term (Marquet et al., 2019). Therefore, these results build on the existing evidence that violent crime in parks may contribute to further disorder and thus, have a more considerable impact on the decline of parks. Alternatively, the variations in park disorder may reflect differences in place management and funding. Regardless of the cause, this finding signifies how place management may increase criminal opportunities by failing to remove situational factors that provoke offending (Ekblom, 2011) and extends this knowledge into a public park context.

Physical Security

Feelings of safety are further driven by physical security features (Ekblom, 2011). This study found various forms of physical security throughout the parks, such as security fencing and alarms, albeit at varying degrees. Security in Park 2 was minimal and unobtrusive, whereas, in Park 5, the observations detected overt and apparent security, such as drain spikes and locks, indicating that the function of physical security may vary between settings. This finding may reflect the delicate balance between the successful protection of space (Tseloni et al., 2014; Taylor et al., 2019) and 'bolting-on' of security following the development of a crime problem (Armitage, 2017) and the creation of a 'fortress mentality' (Cozens et al., 2005; Cozens & Love, 2017) compromised the park aesthetic (Iqbal & Ceccato, 2016). This symbolism of crime may increase of crime (Cozens & Davies, 2013) and thus feed into the discussed cycle of decline (Shehayeb, 2008). This finding highlights the interlinked relationship between environmental design,

usage, and crime and further questions the effectiveness of physical security in parks. This result contributes a clearer understanding of how physical security is better integrated into park design due to the implications on fear of crime and usage. However, due to the lack of available data regarding long-term crime trends and implementation dates, the results cannot confirm whether these features increased target resistance (Ekblom, 2011) and overall reduced crime levels; this area remains an avenue for future study.

Activity Support

The presence of park users who can supply guardianship appears to be a critical factor in facilitating or preventing crime. This study found two 'risky' parks which featured high numbers of active and passive recreational amenities. Due to the selected methods, this study did not test the correlation between the number of amenities and crime levels. These results may reflect Kimpton et al. (2016), who found that increased activity support was significantly associated with increased crime, yet conflict with the inverse research linking increased activity support to significantly decreased crime (Groff & McCord, 2011; McCord & Houser, 2015). Contrary to 'eyes on the street' theory (Jacobs, 2011), these results question the assumption that usage equates to surveillance and guardianship and instead builds on the existing evidence that parks with many, various amenities are crime generators (Brantingham & Brantingham, 1993), bringing together large numbers of motivated offenders, suitable victims without capable guardianship (Cohen & Felson, 1979). Indeed, higher usage and footfall are likely to create more crime (Bowers, 2014), and this finding importantly indicates that although more people are in the park, they are not necessarily acting as guardians. A possible explanation may be how increased activity level decreases active guardianship (Reynald, 2009; Reynald, 2010a). Although this association was insignificant, these findings contribute a clearer understanding of how increased usage may affect the ability or willingness of guardians to identify offenders. Alternatively, this study and previous research (Hollis-Peel et al., 2012; Hollis-Peel & Welsh, 2014; Reynald, 2009) has found that environmental design features impede surveillance and guardianship. Therefore, the association between activity support and crime may rely on other aspects of environmental design, such as surveillance opportunities to create the desired effects, highlighting the need to consider the interplay between environmental design, usage and crime.

As discussed, this study found that disorder appeared to concentrate in specific park zones. Consistent with Iqbal and Ceccato (2016), this study also found that disorder was recorded in sports amenities, such as skateparks and basketball courts. Unlike those previously discussed, these amenities did not have limited surveillance opportunities,

suggesting alternative causes. Interestingly, this study found that users tended to be homogenous in certain amenities; for example, it was observed that sports amenities tended to be used by adolescents. This finding is not unexpected considering that parks are a primary location for adolescents to socialise (Davey & Wootton, 2017; Hatzopoulos & Glancey, 2007), providing relief from informal control and surveillance (Hilborn, 2009). However, this present study provides new insight into how environmental design, precisely sports amenities, may attract specific types of users and the subsequent criminal opportunities.

The relationship between adolescent users and crime is further substantiated when considering temporal crime and usage patterns. This study indicates that a higher volume of crime occurred between 2-7pm, which the observations detected coincided with changes in usage, from elderly and families to adolescents and the closure of park amenities, such as the café and museum. The results confirm Kimpton et al. (2016), who found that crime levels concentrated after 3pm, alongside the closure of educational establishments. This collated data contributes a clearer understanding of the park settings which create crime. Firstly, these results indicate that temporal crime patterns vary alongside routine activities (Cohen & Felson, 1979) and subsequent changes in usage; therefore, guardianship may be a significant factor in creating criminal opportunities in parks.

Moreover, during these hours, adolescents are within the park space unsupervised, reflecting conditions in which adolescents are more likely to take risks (Beier, 2017; Chein et al., 2011; Smith et al., 2014). Furthermore, the data suggest that park users, primarily other adolescents, were present but seemingly unable to provide capable guardianship, building on evidence that personal and situational factors form guardians' ability (Moule & Powers, 2019; Moir et al., 2018; Reynald, 2010b). It can be hypothesised that during the hours of 2-7pm, adolescents may be rendered more vulnerable to victimisation and liable to offend without capable guardianship. Therefore, the effects of activity support may have varied results dependent upon the usage they promote and the availability and skills of guardians. These findings have important implications for developing prevention approaches; capable guardians should be drawn to the park space using scheduled activities targeted at adults as intimate handlers (Felson, 1995) to prevent the convergence of victim and offender. Alternatively, strategies to reduce adolescent usage might include after school recreation to redirect adolescents from parks to other forms of social enrichment (Ross et al., 2011).

