SYSTEMS THINKING FOR SUSTAINABLE CRIME PREVENTION

PLANNING FOR RISKY PLACES

Vania Ceccato and Andy Newton

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This book offers a comprehensive overview of areas with elevated levels of crime, which we consider 'risky places.' These can be facilities, nodes, or paths and can be found everywhere, from small towns to megacities. Crime and fear are examined from the perspective of those who use these places, based on examples from the US, the UK, Sweden, Nigeria, Brazil, China, Australia, and more. Advocating for a systems thinking approach, the book shows what can be learned from risky places and identifies ways to address their inherent problems. The book also assesses current barriers to applying systems thinking and identifies ways to foster interconnected long-term crime prevention strategies that meet the diverse needs of multiple stakeholders. Aimed at academics, students, and professionals in urban planning, criminology, geography, and related fields, this book is a vital resource for those dedicated to creating safer, more inclusive, and sustainable environments.

Vania Ceccato is Professor at the Department of Urban Planning and Environment, School of Architecture and the Built Environment in Stockholm, Royal Institute of Technology, Sweden.

Andy Newton is Professor of Criminology and Policing at Nottingham Trent University, Nottingham, UK. He is a co-director of the cross-disciplinary strategic research theme Safety and Sustainability.

"This book provides an important advancement in sustainable crime prevention in risky places. The authors ask the reader to look at risky places within the context of the surrounding complex systems that make up the local, regional and larger areas as well as the actors that shape what occurs. Each chapter in the book is of great value but, as a whole, it brings criminologists, geographers, psychologists, urban planners, architects, sociologists and government officials closer together in advancing safety and reducing risk."

Patricia Brantingham, *Professor of Computational Criminology, Simon Fraser University, Canada*

"Through a systems thinking approach, the authors explore the interconnected nature of risky places and the socio-spatial contexts in which they are located to understand the challenges and opportunities for more appropriate intervention. They offer new ways to analyze the complex dynamics giving rise to crime in specific areas and propose a framework for applying systems thinking to study and intervene in risky places. The book offers a valuable lens and tool towards safer and more sustainable human settlements."

Karina Landman, *Professor, Department of Town and Regional Planning, University of Pretoria, South Africa*

"Through their wide-ranging and stimulating treatment of risky places, the two internationally leading authors of this book show why it is now necessary and appropriate to build a systems perspective onto two well-established approaches to safety and security. Situational crime prevention first emerged as a successful field of research and practice by isolating itself from traditional criminological domains of societal structure and offender motivation. CPTED (Crime Prevention Through Environmental Design) arose as a school of practice within architecture. The authors show how to treat situations and built environments both urban and rural via a wider and deeper systems-level analysis. Systems thinking promises to guide understanding, intervention, practical implementation, and evaluation in this complex domain involving many diverse stakeholders at various geographical scales. It also enables us to merge security goals creatively and rigorously with those of sustainability and other beneficial outcomes."

Paul Ekblom, *Emeritus Professor, Design Against Crime Research Lab, Central Saint Martins, University of the Arts London; Visiting Professor, Department of Security & Crime Science, University College London and Applied Criminology & Policing Centre, University of Huddersfield, United Kingdom*

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This book is dedicated to all those who intentionally work to make a safer and more sustainable world.

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PREFACE

Amidst the pandemic, we organized and hosted 20 online webinars from January to November 2021. This sparked international discussions about risky places, engaging criminologists, urban planners, and safety experts from academia and practice. Recognizing the need for a comprehensive framework to study these high-crime areas, the importance of not only understanding but also intervening in these spaces became evident. Throughout our exploration of these places, a distinct need arose. We needed a theoretical foundation to facilitate the connection between safety and sustainability. This book aims to address these two pressing issues, providing insights and strategies for understanding and intervening in risky places. We draw from our own research and reflect on our collaborations with academia, communities, and practice over a period of 20-plus years. We have studied stations, parks, paths, and other risky places in different cities and country contexts. After reflection and considerable head-scratching, this book advocates for a paradigm shift by adopting systems thinking for crime prevention at risky places. This approach recognizes the interconnectedness of a system's multiple parts and provides a transformative perspective for environmental criminology, urban planning, and other related fields. Our analysis in this book challenges the conventional, localized situational crime prevention approaches that often fail to achieve long-term sustainable prevention. By promoting a broader debate on integrated strategies, we offer an introduction to systems thinking for those committed to enhancing urban safety and sustainability.

Vania Ceccato and Andy Newton

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We are deeply grateful to the individuals and organizations that played crucial roles in bringing *Systems Thinking for Sustainable Crime Prevention: Planning for Risky Places* to life.

The seminar series on risky places for crime, held in 2021, was a significant source of inspiration. It featured insightful lectures from globally recognized experts on crime, place, and risk, complemented by the innovative contributions of early career researchers focusing on crime in various individual risk settings. The engaging discussions and valuable feedback we received from participants were instrumental in shaping our work.

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We express gratitude to our colleagues from ECCA (Environmental Criminology and Crime Analysis), particularly those who participated in the conference in Stockholm in June 2023. Naming all would be lengthy, but we sincerely appreciate all those who share our research interests. Your support has inspired us and given relevance to our own work.

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We extend our deepest appreciation to our family and friends for their unwavering support throughout this journey. Recognizing the significance of our work, we dedicate the book to our families (Vania dedicates it to Anders, Filip, Amanda, and extended family in Brazil, and Andy dedicates it to Laura, Oli, and Isi). Your invaluable encouragement and patience have been a cornerstone of our efforts.

Vania Ceccato and Andy Newton

1

INTRODUCING RISKY PLACES FOR CRIME

1.1 Introduction and Aim

The United Nations' 2030 Agenda for Sustainable Development recognizes the multifaceted nature of urban challenges. This underscores crime and the fear of crime as significant threats to urban sustainability (UN-Habitat, 2019). Across the globe, we find places that are 'risky,' with higher levels of crime than other nearby locations. This holds true for small towns, urban municipalities, and megacities. These risky places demand tailored interventions that integrate crime prevention within broader safety and sustainability strategies.

This book focuses on 'risky places,' which are settings that draw disproportionately high levels of crime in relative and absolute terms. However, these places are vibrant hubs where diverse communities converge and cultural hubs for urban life (Gehl, 1987). They are unique settings, offering a range of different experiences for those who live, work, visit, or travel through them. This book explores ways to better understand the nuances of crime at risky places and how crime prevention efforts can be integrated into wider safety and sustainability plans. These should consider socio-economic, environmental, and political processes that shape their futures in a world marked by globalization, digital technology, and climate change.

Contemporary safety challenges demand a set of abilities and expertise that extend beyond what is traditionally expected from professions, emphasizing the need for a broader spectrum of skills to understand and address crime in risky places. We contend that current knowledge of the

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context of crime in risky places is not sufficiently formulated to develop sustainable crime prevention approaches. Situational approaches to crime prevention involve modifying specific environmental conditions to reduce opportunities for crime. These approaches possess many qualities and have demonstrated successful reductions in risky places, at least in the short term. However, concerns have been raised about the potential for situational crime prevention to result in crime displacement (Guerette & Bowers, 2017). Moreover, situational crime prevention tends to be excessively localized and does not demonstrate long-term impact. The problem or narrowly focused interventions are also recognized in problem-solving models for crime prevention and policing (Borrion et al., 2020; Lamont, 2021). Moreover, situational crime prevention approaches rarely offer a comprehensive understanding of the system they are part of and neglect to involve a range of different users adequately. There have been previous calls for a more in-depth discussion of these challenges by previous research; see, for instance, Ekblom, 1990; Tilley, 1993; Clarke & Weisburd, 1994; Welsh & Farrington, 2009.

Systems thinking recognizes these shortcomings and compares a particular problem to the multilevel dynamics of the whole system. It acknowledges that a system's performance depends on how the parts of the system fit together (Meadows, 2008). A novelty of this book is that, informed by systems thinking, we define pathways to address the existing challenges associated with conventional situational crime prevention approaches and develop more sustainable interconnected approaches to reduce crime in risky places.