Across weekdays and weekends, this study found that the temporal crime patterns similarly coincided with changes in usage, yet the results differed between the case studies. In Park 5, a disproportionate amount of crime occurred on weekdays than weekends when usage was markedly increased and diverse. The results corroborate the claims of Shehayeb (2008) that diverse user groups best deliver guardianship and, contrary to the above discussion, suggest that increased usage equates to reduced crime levels (Jacobs, 2011; Payne & Reinhard, 2016; Schertz et al., 2019). These findings may again represent the interplay between routine activities (Cohen & Felson, 1979) and environmental design whereby varied amenities drive diverse usage (Atlas, 2008); however, this may only reduce crime when users are available to spend time in the park. The data contributes a clearer understanding of how activity support functions to reduce crime according to the routine activities of users. Alternatively, in Park 2, crime appeared evenly distributed across days of the week yet replicated the same usage patterns, implying similar levels of guardianship. Although this finding may undermine the above conclusions, these contradictory results may be related to differing park sizes and environmental design. Park 2 (13.67 hectares) was considerably larger than Park 5 (4.57 hectares). Due to Park 2's expansive size, amenities (where usage concentrated) were physically distanced. These results build on existing evidence that environmental design may have hindered the ability of users to perform surveillance and guardianship (Hollis-Peel et al., 2012; Hollis-Peel & Welsh, 2014; Reynald, 2009) in a park context. From these findings, it could be suggested that the future design of parks could ensure that amenities, which attract different user groups, are placed within proximity that enables guardianship yet distanced enough to limit contested space (Groff & McCord, 2011).

5.5 Research Limitations and Future Recommendations

This research has provided an investigation of spatial and temporal park crime concentrations and a detailed exploration of the potential connection between environmental design and crime in parks. This study also faced various issues, including data accuracy and limitations enforced by Covid-19, researcher safety and the resource constraints of a master's study. This in-depth review and analysis of park crime were collected using case studies which typically use small sample sizes. As outlined in chapter three, a limitation with this method is that the results are not generalisable to all parks. Although this was not the aim of this study, the results must still be considered with caution. Therefore, it is recommended that future studies employ much larger, representative park samples. In addition, this study has begun to explore the spatial patterns of individual crime types; however, the small sample size may have restricted the understanding of when violent, property and disorder crimes occur in parks and the

potential associations with environmental design. Future research could uncover any distinct patterns by using a larger sample.

Although a commonly used data source in spatial crime research, police recorded crime and incident data may not have been an accurate record of the total, nature, and temporal patterns of park crime, reducing the overall validity of the findings. However, police recorded crime data remains one of the only data sources which provides comprehensive offence coverage (ONS, 2021) and records the time and location of offences. This information enabled analysis of the temporal and spatial crime patterns beyond what would be possible using primary data collection methods. Also, like other park studies (Groff & McCord, 2011; McCord & Houser, 2015), data were unavoidably collected several years before the site observations. Park design may have changed during this time; thus, the current data may have misrepresented the relationship between environmental design and crime. Therefore, future research should ascertain a detailed record of changes to the environmental design or study parks over a more extended period.

Although the police data provided enough information to explore spatial and temporal crime patterns, this study acknowledges that these associations need to be studied in greater depth. Research has found that parks are heterogenous locations with specific problematic areas (Iqbal & Ceccato, 2016; Payne & Reinhard, 2016); however, due to data limitations, the specific location of crime within parks was unknown in this study. The use of site observation minimised this issue and enabled direct observation; future research could use data, such as modus operandi, to explore park crime concentrations more accurately.

One key criticism of this study is the short duration and subsequent restrictions on the validity and transferability of the findings. The observations were a snapshot of the park's crime, disorder, and usage, collected for one week in May. Due to resource and time constraints, observations could not be conducted across a lengthy period. Repeated observations minimised this issue and enabled access to environmental design issues critical to spatial and temporal crime patterns. This limited timeframe may not have accounted for the effects of seasonality (Tompson & Bowers, 2015) on crime and park usage (Cohen et al., 2009; Payne & Reinhard, 2016) and longer-term changes in the park environment, such as maintenance and repair schedules. Furthermore, researcher safety was integral to the research process; however, it limited the diversity of site observations, specifically at night. Therefore, future research should study parks for

more extended periods to detect repeat patterns and explore park usage and the functioning of environmental design at night.

Covid-19 affected the entire research process as restrictions limited the researcher's choice of additional or alternative methods during the designing phase. Due to restrictions on household mixing, this study could not explore park user perception using interviews or safety walks (see Marzukhi et al., 2013) or offender perceptions of environmental design and guardianship, such as what attracts and deters. Also, prior to the site observations, restrictions on outdoor household mixing were eased from a maximum of six to thirty people (Cabinet Office, 2021b). National unease may have reduced typical park usage to smaller groups or, as an outdoor facility, restrictions may have considerably increased park usage. This context may have reduced the comparability of this study to existing park research; therefore, future studies on the current topic are recommended. Moreover, research indicates that the Covid-19 pandemic and subsequent restrictions brought about changes in crime levels, such as increased domestic violence (Boserup et al., 2020; Bradbury-Jones & Isham, 2020; Mohler et al., 2020) and significantly decreased burglary rates (Gerell et al., 2020; Mohler et al., 2020). As parks remained one of the only accessible recreational facilities throughout the pandemic, future research could add to environmental criminology by exploring the effects of restrictions and usage on park crime levels.

As outlined in chapter three, the nature of observational findings may have been influenced by elements of subjectivity. Therefore, reflexivity is essential in evaluating the findings. Burnham's (1993) social graces is a valuable tool for reflection. The researcher identifies as a young, working-class woman. It is well-documented that women present with a higher fear of crime in parks (Koskela & Pain, 2000; Ogneva-Himmelberger et al., 2019) and an increased fear of social and physical disorder (Ceccato & Hansson, 2013). Therefore, the researcher may have been over-perceptive when identifying features, such as areas of darkness. Regardless of gender, users have different perceptions about parks and appropriate usage (Hilborn, 2009). Although data were limited to a structured observation, the researcher's norms and acceptability of park usage may have affected the desired objectivity. Therefore, although the researchers personal and professional experiences may have somewhat shaped the outcomes of this study, affecting validity and reliability (Gray, 2014), the likely over-identification of risks only benefited this research. To minimise this issue, future research could use multiple, diverse observers to ensure consistency and reduce the potential for bias.

Chapter Six: Conclusion

This conclusion summarises the key research findings in response to the research aims and questions and discusses the research value and contribution. This section will also review the study limitations and suggest opportunities for future research.

This research aimed to study how the environmental design of parks may contribute to crime and disorder at the micro-scale. This study included two phases: a secondary analysis of police crime data and a case study utilising police data and site observations of two 'risky' parks. From these it can be concluded that environmental design and guardianship appear to be contributory factors in the spatial and temporal patterns of park crime. The results indicate that the principles of CPTED and park usage patterns functioned to facilitate or prevent criminal opportunities in parks. Findings further indicate that the temporal patterns of park crime aligned with changes in park usage, with crime more likely to occur during periods of limited guardianship. Analysis of spatial patterns in police crime data demonstrated that a small number of 'risky' parks are responsible for a large proportion of crime. Social disorganisation was not significantly related to recorded crime, whereas park size was a contributory factor. The results indicated that larger parks are likely to experience more crime; however, the nature of this association requires further research.

The findings address several gaps in the current literature. This thesis has been one of the first attempts to thoroughly examine the micro-spatial and temporal crime concentrations of park crime alongside an assessment of environmental design and guardianship on levels of crime and disorder in a UK context. Existing evidence of micro-spatial crime concentrations is mainly restricted to commercial and residential facility types. This study contributes to this growing body of research by confirming the applicability of the risky facility pattern in a park context. The findings reported here also add weight to the small evidence base rejecting social disorganisation explanations and provides a new understanding of how facility size may affect crime distribution.

Environmental design and guardianship are central concepts in explaining where and when crime occurs; however, little was known about their functioning beyond commercial and residential settings. This study has confirmed that CPTED and routine activity theory can be used to extend understanding of spatial and temporal patterns of crime and disorder in a park context. Most notably, this thesis has identified the physical environment pertinent to criminal opportunities and illustrated how CPTED principles and guardianship are mutually dependent to reduce criminal opportunities. Also, this thesis has provided new insights into how the principles of CPTED, mainly used in private

spaces, may contrast with the freedom of a recreational setting such as parks and, inversely, contribute to fear of crime. As noted, this study was not able to explore geographical juxtaposition beyond the micro-level therefore, future research should consider the proximal, meso and macro contexts of park crime.

The results of this study present implications for planners, councils, landscape architects and crime reduction practitioners. This research suggests that crime reductions could be achieved by integrating CPTED features in parks. However, to successfully do this, there must be a balance between perceptions of safety, criminal opportunities, and maintaining an open, natural, recreational park space that can attract diverse users. Several key design issues emerged, forming recommendations to reduce crime in parks. Park managers and councils should consider adding appropriate guardianship during periods of heightened crime or increasing the ability or diversity of guardianship. A reasonable approach may be to draw capable guardians to the park space during periods of homogenous usage using scheduled activities targeted at adults. To remove criminal opportunities, the design of parks could improve surveillance opportunities of problematic park amenities and areas. When implementing crime prevention strategies, attention must also be paid to the effects of park aesthetics on fear of crime. Provision of increased maintenance or alternative action to physical security, such as improving guardianship, could enhance user perceptions of safety and reduce the likelihood of park decline. This present study may also have implications for policing. Overall, this study has developed a better understanding of park crime by exploring the nature, extent, and potential causes. Based on these conclusions, the police could tailor their prevention strategies to local contexts. For instance, they could target crime prevention resources at parks when and where crime is concentrated, saving resources and achieving the most significant crime reduction. Also, improvements to park design can reduce criminal opportunities and improve feelings of safety which may lower police demand in parks.

The limitations of this research have been thoroughly discussed in section 5.5. In summary, due to the selected study approach, sampling and analysis methods, these findings are not generalisable or conclusive. Notwithstanding, by coupling secondary crime data with a holistic case study approach, this study explored multiple dimensions of park crime. It offers valuable insight into the spatial and temporal patterns of park crime and has extended knowledge of the relationship between crime, environmental design and guardianship, which may be extended to broader, more general explanations for the criminogenic nature of parks. This research should be repeated using more sensitive data collection and analysis methods on a larger, representative park sample covering a longer period. For instance, future studies may perform a large-scale risky facility analysis of UK parks and environmental design features. More broadly, future

studies might explore offender, police and park user perceptions. Finally, this study hasbegun to identify how guardianship may function in parks. Future research should focuson this concept, including creating and testing a public park measure of GIA (Reynald, 2009) to account for why different users have varying guardianship abilities in parks.

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Appendices

Appendix 1: Data Request Letter and Information Sheet

Data Request

Dear Kirklees Council,

I am writing in reference to an MSc Criminology research study:
A risky facility analysis of crime and disorder in parks: a case study of Kirklees

This study aims to assess environmental design features associated with guardianship and Crime Prevention Through Environmental Design, on levels of crime and disorder in risky parks. As a result of carrying out this study, I offer to provide the Council with an analysis of the environmental design features and usage, which may contribute to Kirklees parks' problematic nature. To achieve this, I am requesting information on Kirklees parks.

Parks will be selected based on total crime and disorder counts. If possible, alongside this, I would like to request access to the **selected** parks' crime and disorder data. Access to this data will significantly benefit the study and its findings. To be specific, I am requesting:

- **Data held covering all crime (property, personal, violent and drug) and disorder (vandalism, damage) within the park boundary.**
- **Data covering the period of two calendar years (Jan 2019 – Jan 2021)**
- **Recorded time or time periods of the offences**
- **Any significant renovations/changes to the parks throughout the data timeframe**

*** The data provided will only be used in relation to this study and viewed by the research team. The results will be presented as part of a master's thesis, academic conferences and publications and any reports/documents requested by yourselves.*

The problematic parks identified by the Council will be explored using mixed methods.
1. To analyse the park's crime and disorder, data will undergo statistical analysis to determine which types of crime and when crime occurs
2. The park environment will be explored using structured site surveys/observations to assess the environmental design features and park usage to explain crime and disorder levels.