Applying systems thinking to situational crime prevention involves understanding the nature of systems and identifying interconnections between their component parts. This approach calls for a shared understanding of crime and safety problems and acknowledges that conventional prevention efforts only realize short-term outcomes. When organizations focus solely on their own priorities without considering the broader impact on the whole system, this will hinder effective problem-solving. Systems thinking encourages self-reflection and establishes a common language for communication (Meadows, 2008). In the context of crime prevention, where disjointed initiatives often lack coordination, systems thinking can guide and promote continuous learning and engage relevant practitioners and users.

Systems thinking aligns with the complexities inherent to contemporary globalized city dynamics, which require a confluence of knowledge on housing, transportation infrastructures, technology, and other research areas about people and their activities. Adopting systems thinking for crime prevention at risky places is a basic condition that must align with

the mechanisms of 'sustainability transitions.' These are the "processes of long-term structural change towards more sustainable societal systems. They include profound changes in ways of doing, thinking, and organizing, as well as underlying institutions and values" (European Environment Agency, 2024). Unlike conventional approaches that may treat these changes in isolation, systems thinking acknowledges the interconnections within systems. It is the convergence of these socio-economic factors, cultural influences, and environmental conditions at risky places that influence the manifestation of crime. We find these in the Global North and the Global South, as well as in areas on the rural-urban continuum, namely those places that vary in their potential for crime due to geographical location and particular characteristics. These areas on the rural-urban continuum are important because, in a globalized world, these places may be hybrid, in other words, 'rural' in some respects and 'urban' in others (Ceccato & Abraham, 2022). Thus, the adoption of systems thinking, as articulated in this book, may hold profound implications for environmental criminology and other related disciplines such as urban and regional planning, geography, sociology, policing, and others devoted to the sustainability of places.

Aims

This book has two aims. The first goal is to investigate the nuances and nature of crime in risky places. We examine the characteristics of these places, for example, bars, train stations, or transport corridors, and identify similarities and key differences for each type of risky place. However, local context matters, and these risky places do not exist in isolation from their surrounding environments. They are linked to nearby places and elements of a broader system of which they are part. This may extend to other parts of the town or city but can also be influenced by national and global factors, perhaps best exemplified by the physical and cyber world interaction. We, therefore, seek to better understand risky places for crime by unraveling the contexts and systems in which these places are embedded.

A further goal is to advocate for systems thinking to foster a longer-term approach to understanding risky places. To achieve this, traditional concepts of 'boundaries' need to be reframed, away from 'target and control areas' to hierarchical and nested boundaries (Chapter 2) that are embedded within multiple scales. Approaches should consider the voices of different users or risky places, including women, older adults, LGBQTI+, people with disabilities, and other vulnerable populations. We also need to consider the goals of practitioners who develop interventions to prevent crime at these risky places and to what extent these are shared or in conflict. We

can never know all parts of a system (Meadows, 2008), but by using systems thinking, we seek to identify key leverage points. These are the points in a system where coordinated changes sustained over time will produce the greatest level of system change, in this case, sustainable crime prevention and increased feelings of safety.

1.2 Why Are Risky Places Important?

As highlighted earlier, a risky place for crime constitutes a setting with disproportionately high levels of crime. These areas frequently serve as bustling urban hubs, drawing crowds for various activities and purposes, and can be found in places beyond large metropolitan cities. All of this points to a need to better understand their problems.

Knowing where crimes are more likely to occur helps allocate resources. Police can focus their efforts on areas with more problems and target daily patrol services to more specific areas, consequently producing less carbon emissions, and cities can become more sustainable. Cities can invest in infrastructure improvements and community programs where they are most needed to support vulnerable groups, thus improving overall safety conditions but with a focus on those most affected by crime and poor safety perceptions.

Another motivation is that areas with concentrations of crime often overlap with other social problems, such as poor infrastructure and poor health. Thus, investing in solutions to address criminogenic conditions in risky places means we are also investing in social justice and equity. Engaging communities in crime prevention efforts can leverage local knowledge and foster a collective sense of responsibility for safety and well-being for groups that are more exposed to victimization or suffer from the impact of fear of crime.

Moreover, areas on the rural-urban continuum can also benefit from this. The need for planning outside of metropolitan areas is evidenced by ongoing global debates about the future of rural areas (Gallent & Gkartzios, 2019; Yarwood, 2023). Interventions might go beyond increasing the number of police officers, for example, improving infrastructure such as roads and lighting, enhancing communication networks, supporting schools, and providing recreational and social spaces. These may foster community cohesion, deter crime, and increase safety perceptions. These interventions are not necessarily focused on crime prevention in the short run but can, in the longer term, be important for sustainability. In a globalized world, problems in risky places demand extensions to our analytical boundaries, from local to global, from case-based to multi-scale, and to consider interconnected relationships.

Finally, understanding risky places for crime is important for research and education. Studying risky places for crime contributes to a wider academic understanding of many disciplines, for example, criminology, sociology, public policy, urban planning, architecture, psychology, geography, computer science, and engineering. Evidence from these fields can enrich our knowledge of risky places and guide policy experts in planning targeted crime reduction and community-strengthening strategies. With modern communication platforms facilitating blended learning, new platforms have emerged to bridge the gap between researchers and practitioners. Webinars and online lectures can unite experts and benefit diverse audiences. For example, in 2021, we held a series of webinars organized by the authors on behalf of KTH, the Royal Institute of Technology and academic host of the 'Safeplaces' network in Sweden, and Nottingham Trent University in the UK. These webinars convened a diverse group of speakers and audiences to discuss risky places for crime (https://bit.ly/Risky_places). A recurring theme throughout these discussions was the demand for comprehensive theoretical frameworks to analyze such risky places. This book represents an effort to respond to those calls, which were also identified at the International Symposium on Environmental Criminology and Crime Analysis (ECCA) in Stockholm in June 2023 (https://www.sakraplatser.abe.kth.se/ecca-2023/).

Addressing crime and fear of crime in risky places requires a multifaceted approach that combines law enforcement, community engagement, urban and community planning, and social policy. In the next section, we demonstrate the need for a different approach to addressing underlying problems in risky places. We suggest that systems thinking can offer innovative ways that are fine-tuned to the unique challenges of the 21st century.

1.3 Systems Thinking, Situational Crime Prevention, and Risky Places

Systems thinking is a broad approach encompassing theoretical understanding and practical problem-solving, emphasizing a broad and interconnected view of systems (Ackoff, 1994; Meadows, 2008). It encourages exploration beyond individual components to consider the dynamic interactions and feedback loops of a system (Arnold & Wade, 2015). Related concepts include general systems theory and systems analysis. The first of these relates to theoretical frameworks and general principles that support a wider understanding of systems (Von Bertalanffy, 2010). System analysis can be considered the practical application of systems thinking and uses tools such as data modeling, simulation, and optimization to analyze and enhance the performance of a system (Bergen, 1986). In this book, we

consider systems thinking as an approach that explores systems, identifies the interdependencies present, and recognizes interconnected parts.

Systems thinking has been applied across a range of disciplines, such as organizational learning, engineering, biosciences, ecology, and public health (Leveson, 2016). It has gained some traction in criminology, including green criminology (Tourangeau, 2022), cybercrime (Shaked et al., 2021), intimate partner violence (Carne et al., 2019), prisons (Gaskell, 1995), and police reform (Bagby, 2021). However, to date, it has received little exposure in place-based responses to crime prevention. In Chapter 7, we reflect on some broader explanations for this.

One of the challenges that can be identified at risky places for crime is the complexity of problems evident. Problem-oriented and action-focused interventions rely on a narrow, focused, reductionist understanding of a problem and the identification of appropriate solutions to address this. Whilst problem-oriented policing and situational approaches to crime prevention have successfully reduced crime (Hinkle et al., 2020), we have limited evidence of their sustainability. Indeed, Ekblom (2024) poses a series of challenges to what he calls an oversimplification of research and practice. Others have attempted to link situational perspectives of places to tools in public health (Ceccato, 2020; Sidebottom & Tilley, 2023; Eck et al., 2024). Ekblom (2024) has developed a series of frameworks, which he describes as "precision tools for thinking, communication and action," which can support the complexity involved in preventing crime. Examples of these include the conjunction of criminal opportunity (CCO) and the 5Is framework, which can be used to help practitioners and researchers navigate some of the 'messiness' present when identifying and responding to crime in risky places. These frameworks help guide thinking and the complexities of the problems evident. However, as will be evident in this book, we suggest that to achieve more sustainable approaches to crime prevention, we need to extend these frameworks further and incorporate a broader systems-thinking perspective.