***Ethical approval has been received from the School Research Integrity and Ethics Committee (SRIEC) - specific ethical considerations and processes will be provided. This research will strictly adhere to any further requirements outlined by the Council.*

I would very much welcome a follow-up discussion. Please contact me on the details below to arrange a suitable time and method for doing this.
Jody Walker Email: jody.walker@hud.ac.uk
Project supervisors:
Melanie Flynn Email: M.Flynn@hud.ac.uk
Leanne Monchuk Email: L.Y.Monchuk@hud.ac.uk

Kind Regards,
Jody Walker & Supervisors

Information Sheet

Dear Kirklees Council,

I am writing in reference to the research study:

A risky facility analysis of crime and disorder in parks: a case study of Kirklees

This study aims to explore crime and disorder in Kirklees parks by considering the impact of environmental design and general usage. Specifically, this study seeks to assess features of guardianship and Crime Prevention Through Environmental Design on levels of crime and disorder in risky parks.

As a result of carrying out this study, I offer to provide the Council with an analysis of the environmental design features and usage, which may contribute to the problematic nature of Kirklees parks. To achieve this, I am requesting information on which five parks, in rank order, Kirklees Council finds to have (1) the highest amounts of crime and disorder and (2) to be considered the most problematic (should this differ).

Parks will be selected based on total crime and disorder counts. If possible, alongside this, I would like to request access to the **selected** parks' crime and disorder data. Access to this data will significantly benefit the study and its findings. To be specific, I am requesting:

- **Data held covering all crime (property, personal, violent and drug) and disorder (vandalism, damage) within the park boundary.**
- **Data covering the period of two calendar years (Jan 2019 – Jan 2021)**
- **Recorded time or time periods of the offences**
- **Any significant renovations/changes to the parks throughout the data timeframe**

I would very much welcome a follow-up discussion about this request. Please contact me on the details below to arrange a suitable time and method for doing this.

WHO IS THE TARGET AUDIENCE?

The findings of this research will be most relevant to Kirklees Council/safer communities partnership and the West Yorkshire Police. As part of a master's degree, the likely audience for this project is also supervisors, examiners, academic researchers, government policymakers and possibly, future students.

WHAT IS THE RESEARCH PROCESS?

This project will use mixed methods to explore park crime and disorder. The problematic parks identified by the Council/safer communities partnership will be explored using several methods.

(1) To analyse the park's crime and disorder, data (if provided) will undergo statistical analysis to determine which types of crime and when crime occurs
(2) The park environment will be explored using structured site surveys, and observations to measure the environmental design features (related to Crime Prevention Through Environmental Design and guardianship) and how the park space is used to explain levels of crime and disorder.

During the research process, issues of consent, anonymity and confidentiality will be minimised through several measures. It will be ensured that any images taken will not include members of the public, and no personally identifiable information will be collected throughout. As a precaution, I will carry identification forms outlining the above information and university ID if approached by a member of the public. Park names and/or locations can also be anonymised if requested.

WHO IS CONDUCTING THE RESEARCH?

Jody Walker is conducting this study as part of her MSc Criminology at the University of Huddersfield. The project is under the supervision of Dr Melanie Flynn and Dr Leanne Monchuk.

WHO WILL HAVE ACCESS TO THE DATA & FINDINGS?

The data provided will only be used in relation to this study and viewed by the research team (Jody Walker, Melanie Flynn and Leanne Monchuk). The results will be presented as part of a master's thesis and any reports/documents requested by yourselves. The research findings may also be presented at academic conferences and/or in academic publications. Throughout, any requirements defined by the data providers will be maintained.

WHAT WILL HAPPEN THE DATA?

Any data provided will be handled and stored per the University's Data Protection Policy on a password-protected computer. Sensitive or confidential Kirklees Council crime and disorder data will be kept in the University's cloud storage. The data will be stored for the recommended period of 10 years unless requested otherwise by Kirklees Council.

Council data will be held confidentially by the University of Huddersfield per the requirements of the General Data Protection Regulation (GDPR) and Data Protection Act 2018. The University is the Data Controller and is responsible for its secure management. The research team are the data processors.

The data will be securely stored for a maximum of ten years unless funding bodies or regulators have longer or shorter retention periods. It will then be safely destroyed.

The University of Huddersfield is the Data Controller. Complaints should be addressed to the University Solicitor (the Data Protection Officer): data.protection@hud.ac.uk.

ETHICAL APPROVAL

This research project has obtained ethical approval from the School Research Integrity and Ethics Committee (SRIEC) at the University of Huddersfield.

WHO CAN I CONTACT FOR FURTHER INFORMATION?

If you require any further information about the research, please contact me on:

Jody Walker

Email: jody.walker@hud.ac.uk

Project supervisors:

Melanie Flynn

Email: M.Flynn@hud.ac.uk

Leanne Monchuk

Email: L.Y.Monchuk@hud.ac.uk

Kind Regards,
Jody Walker & Supervisors

Appendix 2: Crime Categories

Violent Crime

Crime Type	**Number of Crimes**
Violence Against the Person	192
Sexual Offences	16
Total	208

Property Crime

Crime Type	**Number of Crimes**
Theft	65
Robbery	27
Vehicle Offences	19
Fraud	1
Burglary	20
Total	132

Disorder Crime

Crime Type	**Number of Crimes**
Public Order Offences	92
Arson and Criminal Damage	76
Drug Offences	31
Possession of Weapons	12
Miscellaneous Crimes Against Society	8
Total	219

Appendix 3: Park Inspection Checklist

Park Inspection Checklist Based on CPTED Principles

CPTED Principles	Present	Not Present
Surveillance		
Clear sight lines		
Land-use mix/activities		
Natural surveillance of gathering areas		
Maintenance of trees and bushes (cutting)		
Buildings/windows placement		
Playgrounds		
Park structure/benches		
Pathways		
Public utilities—telephones, Automated Teller Machines (ATMs),		
bus shelters/stops/train/metro		
Youth recreation facilities		
Public toilets		
Users, children, parents		
Lighting levels/shadows/ pedestrian routes		
Car park/underpass/overpass/crossing lighting		
Needs of special groups (hearing/visual aids)		
Territoriality		
Site boundary definition fences, gates		
Transitional space defined		
Conflicting space use		
Sign/cues		
Access control		
Sightlines		
Signage		
Choice of pathway routes		
Problematic spots/nodes/crowding		
Lawn/flooring/sidewalks		
Relationship to landscape		
Target hardening		

Site boundary definition fences, gates

CCTV cameras

Public utilities—telephones, ATMs, bus shelters/stops/train/metro

Locks

Signage

Alarms

Activity support

Users of parks

Sports/football ground

Cafe´

Pedestrian groups

School groups

Alcoholics

Mini golf

Kids play area

Other activities

Social cohesion and connectivity

Technological integrations for collective activities

Image of park

Maintenance (see also, Surveillance)

Graffiti

Litter

Vandalism

Others

Note. CPTED = crime prevention through environmental design; CCTV = closed-circuit television.

Appendix 4: Site Observation

Location:	
Date/Day	
Start time:	
End time:	
Weather:	Sunny Cloudy Windy Snowy Rainy Mixed

Land use surrounding park (& types of business)

Residential	
Commercial	
Mixed	

Principle	**Feature**	**Frequency**	**Other/Comments**
Movement control	**Is there a well-defined, clear entrance?** Is there sign and ground rules at the entrance? Is the entrance well-maintained? Are there multiple entrances and exits? *Count* Are they well-lit?		
	What is the main boundary? Is it clearly defined? What is the material? Does it extend round the full park?		
	Is there clear signage around the park? What does the signage say?		
	Are there any locations of interest? Places providing concealment, crowding.		
	Are there defined routes throughout the park? Pathways, signs Walls flowerbeds		

	Is there choice of pathway routes? Multiple paths to different park zones		
Surveillance	**Are there clear sight lines?** Unobstructed sight lines of pathways Surveillance of facilities? Are there areas hidden from view? Consider landscape (tree/hills etc) Are pathways narrow? Through areas hidden from view?		
	Is there CCTV? Are there visible cameras? Is there CCTV signage? Tilt and zoom or fixed?		
	Lighting Are pathways well-lit? Tall or low lighting columns? Are the lights functional? Are the lights well-maintained?		
	Is the park overlooked by housing or commercial? Consider if the view is obstructed (land use/mix activities)		

	If evening – are curtains/blinds closed? Are there clear sight lines?		
	Is there natural surveillance of gathering areas? Are there any secluded locations?		
	Is foliage well-maintained to allow surveillance? Consider areas of entrapment.		
	Are building and windows facing the park?		
	Amenities (see activity support)		
Defensible Space/Territoriality	**Are there physical or natural barriers defining park space?** e.g., fencing/shrubbery between residential/commercial areas site boundary definition		
	Are there any forms of park adoption?		
	Are there signs displaying park usage/times?		

	Is there conflicting space use? e.g., basketball court next to a children's play area		
	Is transitional space defined? natural, symbolic, or physical barriers		
Activity Support	**Are there playgrounds?** For what age ranges? Are they well-maintained?		
Questions for all ***1) Counts*** ***2) What equipment is there?*** ***3) Is there defined usage? are they freely accessible/restricted usage?*** ***4) Are the facilities well-maintained?*** *graffiti/damage* ***Consider*** - *covid closures*	**Are there sports/football fields?**		
	Are there Bowling Greens?		
	Are there toilets?		
	Is there parking?		
	Are there sports courts?		
	Is there public art?		

	Is there a recreation centre		
	Are there benches? Material?		
	Are there public transit stops on perimeter?		
	Is there a dog park?		
	Is there an on-site café?		
	Are there litter bins?		
	Is there a water fountain?		
	Are there improved walkways?		
	Is there evidence of any social cohesion or connectiveness? Social interaction between park users		
	Is there a car park? Number of spaces?		

	Pay and Display? Covered by CCTV?		
Image & Maintenance *Rated by physical disorder section (p.9)*	**Is foliage well maintained?** *Rated as poorly maintained, average or high-standard (Hollis-Peel & Welsh, 2014)* Ground plantings less than 32 inches, tree canopies not over 8 foot Is it overgrown?		
Physical Security	**Is there security fencing?** Lockable? Over 6ft? What areas are covered?		
	Is there signage? Outlining rules/times for usage		
	Are there locks? Gated areas		
	Is there a site boundary definition?		
	Are there any alarms? Recreational building, toilets		
	Is there CCTV?		

Social & Physical Disorder

Feature	**Measure**	**Frequency**	**Comments**	**Score** 0=none 1=trace 2=some 3=heavy
Social disorder	**Are people loitering in the park?**			
	Are people consuming alcohol in the park? Is there evidence e.g., empty bottles on floor/bins Are people intoxicated in the park?			
	Presumed drug sales What is their activity?			
	Are there groups of young people? What are these activities? And equipment used?			
	Is there evidence of drug use? matches, burned foil, needles			
	Is there evidence of sexual activity? e.g., condoms			

	Other			
Physical Disorder	**Is there vandalism?** damage/excessive use of park facilities broken destroyed park equipment			
	Is there graffiti?			
	Is there litter? Is there litter on the floor? Are the bins overflowing?			
	Are there needles/syringes?			
	Are there any broken lights?			
	Are there any broken windows?			
	Is there dog fouling?			
	Other			

Park usage

Variable	Measure	Score
Quantities of users	*Open notes*	*Quiet* *Moderate* *Busy*
Type of facilities used	*Open notes*	
Types of users	• Legitimate (using the place for its intended purpose) • Non-Legitimate (not using the space of its intended purpose) • Police, park staff, council	*Mostly legitimate* *Mostly non-legitimate* *Count police*
User characteristics	Gender • Female • Male Age group • Children & Youths (<16) • Young (17-40) • Older (>40)	*Mostly female* *Mostly male* *Mostly youths* *Mostly young* *Mostly older*
Activity	Walking Passing through an area Waiting Playing Jogging Working Cycling Skateboarding	*Open notes*