In this book, we consider a system as "an interconnected set of elements that is coherently organized in a way that achieves something" (Meadows, 2008, p. 18). Systems can be nested; for example, a risky place is a system, but this is part of a neighborhood, which is a wider system. This neighborhood can also be part of another broader system, such as the city and so forth. A system consists of three components: elements, interconnections, and functions. For example, a school can be considered a system. The elements are the parts of the school that are most easily identified, for example, pupils, teachers, the buildings, the resources, the organizational structure of staff, and the school rules and policies that students should follow. The interconnections include the flow of learning and knowledge,

communication between staff and pupils, the enforcement of policies, and the movement of pupils between lessons. A primary function is education, which may, for example, include elements of 'character building.' Other functions of the school may be to connect socially with the local community. At times, its functions, such as leisure or other activities, maybe more diverse. During election times, schools can become polling stations where people vote. System dynamics are also highly relevant, and it is necessary to consider how a system or its components behave over time. Characteristics that define a well-functioning and sustainable system include its 'resilience,' 'self-organization,' and 'hierarchy.' We return to these in detail in Chapter 2.

In Chapters 4–6, we will explore how some places may be risky and others may not. One approach that has been used to reduce crime at risky places such as schools is to design and engineer specific situations or settings that reduce the opportunities for offending. The purpose of this is to make offending more complex, less attractive, or riskier. This is known as situational crime prevention, which offers practical approaches to reduce opportunities for offending. This might be by manipulating the immediate environment in which crime occurs, for example, altering the environment's physical, social, or managerial aspects (Clarke, 1995). This is different from broader crime prevention strategies that seek to address structural causes of crime by targeting an individual's inherent 'criminality.' Examples of situational crime prevention measures include installing surveillance cameras, improving lighting in public spaces, implementing access controls, or changing the design of buildings to minimize potential hiding spots for criminals. They also include initiatives engaging with 'plural policing,' recognizing that the police can't solve issues independently and must involve residents, businesses, the fire service, and other community safety partners.

This book brings together well-established disciplines that have evolved over the past 50 years. While we do not claim novelty in the foundational principles, this robust body of knowledge informs and strengthens our approach. When framing this through a systems approach, we start to unravel the different elements, interconnections, and functions present and identify the complexities evident. To better understand complex systems, we also need to understand the local context. Applying systems thinking to the study of risky places supports a better understanding of the rhythm and dynamics of risky places, creating comprehensive models of the problem and supporting long-term sustainable solutions. We contend that situational approaches effectively reduce crime in risky places, but we need to be more sustainable in how we do this. In other professions, systems thinking has been demonstrated as an effective approach to sustainable

change. We propose integrating systems thinking with conventional situational crime prevention as a way forward. We believe it has the potential to achieve sustained prevention of crime in risky places. We contend that systems thinking should be considered a complementary approach to situational crime prevention and not something to replace or contradict it. We suggest readers should consider how they might integrate this thinking into their own crime prevention approaches for a more sustained impact.

Systems thinking is a complementary way of looking at situational conditions of crime and crime prevention in at least three ways. First, systems thinking recognizes that situational approaches provide a practical framework for understanding and addressing crimes by focusing on the immediate situational factors that influence offending. Therefore, analyzing crime patterns and concentrations aids in pinpointing the problem to better target protective measures in risky places (see Chapter 8). These approaches complement broader long-term efforts based on structural causes of crime and can enhance the effectiveness of law enforcement strategies by protecting targets (people, properties, and areas) and involving actors and communities. As Meadows (2008) makes clear, it is necessary to take time to observe 'the beat of the system,' which is an essential step embedded in many situational approaches to crime. For instance, the SARA model (Chapter 3) grew from Problem Oriented Policing (POP; Goldstein, 1979). Analysis is integral to both approaches, providing an understanding of the events and conditions that precede and accompany the problem.

Second, an intervention designed to achieve short-term success is assumed in conventional situational crime prevention to incontestably ensure long-term success. However, there are many examples where this is not guaranteed. This demands long-term monitoring of such interventions, which may not be effective in the long term or could even make matters worse. There are several challenges for evaluation that will be explored throughout this book, and they are not new. More than 30 years ago, we were warned about the limitations of our Popperian claims of cause and effect based on falsification principles. Ekblom (1990) states that it is unreasonable to expect definitive proofs outside of a laboratory setting in the practical realm of developing responses to crime, where numerous specific and complex evaluation challenges arise. Tilley (1993) rightly reminds us that absolute proof is unattainable even in the most rigorous of sciences. The best we can strive for is the development of improved theories that result in improved knowledge and practice. This can only be achieved through well-conducted evaluations, and even after well-conducted evaluations that identify initial success, sustaining these effects over time is challenging without ongoing adjustments and broader community engagement.

Third, in conventional situational approaches, it becomes imperative to narrow down the scope of the problem as specifically as possible. This process allows the identification of the problem and the resources that can assist in developing a deeper and more nuanced comprehension of the problem. Doing this creates a risk of hyper-segmentation of a problem, leading to unsuccessful outcomes. This 'hyper-segmentation' of the problem has created short-sighted organizational structures. The nature of funding is problematic and generally short-term, which limits the length of time interventions can be delivered. This also results in short-term approaches to training and education. As a result, everyday practices cannot be aligned to long-term visions. In the next session, we will discuss these issues in more detail.

1.4 Sustainability and Crime Prevention

In this book, we adopt the concepts of 'security' and 'safety' interchangeably whilst recognizing that security is more frequently associated with the 'absence of crime,' and safety is more regularly linked to 'lack of fear or worry about crime.' Addressing crime and fear in risky places requires a comprehensive approach that goes beyond the planning of the physical environment. Risky places are unique because they demand extra efforts from residents, businesses, law enforcement, government officials, and community organizations to ensure that actions reflect the needs of those who use them. More than in any other place in the city, in places that attract lots of crime, the role of planning must "take into account a variety of aspects of society with good touch" (Forsberg, 2019, p. 12). The challenge is how to interpret democratically made decisions, different needs and expectations of diverse groups, and combine them into long-term sustainable solutions.

Integrating a sustainability agenda into this equation is essential, as this encompasses the structures and processes of authority that govern social, political, and economic relationships and includes both formal and informal institutions, as well as private forms of authority (UNODC, 2020). The expectation is that planning aligns with community needs and broader policy goals. This is particularly true for the United Nations' 2030 Agenda for Sustainable Development, which recognizes that reducing conflict, crime, violence, and discrimination and ensuring the rule of law, inclusion, and good governance are key elements of people's well-being and essential for securing sustainable development (UN, 2015).

Sustainability was first defined over 40 years ago and is now broadly recognized as a guiding framework for shaping policy and development (Scoones et al., 2020). In a globalized world, social, economic, and

environmental knowledge underpins the political processes that determine the future shape and functioning of urban and rural areas. Such a process focuses not only on the environmental and economic dimensions of sustainability but also on the social dimension (De Fine Licht & Folland, 2019). These goals show the opportunities to accommodate complementary interests between sustainability's social, environmental, and economic dimensions and those that conflict with each other (Campbell, 1996; Vallance et al., 2011).

Sustainability has also become a key construct across many disciplines (Williams et al., 2000). Crime and safety are not generally considered part of the sustainability debate, but there is some evidence of a change here. The clearest is found in green criminology, which focuses on environmental crimes, climate change, and ecological justice (White, 2007). A further example is restorative justice, which focuses on repairing the harm caused by criminal behavior (Van Ness et al., 2022). The more obvious link between crime and sustainability is through social cohesion, which can be considered a vital element of a community's long-term stability and growth (Jeannotte, 2003). Ensuring a sense of safety in a place is intimately connected to various aspects of community sustainability, where residents engage socially with others and participate in community activities.

There is an increasing recognition of the need to embrace interdisciplinary approaches to address complex challenges, particularly those related to sustainability. Laub (2006) questions why many criminologists do not draw from other disciplines to aid their understanding of crime. He suggests that conventional reliance on single disciplines limits a field's ability to comprehensively understand and address sustainability problems. To advance and contribute meaningfully to sustainability, we must adopt interdisciplinary research methodologies, and we suggest systems thinking and systems analysis emerge as crucial tools for this.

The historical reliance on single disciplinary perspectives to understand crime has resulted in a narrow understanding of its complexities. However, in a globalized and digitized connected world, sustainability challenges demand a more integrated approach to understanding crime. Collaboration with fields such as environmental science, urban planning, and public health allows criminologists to consider the interconnectedness of social, economic, and environmental factors that contribute to crime. The adoption of systems thinking enhances our ability to understand the complexities of criminal systems, facilitating innovative and sustainable interventions.

In practice, sustainability is also linked to the societal costs of crime, both realized costs for 'processing' crime and the costs of preventing crime. Paulsen (2013) divides the effects into three categories: economic, social, and environmental costs. The economic costs of crime are related to direct

losses attributable to crime, including reductions in, for example, property values or total government spending. Social and emotional costs are more difficult to quantify but can, for example, be assessed by the impact the fear of crime has on people's mobility and behavioral choices. As victimization is unequally distributed in society, the price of crime and fear is higher among the most vulnerable. Finally, the environmental costs of crime prevention include, for example, carbon dioxide emissions. Research shows that crime prevention contributes 12.5 million tons of CO2 annually in England, equivalent to the emissions of countries such as Lithuania as a whole (Wordmeter, 2024). Other costs include the environmental costs of construction and planning areas requiring renovation or demolition.

A potential way to address these costs and challenges is through systems thinking. This requires a clear common vision that is plainly articulated and socially shared, discussed and debated constructively, and formulated and constantly reformulated (Meadows, 1994). Using the 2030 Sustainable Development Goals (SDGs) as a starting point, our shared goal is to align with the goal of creating safer places and critically think about the ways we develop sustainable crime prevention. This is the first step towards 'sustainability transitions,' which involve long-term structural changes toward more sustainable societal systems through profound shifts in practices, thoughts, organization, institutions, and values (European Environment Agency, 2024). Thus, our vision could be informed by knowledge implementation from the SDGs 1, 3, 5, 11, 13, and 16.

Addressing the safety of risky places through systems thinking aligns with SDG 11, which aims to make cities and rural settlements inclusive, safe, resilient, and sustainable. By adopting a systems thinking approach, we can contribute to SDG 11 by understanding and addressing the interconnected challenges related to safety in urban and rural areas, promoting sustainable solutions that enhance the overall well-being and resilience of communities. Finding risky places in areas of the rural-urban continuum involves a combination of research, data analysis, and on-the-ground observations. In Chapters 4–6, we provide several examples of using conventional methods to detect risky places and analyze likely key drivers. In Chapter 8, we explore how more recent innovative methodologies could support systems thinking approaches and be combined with traditional approaches.

Safety directly impacts the health and well-being of individuals and communities, which is linked with the aims of SDG 3, which is to promote good health and well-being. A systems thinking approach to safety in risky places contributes to achieving the goal of ensuring good health and well-being by addressing the structural causes of safety challenges and promoting overall community health. For example, in a Latin American city in the Global

South, local institutions collaborate to address safety challenges, addressing high crime rates, limited healthcare access, and inadequate infrastructure. A systems thinking approach integrates efforts for community safety, healthcare access, and infrastructure, aligning with SDG 3 for overall community health. If applied to risky places in the Global North, the specific strategies and institutions involved would vary based on the local context and the unique challenges faced by each community. However, still, the approach would be the same, recognizing the interconnected nature of safety, well-being, and health.

SDG 13 focuses on climate action to combat climate change and its impacts. The targets of SDG 13 include strengthening resilience and adaptive capacity to climate-related hazards, integrating climate change measures into national policies and strategies, and improving education and awareness on climate change mitigation. In environmental criminology, there have been recent calls for the need to identify synergies in the built environment between climate change adaptation and crime prevention; see Chamard (2024), who assessed specific risks associated with climate change, such as heat, wildfires, and flooding. Yet, this is just the start; there remains a significant breadth of issues to be explored and investigated in this area, including the connections between environmental and organized crime (Wyatt, 2021) that link various risky places worldwide.

Policies that acknowledge 'inequalities and inequities' in opportunities have become central in Europe (EC, 2021); for example, the 'Just Transition Mechanism' emphasizes the importance of supporting those who bear the heaviest burdens and recognizing that certain groups may be more affected than others. Engagement of vulnerable groups in adaptation planning and implementation towards a sustainable future is a basic condition for more 'just policies.' This acknowledges the inequalities and inequities that exist between groups and places. Inequities refer specifically to unjust inequalities that could be remedied through changes in policy, societal structure, or practices. Systems thinking can support this by recognizing the need for customized tools to support efforts toward sustainability transitions. An example of this in practice is that the intersectionality of victimization is recognized. Coined by Kimberlé (Crenshaw, 1989), intersectionality addresses how various aspects like gender, race, and economic status intersect to shape discrimination. It is necessary to reflect these differing experiences and perceptions of gender in both the short and long term. This nuanced understanding has the potential to offer more targeted strategies to ensure safety measures address the specific needs of diverse groups, including women and girls, LGBQTI+, older adults, people with disabilities, and other vulnerable groups, as highlighted in SDG 5. Consideration of intersectionality is crucial for addressing the exclusion of

particular groups in society. By addressing these complexities, efforts can align with goals related to safety improvements and economic growth to support the aspirations of SDG 1.

Analyzing safety in risky places through systems thinking promotes the development of effective, just, and accountable institutions, as indicated in SDG 16. For example, municipalities, city councils, judicial systems, and local government bodies all play a role in shaping safety, justice, and governance policies. It is important to note that the specific institutions involved can vary depending on the region and local administrative structure and often work towards various goals. Collaboration and coordination between these institutions are essential to achieving the objectives outlined in SDG 16.

This section has demonstrated that there is considerable overlap across SDG goals, yet often, each is addressed individually. Given the arguments presented in this book for a move towards interconnected and multi-disciplinary efforts and the intersectionality we have identified across SDGs, we contend that a systems thinking approach offers an integrated framework to address multiple SDG goals concurrently. When considering structural causes of crime, can we create peaceful, just, and strong institutions without addressing poverty, good health and well-being, quality education, and reduced inequality? In Europe, despite the EU's commitment to just and equitable transitions, there are still many challenges in understanding how to effectively deliver considerations alongside environmental sustainability goals through policy interventions (European Environment Agency, 2024). Situational approaches to crime prevention may reduce crime, but achieving a more sustainable long-term approach requires greater thought as to how to combine more integrated thinking.

1.5 Novelty and Scope

The book is perhaps the first publication devoted entirely to examining risky places for crime from a systems thinking perspective, which by definition is interdisciplinary. Risky places demand multi-disciplinary perspectives to answer relevant questions about management and governance and to consider temporal factors and multi-scale contexts. The book seeks to unpick the role of the physical, social, technological, and political environments on the commission of crime in a diverse range of risky places. It, therefore, contributed to a better understanding of the circumstances associated with various crime types at different types of risky places. The book can potentially advance our theoretical and practical understanding of places that are risky or perceived as unsafe. It offers detailed insights into the impact of the urban environment on safety perceptions from the

perspective of different users, with suggestions as to how best to address this. Sustainability emerges when we discuss challenging questions about place ownership, rights to public places, and safety as an individual right.

The topic is timely and appropriate. Firstly, despite our growing understanding of crime concentrations, these are rarely considered in the wider context. This book will explore the connected nature of risk at individual facilities and larger complexes, the influence of nearby environs, and the interconnected nature of risky places to gain a deeper understanding of the place of crime risk.