	Other	

Appendix 5: Ethics Application

THE UNIVERSITY OF HUDDERSFIELD

School of Human and Health Sciences – School Research Ethics and Integrity Committee

APPLICATION FORM

Please complete and return via email to:

SREIC Administrator: hhs_srep@hud.ac.uk

Name of Applicant: Jody Walker

Title of study:

A risky facility analysis of crime and disorder in parks: a case study of Kirklees

Department: Human and Health Sciences Date sent: 18/12/2020

Please provide sufficient detail below for SREIC to assess the ethical conduct of your research. You should consult the guidance on filling out this form and applying to SREIC at https://research.hud.ac.uk/strategy/concordat-research-integrity/hhs-ethics/

Researcher(s) details	Jody Walker A research project submitted as part of MSc Criminology U1765001@pgr.hud.ac.uk
Supervisor(s) details	Melanie Flynn m.flynn@hud.ac.uk Leanne Monchuk l.y.monchuk@hud.ac.uk
All documentation has been read by supervisor (where applicable) and Supervisor Report Form attached	YES / NO / NOT APPLICABLE This proposal will not be considered unless the supervisor has submitted a report confirming that (s)he has read all documents and supports their submission to SREIC

Aim / Objectives	<u>Aim</u> This study seeks to assess features of guardianship and Crime Prevention Through Environmental Design on levels of crime and disorder in risky parks. <u>Objectives</u> 1) Establish which Kirklees parks can be classified as high-crime, risky facilities. 2) To analyse crime concentrations in parks, establishing: (a) which types of crime concentrate in parks (b) how crime is concentrated across temporal shifts (weekday vs weekend, daytime vs night-time) 3) To assess whether factors associated with guardianship, CPTED and park usage can be used to identify characteristics of spatial risk related to crime and disorder in parks.

A brief overview of research methods	This project will advance a form of a Convergent Parallel mixed methods design to address the research aims This study consists of four stages: 1) Kirklees Council will be approached to provide information regarding problematic facilities (definition to be determined in discussion with data providers) 2) Kirklees Council crime and disorder data will undergo statistical analysis to determine which types of crime and when crime is concentrated in the selected risky parks. 3) Conduct structured environmental observations a) measuring the occurrence of specific physical features associated with crime based on the principles of guardianship and CPTED b) determine general park usage (the use of facilities, types of users, user characteristics and length of visits) 4) Conduct non-participant observational data to supplement the structured data with alternative physical and social elements **Contingency (if unable to access crime and disorder data): 1) Use sneaky measures of crime and disorder (e.g., signs of drug/alcohol use, vandalism etc.) to identify Kirklee's risky parks Followed by steps 3 & 4.
Project start date	25/01/2021
Project completion date	20/09/2021

Permissions for study	The research will be conducted in urban parks which as an open public space requires no permission to access or study. The Council will be informed of the observation schedule should they receive any report regarding my presence. During the fieldwork, it will be ensured that the physical setting is respected and receives minimal disruption. This research aims to understand park usage and activity; therefore, the site must be accessed at various times (busy and quiet). However, it will be ensured that the site remains unchanged. The secondary data required for stage 2 of the study will be requested from Kirklees Council. The project supervisor is currently in informal discussions with the data provider and an application letter (attached), including details of the research, and the specific data required will be sent after receiving ethical approval. All data acquired will be handled per the requirements outlined by Kirklees Council and the University of Huddersfield. Issues surrounding data storage are discussed below.
Access to participants	This study does not directly include human participants. Any park users present during the study are naturally using the environment and have not been recruited for this research. Therefore, there are no specific ethical concerns regarding how participants will be accessed.
Confidentiality	The fieldwork stage of this study includes observation and a systematic site survey. During the fieldwork, photos will be taken. To minimise issues of consent, anonymity and confidentiality, no images will be taken involving human participants, and no personal identifiers will be collected throughout. If during the fieldwork a crime occurs, there is no legal obligation to report (except for terrorism, financial offences related to terrorism and money laundering). Should a crime occur outside of this remit and potential harm may occur, the emergency services will be called.
Anonymity	This research is wholly anonymous as the researcher is unable to identify the participants (park users); therefore, parks users will not be offered formal anonymity. Minimal user characteristics are to be collected, which will be completely anonymised and not include personal identifiers. Park names and locations will not be anonymised unless requested by Kirklees Council.

Right to withdraw	Per the above discussion, the study will not be offering a right to withdraw as none of the data gathered will include personally identifiable information.
Data Storage	All data collected will be stored and handled in accordance with the University's Data Protection Policy on a password-protected computer. Sensitive or confidential Kirklees Council crime and disorder data will be kept in the University's cloud storage. The data will be stored for the recommended period of 10 years (unless requested otherwise by Kirklees Council) by Melanie Flynn to aid transparency and integrity of research. Observational data will either be kept on the person or in a locked office drawer at a personal address. Data access will be restricted to the researcher and supervisors (Melanie Flynn and Leanne Monchuk).
Psychological support for participants	It is unlikely that any psychological support will be required for park users as a result of this study due to the discussed measures. However, as a precaution and to minimise any potential, unexpected harm, the identification form (attached) includes a brief explanation of the study and reference to further support/guidance including Kirklees Council and the University of Huddersfield.
Researcher safety/support (attach completed University Risk Analysis and Management form)	Completed RAM form attached considering physical/emotional researcher harm.
Information sheet	A modified information sheet (attached) will be provided to Kirklees Council.
Consent form	Consent in this study is not applicable for several reasons. 1) The location of this study is a public place where individuals expect to be observed by strangers. 2) The research is unobtrusive and poses minimal (if any) risk/harm to the public as the study aims not to disturb park user's original activities. 3) This study will entail large numbers of people who form part of the broader social setting and therefore, park users cannot be predicted. Ensuring everyone has consented would disrupt the context this research is attempting to observe. If participants are to notice they are being observed, an identification form (attached) will be provided to reduce any risk or harm to the individual and the University. The identification form will explain the study and reassure them that no identifiable information is being gathered. Also, during the site visits, a university lanyard with an ID pass will be worn, ensuring I am identifiable to the public.