Secondly, the book responds to calls from previous research, highlighting the need for a broader understanding of risky places by drawing together state-of-the-art research. These include how risk is measured across space and time, how the concept of risky places differs from pre-existing theoretical constructs such as 'hot spots' and 'repeat victimization,' how widespread these risky places are, and how risk at these environments can vary across differing settings. With digitalization, new forms of interaction between physical and cyber environments are created where new crime opportunities emerge. This necessitates crime prevention efforts that extend far beyond risky places. Globalization has created new demands for products and services, generating crime opportunities in environments not observed before, linked to flows of movement of people, products, and information, which impact the governance and sustainability of places.

Thirdly, the book of risky places for crime is warranted to support the development of safety interventions consistent with the goal of planning, designing, and creating places that are both safe and socially sustainable. This aligns with the UN-Habitat Safer City program and the key aspirations of SDG 11 of the United Nations 2030 Agenda for Sustainable Development. We are particularly interested in city users, and in this book, we adopt an intersectional viewpoint on safety and security, considering individuals' multiple identities and experiences as crime victims. This perspective recognizes that exposure to crime or fear of crime results from the interaction of the environment and individual characteristics such as gender, age, sexual orientation, ethnicity, and socio-economic conditions. Taking distance from gender-neutral perspectives to safety, we highlight the specific needs of the most vulnerable groups in an intersectional perspective in risky places.

In addition, we seek to draw from perspectives of risky places from the Global South. We include this to demonstrate that context matters. Whilst some of the problems mirror those experienced in more developed nations, for example, crime concentrations, there are important local factors, such as culture, poverty, socio-economics, and political structures, that reveal important nuances in these risky places. Preventing crimes here requires

knowledge of the interconnected nature of these issues in a particular context.

In a globalized world, it is important to consider that crime goes beyond traditional boundaries, and we explore examples where crime and risky places cross international boundaries, such as drug smuggling and human trafficking. Despite efforts to identify from research across the Global South, we are restricted by those written mostly in English and our knowledge of key countries where this has been applied (Brazil, South Africa, Colombia, Mexico, Nigeria, Namibia, and Kenya). We recognize this is only a partial representation of studies that have been conducted in the Global South, but we use these studies as indicative examples.

1.6 Book Structure

In Chapter 2, we introduce some of the fundamental concepts of systems thinking, how we define a system, what we mean by its elements, and central ideas such as interconnectedness, beneficiaries, feedback loops, leverage points, and boundaries. Drawing from several systems thinkers, such as Meadows (2008) and Stroh (2015), we discuss 'the basics of systems approach' as a guide for the chapters to come. We compare systems thinking to more conventional approaches and explore the differences between conventional situational crime prevention and systems thinking for reducing crime at risky places. We consider the multi-scale processes at play to investigate the nature of places that are risky for crimes, what makes them risky, their temporal and spatial characteristics, and the influences of context on risky places, from local to global and vice-versa.

In Chapter 3, we provide definitions of risk, safety, and security as used in this text, and then we review the key theoretical concepts used to understand risky places for crime. We also define and describe the three components of risky places we use as key elements within our book, namely risky facilities, risky nodes, and risky paths. We consider the fundamental theories that underpin our knowledge of risky places, linked to place and time, the interaction between people and their environments, and why and how a series of factors converge at places and times to develop concentrated pockets or opportunities for crime. We then identify some of the key challenges that we are currently faced with when seeking to adopt a systems thinking approach to reduce crime at risky places.

Chapters 4–6 of the book provide case studies of places that are risky, reflecting a selection of international contexts. This includes a consideration of crime risk at risky facilities, including bars, libraries, bus stops, and shops. We also examine risky nodes such as complex transit stations, parks, public housing complexes, and larger outlets such as shopping malls

and nighttime entertainment zones. We also investigate risky paths and journeys to consider the movement between places and how paths and journeys can be considered risky places.

In Chapters 4 to 6, we explore risky facilities from the perspective of those who use these places or manage or work at them. We provide examples from across the globe, both the Global North and Global South. Whilst the majority of findings are from urban areas, we also consider the rural-urban continuum and rural locations themselves. With digitalization and smart cities, people, products, and services have become parts of an intertwined set of overlapping networks, redefining the concept of risky places beyond the physical spheres. We show in this book that environmental contexts beyond cities shape crime dynamics. Concentrations of crime are also found between places, along paths and journeys, while people are in transit. These issues are important because they affect people's safety and mobility and influence the sustainability of areas.

We use the concepts of risky facilities, risky nodes, and risky pathways because these are the geographical scales at which risky places have predominantly been researched and are the elements we know most about. We also use nodes in relation to how Lynch (1960) identifies place nodes, as detailed in Chapter 3. However, we do acknowledge that a key part of systems thinking is that systems can be identified at different scales and that boundaries are not necessarily rigid. Whilst risky facilities tend to represent a single land parcel with high crime concentrations, for example, a bus stop or a bar, we acknowledge these are not isolated from the broader urban system. Nodes can also be considered as places of exchange, where different flows congregate together, intersect, and exchange, and then they flow out again. This may be a flow of people, but it could be information flow, for example, in the case of cybercrime. Therefore, bus stops or micro public spaces can themselves be considered nodes. In Chapter 4, we discuss rail stations as nodes. However, stations vary considerably in size from rural settings, perhaps only serving a few trains per day, which might be classed as a facility, to those in highly dense areas with multiple lines and connections. A large bus intersection could also be considered as a node. On a larger scale, a city itself could be classed as a node within a wider region. Whilst some of the basic structures of facilities, nodes, and pathways remain similar, their application in terms of both their function and their form can vary at different scales. We will discuss these in depth in Chapters 4–6 of this book.

Chapters 7–9 explore the opportunities and challenges of using systems thinking to reduce risk across a range of risky places in different international contexts. Thus, this book responds to the challenge of providing a

reference tool for researchers, practitioners, and policymakers to create safer and more socially sustainable cities (UN-Habitat, 2019). Chapter 7 addresses the hurdles in applying systems thinking to crime-ridden areas, discussing potential implementation barriers. The dialogue continues in Chapter 8, which looks at sustainable governance strategies for managing risky areas, focusing on policy roles and long-term solutions, while Chapter 9 positions systems thinking as a governance tool, aiming to develop long-term strategies for the management of crime problems in risky places. This chapter explores the complex roles of practice in urban development, examining how they interact with the urban planning process and influence each other. This chapter contrasts traditional situational crime prevention methods with the use of systems thinking in handling risky places, enriched by examples that do not fully apply systems thinking but have traces of systems thinking in their implementation. The chapter concludes with a hypothetical case study applying systems thinking to demonstrate effective strategies for urban governance and crime prevention. The book concludes with Chapter 10, advocating for systems thinking in devising crime prevention measures, urging a long-term, interconnected approach towards safety.

1.7 Concluding Remarks

In this chapter, we introduced the theme of this book, 'risky places,' which are characterized by significantly elevated crime levels. These serve several key functions within a system, including hubs for diverse activities and places of convergence visited by many. They provide a range of experiences for residents, visitors, and others engaging in the activities on offer. We highlight the current lack of knowledge to sufficiently address the complexities of crime at risky places sustainably. We suggest that traditional situational crime prevention methods have an overly localized focus and limited long-term impact. By questioning the effectiveness of current interventions, the book advocates for a systems thinking approach, emphasizing the importance of understanding and addressing the interconnected elements of urban and rural environments in a globalized world.

This perspective aims to propose a complementary, more sustainable path forward for enhancing safety and crime prevention. In this book, although risky places are described by tangible elements of the environment such as 'facilities,' 'nodes,' and 'paths,' they also represent intangible aspects of human interactions and their meaning in public places for a diverse population. Risky places are complex systems, not only because of the activities they attract locally but also because they are embedded in other systems, for example, the neighborhood and the city, which have

significant implications for their governance. By extending the focus to risky places beyond settings, situational crime prevention strategies can be tailored to safeguard the function they provide for residents and visitors, contributing to safety in diverse environments. Finally, we have also aimed to connect the specific challenges posed by risky places with broader sustainability goals and transitions by emphasizing the need to address inequalities in victimization and opportunities, as well as the vulnerabilities of certain groups. By highlighting the insufficiency of current knowledge and questioning the current practices in crime prevention interventions, we call for a more comprehensive understanding of risky places as complex systems embedded within larger frameworks.

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2

THINKING IN RISKY PLACES AS SYSTEMS

2.1 A System and Its Parts

Most experts are not confronted with problems that are independent of each other. Take, for example, a place that concentrates high levels of crime in a deprived ethnic heterogenous area. The crime concentrations are unlikely to be caused by the criminogenic conditions of a single address or process. If we want to address the problem, we need to understand it as part of a complex system and consider the neighborhood, the city, and possibly, outside connections. If the crime prevention response is to solely increase police presence, this will likely overlook other systemic factors. Applying a narrow action-orientated focus may lead to unintended consequences, such as the over-policing of certain parts of the city, the perception of racial profiling, and the criminalization of poverty. Systems thinking acknowledges these limitations and emphasizes the need to consider the entire system, recognizing that the performance of a system is dependent on how its parts interconnect and function together.

Donella Meadows was a leading voice in systems thinking, and much of the inspiration for this book stemmed from her ideas. She suggested that because we live in an increasingly changing world and problems become increasingly complex, systems thinking can support our search for the structural causes of these complex interconnected problems. Only when we see the relationship between the structure of the system and its 'behavior' can we begin to understand how a system works and then respond to the problems more appropriately. According to Meadows (1994), there are several fundamental prerequisites for successfully implementing

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systems thinking. These include having the necessary resources and putting together frameworks to support this. Additionally, it is essential to have a thorough understanding of the issues at hand. This involves developing models and gathering detailed information about the challenges we wish to address, as well as how previous 'missteps' may have made the problems evident. Beyond these technical requirements, it is crucial to develop well-defined goals and a shared vision. This vision must be collaboratively discussed and widely embraced across the community to ensure a cohesive and practical approach.

We consider a system as "an interconnected set of elements that is coherently organized in a way that achieves something" (Meadows, 2008, p. 18). A system consists of three types of things: 'elements,' 'interconnections,' and a 'function' or 'purpose.'

'Elements' are the individual parts of a system and are usually the easiest to identify, such as the houses in a street or neighborhoods in a city. Intangible elements include trust, social cohesion, or fear of crime. Elements may include law enforcement agencies, planners, community organizations, and residents. The elements work together and are linked by interconnections.

'Interconnections' involve communication channels, collaboration efforts, and information sharing among these elements, and sometimes they are not easy to detect, such as information flow. The interconnections are "the relationships that hold the elements together" (Meadows, 2008, p. 13).

The 'function' or 'purpose' of a system, for example, can be to achieve a safer community by reducing crime. The function or purpose of a system is multi-faceted, exemplified by its role in fostering a safer community through the strategic reduction of crime. In this context, the system operates as a complex mechanism, employing various interconnected elements and strategies to enhance community safety. A system's purpose is not necessarily spoken, written, or expressed explicitly except through the operation of the system itself (Meadows, 2008). To identify a system's purpose, we need to observe how it behaves. For instance, if the local government publicly expresses a commitment to addressing street violence but allocates insufficient funds or effort toward that objective, it becomes clear that the actual purpose of the local government may not align with the stated goal of violence reduction. There is a mismatch between the government's stated goals and its policies, and the system will, therefore, fail to achieve the goal of violence reduction. As suggested by Rutherford (2018), the system's real purpose may end up being something that was not wanted by any of the elements, as their elements within the system work toward different purposes. This is an example of a system trap, which we return to in more detail in the final parts of this book.

Another fundamental concept in systems thinking is 'feedback loops' (Meadows, 2008). These are considered recurring interactions where the output influences the input. For instance, increased police presence may reduce crime, create a reinforcing positive feedback loop, and improve safety conditions. Crime can be considered an 'event,' something that happens and is often a symptom of underlying systemic factors rather than isolated incidents. An increase in crime in a facility can also be considered an event. A system's structure is the source of its behavior, and "systems behavior reveals itself as a series of events over time" (Meadows, 2008, p. 18).

In the context of systems thinking, 'beneficiaries' refers to those who gain or benefit from the structure and operation of a system (Meadows, 2008). However, there may also be detrimental experiences, such as being the victim of a crime. In a city, beneficiaries might include commuters who have access to efficient travel by public transportation or kids who enjoy good-quality schools. Beneficiaries can be the users of a place, for example, spectators at a stadium, patrons in a restaurant, or school pupils. However, there are other beneficiaries at places, including managers, police officers, and other practitioners who provide services or may profit from the system. Definitions of beneficiaries depend on the system's scale and how it is contextualized.

'Leverage points' are strategic points of influence in a system. A minor modification at a leverage point can significantly change the system's behavior (Meadows, 2008). Leverage points can be elements of the system itself, such as rules, norms, parameters, or structures, whose adjustment or transformation can lead to impactful changes in the system's overall functioning.

It is important to highlight that when using this approach, a system cannot be divided into independent parts (Ackoff, 1994). None of the parts has an independent effect overall. We propose that a critical challenge we currently face in crime prevention that restricts long-term thinking is that we only focus on a single part of the system, neglecting the interconnections between parts, which gives rise to unintended consequences. To detect a system, Meadows (2008) suggests we should consider the following questions:

a) Are there identifiable parts?
b) Do these parts influence one another?
c) Do the collective actions of the parts yield outcomes beyond their contributions?
d) Does the impact of behavior persist over time and across different situations?

Therefore, whilst we cannot break down a system into its parts, we cannot aggregate the parts back, as the parts alone do not make it a system. Indeed, a system is more than the sum of its parts. Meadows (2008) provides an interesting example. She compares an old residential area to a newer one. An old city neighborhood is a social system because people who know each other may communicate regularly. A new residential area full of strangers who have just moved in is not yet a system, as it requires time for relationships between people to develop. Similarly, a high crime segregated neighborhood where people distrust the police and are fearful of each other should perhaps not be characterized as a social system. On a sub-scale, such as the street or individual household level, people may interact with each other, and the system concept applies, but this does not apply at a neighborhood level. This raises an important question about how to set and define the boundary of a system.

Boundaries

System boundaries are crucial for determining what is considered part of a system and what is external to it. As Meadows (2008, p. 97) reminds us, we cannot attain knowledge of a whole system. However, understanding key components allows for effective intervention and system improvement. To do this requires a focus on understanding the critical elements of a system and gaining knowledge of how it works rather than trying to comprehend the entire system. Meadows acknowledges the difficulties and challenges of defining boundaries in systems thinking: "There are no separate systems. The world is a continuum. Where to draw a boundary around a system depends on the purpose of the discussion." Meadows highlights that there is often no single 'correct' way to define system boundaries because they depend on the specific purpose of the analysis or inquiry.

The difficulty arises from the systems' interconnected and dynamic nature, where components and influences can extend beyond traditional or anticipated boundaries. Therefore, the choice of system boundaries is subjective and influenced by the goals and perspectives of the user(s), for instance. In complex systems, interactions and feedback loops can create ripple effects across boundaries, making it challenging to isolate components from their broader context. Meadows encourages thoughtful consideration of what to include within the system and what to treat as external factors, recognizing that different boundary choices can lead to different insights and interpretations. Meadows underscores the need for a nuanced, context-specific approach to defining system boundaries.

Equilibrium

The behavior of a system over time, or that of its component parts, can be considered as the 'dynamics' of a system. Some systems are in equilibrium. We talk about dynamic equilibrium when the condition of a system's 'stock' is steady, in which case the 'inflows' and 'outflows' are equal (Meadows, 2008). In the context of crime in a city, dynamic equilibrium can be illustrated by considering the number of criminal offenses. Imagine a city where the rate of reported crimes remains relatively stable over an extended period despite fluctuations in individual incidents. In this scenario, the stock represents the total amount of offending in the city at any given time. Inflows refer to new crime incidents, such as thefts, assaults, or burglaries. Outflows are the resolved cases, arrests, or other factors leading to decreased offending. In a state of dynamic equilibrium of crime, the overall level of offending remains steady despite the constant inflow of new incidents and the outflow of resolved cases. This implies that the city maintains a balance where the rate of new crimes is offset by the rate of resolution or deterrence, resulting in a relatively stable crime rate over time.