Letters / posters / flyers	N/A
Questionnaire / Interview guide	Site survey & observation guide attached
Debrief (if appropriate)	N/A
Dissemination of results	This research is part of a programme of study. The data and findings will be presented in a master's thesis and any reports/documents requested by the data providers. The research findings may also be presented at academic conferences and/or in academic publications. Throughout, any requirements defined by the data providers, e.g., place anonymity, will be maintained.
Identify any potential conflicts of interest	N/A
Does the research involve accessing data or visiting websites that could constitute a legal and/or reputational risk to yourself or the University if misconstrued? Please state Yes/No If Yes, please explain how you will minimise this risk	No
The next four questions in the grey boxes relate to Security Sensitive Information – please read the following guidance before completing these questions: https://www.universitiesuk.ac.uk/policy-and-analysis/reports/Documents/2019/Oversight-security-sensitive-research-material-guidance-3.pdf	

Is the research commissioned by, or on behalf of the military or the intelligence services? Please state Yes/No If Yes, please outline the requirements from the funding body regarding the collection and storage of Security Sensitive Data	No
Is the research commissioned under an EU security call? Please state Yes/No If Yes, please outline the requirements from the funding body regarding the collection and storage of Security Sensitive Data	No
Does the research involve the acquisition of security clearances? Please state Yes/No If Yes, please outline how your data collection and storages complies with the requirements of these clearances	No

Does the research concern terrorist or extreme groups? Please state Yes/No If Yes, please complete a Security Sensitive Information Declaration Form	No
Does the research involve covert information gathering or active deception? Please state Yes/No	No
Does the research involve children under 18 or participants who may be unable to give fully informed consent? Please state Yes/No	No
Does the research involve prisoners or others in custodial care (e.g., young offenders)? Please state Yes/No	No

Does the research involve significantly increased danger of physical or psychological harm or risk of significant discomfort for the researcher(s) and/or the participant(s), either from the research process or from the publication of findings? Please state Yes/No	No
Does the research involve risk of unplanned disclosure of information you would be obliged to act on? Please state Yes/No	No

Will your research involve NHS patients? Please state Yes*/No *If Yes, please follow the HRA Decision Algorithm (http://www.hra-decisiontools.org.uk/ethics/) and indicate the outcome. If the algorithm indicates that an application will be required through the IRAS system please append your draft IRAS application and all accompanying documents to this form. NB: Do not submit your IRAS Application until full approval has been granted at School level.	No

Will your research involve NHS staff? Please state Yes*/No *If Yes, please follow the HRA Decision Algorithm (http://www.hra-decisiontools.org.uk/ethics/) and indicate the outcome. If the algorithm indicates that an application will be required through the IRAS system please append your draft IRAS application and all accompanying documents to this form. NB: Do not submit your IRAS Application until full approval has been granted at School level.	No
Where application is to be made to any other External Agencies	No
Other issues	N/A
Please supply copies of all relevant supporting documentation electronically. If this is not available electronically, please provide explanation and supply hard copy	

All documentation must be submitted to the SREIC Administrator. All proposals will be reviewed by two members of SREIC.

If you have any queries relating to the completion of this form or any other queries relating to SREIC's consideration of this proposal, please contact the SREIC Administrator in the first instance – hhs_srep@hud.ac.uk

Appendix 6: Identification Form

This research study:

A risky facility analysis of crime and disorder in parks: a case study of Kirklees is being conducted as part of an MSc Criminology at the University of Kirklees.

This study is exploring crime and disorder in Kirklees parks by considering the impact of environmental design and general usage. To achieve this, I am observing the park area, focusing on design features and how people use the space. However, please be assured that no identifiable information is being gathered, and no images will be taken of you or any park users.

If you require any further information about the research, please contact me on:
Jody Walker Email: jody.walker@hud.ac.uk

The project is under the supervision of Dr Melanie Flynn and Dr Leanne Monchuk.
Melanie Flynn Email: M.Flynn@hud.ac.uk
Leanne Monchuk Email: L.Y.Monchuk@hud.ac.uk

If you require any additional support or help as a result of this study, please contact:
Kirklees Council **relevant contact details will be requested and inserted here**