Interdependencies

Interdependencies refer to the relationships and connections between different parts of a system, where the elements within the system affect and are affected by each other (Meadows, 2008). Place owners, intricately connected to larger political and economic systems, operate within networks that include other proprietors, financial institutions, and government regulations show how place owners establish a series of networks of control over the whole city. The systems are composed of elements and extend to the operation of streets, neighborhoods, and cities, where ownership equates with control. This is one of the explanations for why some properties have crime, and others do not (Eck & Madensen, 2018). Consequently, an influential group that owns a large proportion of a neighborhood wields the greatest wealth and influence and, therefore, has a major influence on opportunities for crime (Linning & Eck, 2021). These connections are shown in Figure 2.1.

Self-Organization

A 'self-organizing system' is a complex entity where decentralized interactions among its components result in the spontaneous emergence of patterns, structures, or behaviors without external control. Self-organization is "the ability of a system to structure itself, to create a new structure, to

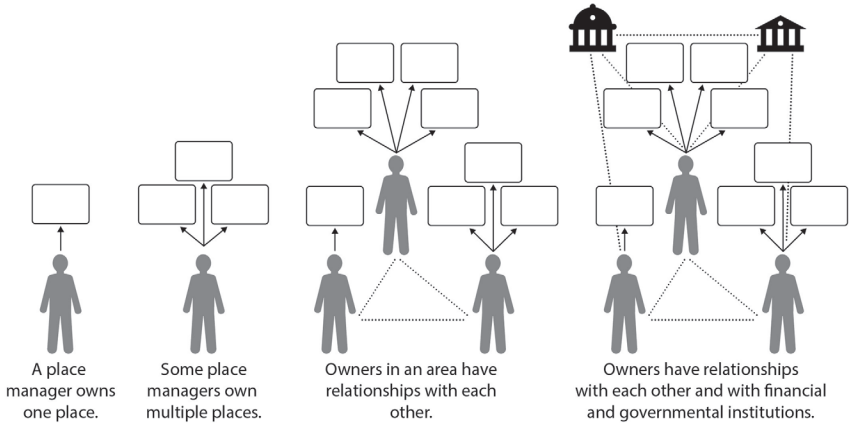

FIGURE 2.1 Networks of place control that extend to larger areas of cities.

Source: Adapted from Linning and Eck (2021, p. 45).

learn, or diversify" (Meadows, 2008, p. 18). An example is a neighborhood coming together to address an emergency or a crisis. The need for action creates interactions between parts of a system, working towards a unified goal. Lacking centralized control, individual components interact locally, allowing the system to organize itself based on these interactions autonomously. These systems exhibit adaptability to environmental changes by reorganizing themselves, and they are often robust, maintaining functionality despite disturbances or alterations.

Hierarchy

A 'hierarchy' is a structure in which elements are ranked or organized in levels or layers based on their status, authority, importance, or other criteria. Hierarchies serve to provide order, structure, and a clear chain of command or classification within a system. Hierarchy is a fundamental feature of the system, not only because it gives the system stability and resilience but also because it reduces the amount of information the system needs to track. In hierarchical systems, the 'within' relationships are dense. For example, people that live close together in a neighborhood are more likely to know each other than those that live far apart. Hierarchical systems are organized from lower to higher levels, progressing from individual components to the whole. The primary objective of hierarchical systems is to enhance the performance of their constituent parts, ensuring optimal functionality. However, Meadows (2008) highlights that a highly

functional system requires a good balance between central coordination towards a system goal and providing enough autonomy to the subsystems to allow the parts to evolve and flourish. In Chapter 3, we show how the urban hierarchy reflects the structure of central places in a region.

Adaptation/Evolution and Tipping Points

Adaptation refers to how (urban) systems modify their structures, operations, and policies in response to internal and external pressures and challenges (Masson et al., 2014). A key component of this is resilience building against various stresses, for example, economic downturns, crime, climate change, and social unrest; innovative solutions for managing daily problems; feedback mechanisms facilitating real-time adjustments; and collaboration and long-term planning. Adaptations in urban systems can sometimes have adverse effects, such as unintended consequences of policies, displacement effects, or dependence on resources that are not equally distributed across the system.

In the context of systems thinking applied to risky places for crime, evolution refers to how places adapt over time through a series of feedback loops. As crime patterns emerge, cities adjust policies, resource allocation, and community interventions, fostering an evolving urban system better equipped to address and mitigate crime dynamically and effectively. In cities, there are critical thresholds that, once crossed, cause a significant change in the system's state, called 'tipping points' (Stroh, 2015). In urban development, reaching a tipping point can rapidly transform an area, either improving it drastically or leading to decline. Implementing small interventions can positively shift local perceptions and behaviors. These 'nudges' help rebuild community engagement. Therefore, cities must engage in comprehensive planning and continuous monitoring of adaptations to become resilient systems.

The ideas of evolution and adaptation from a Darwinist perspective have been applied to individuals who may offend (Roach & Pease, 2013) or to crime prevention strategies (Ekblom, 1999). Examples include 'evolutionary struggles' such as 'biological coevolution' between predator and prey or military arms races. In the Global South, Nel et al. (2018) and Kgotse and Landman (2022) apply the concepts of change and evolution to cities in South Africa, suggesting the need to adopt a complex adaptive systems approach.

Resilience

'Resilience' refers to the ability of a system to recover quickly from difficulties, challenges, or setbacks. Are systems able to adapt or recover in the face of

adversity, trauma, tragedy, threats, or significant sources of stress (Desouza & Flanery, 2013)? Cumming (2011) defines spatial resilience as an interplay, at different scales, between the spatial attributes of a system and different system constituents, for example, elements, interactions, adaptive capacity, memory, and history. Meadows (2008) states that the opposite of resilience is rigidity.

Resilient systems have several feedback loops that work differently to restore a system even after a major disturbance or 'shock.' They can work at different timescales; if one fails, another loop may 'kick in.' This is more observable in times of crisis, for example, when a natural disaster or war destroys a city and recovers over time. For more chronic day-to-day problems such as crime, one suggestion is for crime prevention to focus on building community resilience. This involves fostering strong community ties, enhancing social cohesion, and implementing programs that empower residents to respond effectively to crime, reducing its impact and promoting recovery. However, Meadows suggests that there are limits to resilience. Many organizations may lose their resilience because the feedback mechanisms are delayed or distorted by procedures such as legal approvals. Resilience in terms of cities generally refers to the ability to absorb, adapt, and respond to changes in an urban system. See, for instance, the case of boomtowns (Fernando & Cooley, 2016). However, Desouza and Flanery (2013) suggest that resilience shares much with other key contemporary urban goals such as sustainability and governance which we below discuss more in detail.

Governance

Governance refers to the processes, structures, and mechanisms through which individuals and institutions exercise authority, make decisions, implement policies, and manage resources within a given organization, community, or society. International literature identifies some key principles for effective governance, including promoting transparency, accountability, and responsiveness to the needs and interests of the constituents (Kjaer, 2023).

The quality of the information and/or knowledge is also important in the system. Scientific knowledge is indispensable in addressing crime and safety issues, as it equips professionals and all actors involved in the planning process to understand the factors influencing the problems. Informed decision-making leads to more long-term effective interventions. As suggested by Rutherford (2018) good knowledge of the phenomenon in focus provides a robust foundation for addressing current challenges:

> A government can't make good policy changes without information and research on the problematic subject. Just because they know there is a problem doesn't mean they can take productive action without having

> the necessary data, research, and listening to the voices of the relevant constituents. Without enough information, making a decision is just as safe as relying on blindfolded, dart-throwing monkeys to hit the center of the dartboard.
>
> *(Rutherford, 2018, p. 23)*

Many of the interconnections in systems operate through the flow of information, which means that changes in information flow can impact outcomes. Systems are typically not dependent only on one component or subcomponent but rather on interconnections. As previously suggested, Meadows (2008) states that its function or purpose is the least obvious part of the system and perhaps the most difficult to influence. The purpose of a system might be straightforward: to enhance public safety with a sustainable perspective. In this example, the system's function might not be solely about reducing crime numbers. However, it could be more subtly tied to how information flows within the planning system work in the long run in a municipality and across a constellation of actors involved in each safety program.