Tel –

Email-

Website - www.kirklees.gov.uk

West Yorkshire Police

Tel – 101

Website - https://www.westyorkshire.police.uk/

Crimestoppers

Tel -0800 555 111
Website - https://crimestoppers-uk.org/

Appendix 7: Risk Assessment

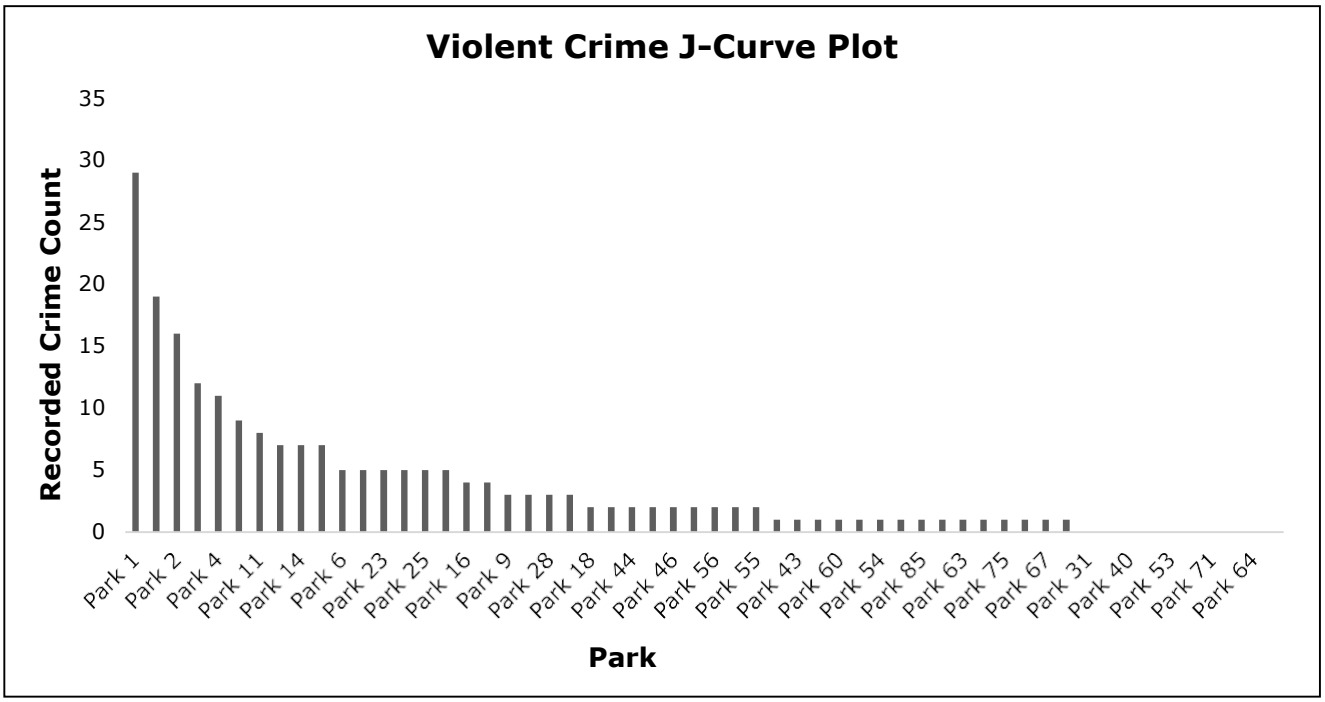
THE UNIVERSITY OF HUDDERSFIELD: RISK ANALYSIS & MANAGEMENT

ACTIVITY: Site Observation			Name: Jody Walker	
LOCATION: Kirklees			Date:	Review Date:
Hazard(s) Identified	Details of Risk(s)	People at Risk	Risk management measures	Other comments
Fieldwork in parks	Personal Safety • Physical or verbal threat and abuse • Lone working in a potentially high-crime location	Researcher	• Fieldwork will be only be conducted accompanied • Inform a nominated person (friend/family member) of times and dates of fieldwork and expected return • Travel in a personal vehicle rather than public transport • Immediately bring the fieldwork to an early conclusion if the situation becomes unsafe • Take a fully charged mobile device in case of emergency • Wear a University ID card and carry an identification form and to present if queried by a member of the public	Date, times and location of site observations will be pre-arranged, and details will be provided to supervisors
	Data Security		• Council data will solely be	When not on my person,

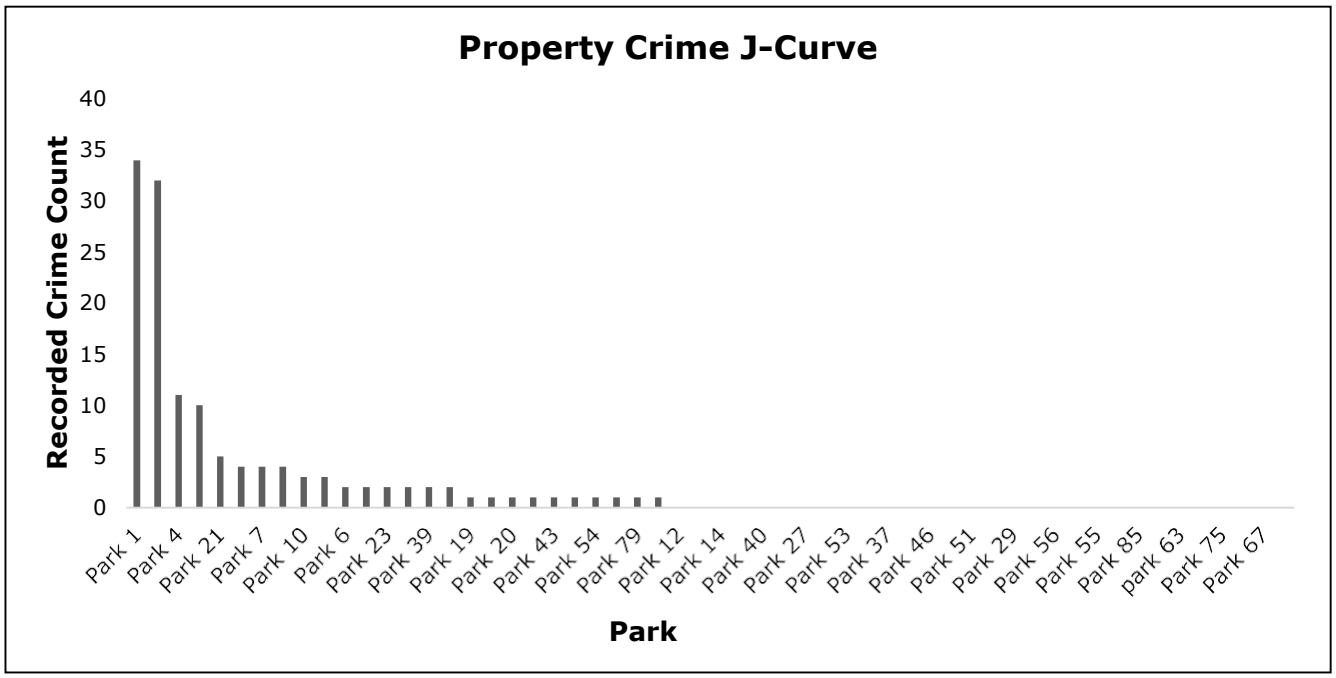
Loss or theft of data		Kirklees Council	stored on the University's cloud service • Any primary data collected (images/site surveys) will be stored on a password-protected computer and storage devices	laptop and other devices containing data will be stored at home in a locked drawer.

Appendix 8: Crime Category J-Curves

Violent Crime (n=208)



Property Crime (n=132)



Disorder Crime (n=219)