If a highly engaged planner/safety expert were to leave the system for any reason, such as retirement or a career change, and this impacts the flow of information to coordinate crime prevention efforts, this could potentially affect the program and, in practice, negatively impact the crime levels. In this way, the least obvious aspect of the system's purpose is reducing crime and maintaining a robust and sustainable flow of information. Recognizing and understanding these subtleties in the system's purpose becomes crucial for ensuring its resilience and effectiveness of the system over the long term. We will return to this topic in the last chapters of this book.

2.2 Cities As Systems

Cities were conceptualized as 'systems' more than half a century ago (e.g. Williams, 1970), and this approach remains integral to how we think about cities. Table 2.1 illustrates the characterization of cities as systems, comparing classic and more contemporary approaches. A system here is generally defined "as organized entities that are composed of elements and their interactions" (Batty, 2013, p. 22). Elements are interrelated to each other in such a way that changes in one element can affect others or all (Gustafsson et al., 1982). The organization of a system is composed of aggregated elements at different scales that form distinct structures and subsystems that can be arranged in a *hierarchy* to hold these parts together (Batty, 2013). A traditional example of cities as systems is given by the notion that they are composed of locations such as places of work and residence interconnected by traffic flows of all sorts, maintaining the system's structure.

TABLE 2.1 Cities as complex systems: key features.

Classical system approach	*Complex systems approach*
• Location, places	• Networks, flows
• Physical morphologies	• Communications and exchange
• Sets of spaces, places, and locations	• Sets of actions, interactions, and transactions
• Mechanic, linear processes	• Organic, stochastic processes
• Cartesian structure	• Fractal structure
• Top-down, centralized.	• Bottom-up, hierarchical organizations.
• Defined as if they were closed off.	• Defined as if they were open, 'Glocal' links.
• Tendency to equilibrium	• 'Far from equilibrium'-status, in constant change
• Uni/bi-disciplinary	• Inter/multi-disciplinary

Cities are about connecting people (Jacobs, 1961). Cities are more than just a well-structured hierarchy of 'sets of spaces, places, and locations' maintained by structures in some temporary equilibrium. Contemporary systemic conceptions of cities recognize them as organic systems instead of machine-like, better represented by 'sets of actions, interactions, and transactions,' in which locations still play a central role in their functionality: the street corner, the square, the buildings, the streets, the stores, and shopping malls, the tangible flows of people and intangible flows of information.

In the classical system approach to understanding cities, the emphasis is on fixed attributes of specific locations and tangible physical morphologies that constitute urban landscapes. This method perceives cities as collections of distinct spaces, places, and locations analyzed through a mechanistic linear process. Employing a Cartesian structure, the classical approach tends to be top-down and centralized in decision-making and control, treating the city as a closed system with defined boundaries. The assumption of equilibrium guides this approach, anticipating a stable state within the city's structures. Furthermore, the analysis is often conducted within the confines of one or two specific disciplines.

Contrastingly, the complex systems approach envisions cities as dynamic and interconnected entities, emphasizing the importance of networks, flows, and the organic, stochastic processes that underlie urban phenomena. A city is a complex system, which means it has a dynamic behavior that is difficult to understand. It is composed of many unforeseen parts and processes of interactions, and as such, are always far from equilibrium, "for they are forever changing" (Batty, 2013, p. 14). Complex systems like

cities tend to be large and show many interlinkages and external interconnections that follow non-linear (stochastic) processes, difficult to predict, and can rarely be understood by single disciplines (Gustafsson et al., 1982). In this perspective, the city is not merely a sum of fixed physical elements but a complex web of actions, interactions, and transactions. The structure is perceived as fractal, exhibiting self-similar patterns at different scales. Decision-making and control are distributed in a bottom-up fashion, acknowledging the emergent properties that arise from the interactions within the city. Open to global and local influences, the complex systems approach recognizes cities as far from equilibrium, in a perpetual state of change. Moreover, the analysis encourages an interdisciplinary lens, fostering a broader understanding of the challenge across various disciplines.

The idea that cities could be defined as if they were closed-off systems in time and from the wider world has been widely discredited as external interactions are part of current decentralization and globalization processes (Batty, 2013). In a world dominated by global interconnections, cities are no longer idealized physical morphologies, but instead, they are better represented as patterns of communications, interactions, change, and exchange. Locations represent "a synthesis of what happens through networks and of how activities interact with one another" (Batty, 2013, p. 15); it is "where processes begin and end" (Batty, 2013, p. 9). Moreover, web and wireless infrastructure and overall technological development have shifted from physical interactions to digital ones, redefining the city as a system.

Another essential aspect of cities as complex systems is their organization. Most cities are built in modular form from the bottom up, in a hierarchical fashion, in which their components determine the networks on which individuals and groups engage with each other through social and economic exchange. However, there are exceptions, such as Hausmann's reconstruction of Paris.

In the previous chapter, we introduced the notion of systems hierarchy and how systems are embedded in wider systems. Cities are no exception. Using principles of fractal theory, we argue that cities can be better understood through the topological relationship of the underlying streets (Ma et al., 2018), which supports the association of systems with human activities, including crime. The evolution of cities built from the bottom up and organized by hierarchical structures is a strength because parts can be damaged, but not the whole system (Simon, 1991). In the past, Cartesian ideas of interconnections provided the basis for thinking about cities as being organized from the top down. However, according to Batty (2009), this is a mistake because cities are better defined as distinct collections of interacting parts from the bottom-up, fractal-like structures with explicit

functions, often in analogy to processes of planning and management, better adapted to current needs of inclusion and urban diversity.

Places that concentrate crime are part of urban systems' interconnected tangible and intangible parts. The view of the future city as a 'holistic' system demands a vision that includes both physical and cyber components. Sustainable urban design must consider integrating digital infrastructure, ensuring the built environment and cyber infrastructure work seamlessly together. This means it is necessary to identify potential cyber threats and vulnerabilities in the design phase and implement measures to mitigate against them. This includes securing digital infrastructure, preventing unauthorized access, and ensuring data privacy (Johnson, 2024). An important principle for future cities is leveraging smart city technologies for sustainability and security.

This requires integrated resilience planning to ensure cities can deal with day-to-day problems such as crime and safety and, at the same time, recover quickly from crisis situations, including cyber incidents. Smart technologies can enhance efficiency, reduce resource consumption, and improve safety. Establishing guidelines and standards for the secure design and implementation of digital infrastructure within the city could be considered a technical problem. However, this demands important shifts in policy and access to resources, alleviating existent inequities dictated by gender, age, ethical background, and socio-economic standards, as well as the legacy of persistent patterns of environmental injustices. Environmental justice is a concept and a movement that addresses the unfair distribution of environmental benefits and burdens among different groups (UNDP, 2024) and, in this context, would involve addressing the causes of crime, such as poverty and inequality, but also investing in situational crime prevention to create a safer and more just urban environment for all residents. By combining these principles, cities have a better chance to work to develop sustainable and resilient environments that minimize the creation of risky places, not least in connection with cybercrime.

2.3 Conventional and Systems Thinking

Building on the definition of systems from Meadows, Stroh (2015, p. 16) defines systems thinking as "the ability to understand [the interconnections between elements] in such a way as to achieve a desired purpose." Systems thinking examines the entire system and all its pieces and connects to the desire to achieve a shared goal. This process is not as simple as it sounds. Meadows (2008) reminds us that most big societal problems, such as crime, unemployment, or climate change, persist regardless of our knowledge and good intentions to solve them. Why do good-intentioned policies end up achieving the opposite of their intended goals?

One of the more salient explanations for this is that we often resort to conventional reductionist thinking to address complex problems. Stroh (2015) provides several examples from the United States of 'failed policies' which, despite good intentions at the outset, resulted in outcomes that were not intended. Examples include 'drug busts' that increase drug-related crime and 'tough on crime' policies that increase fear of violent crime. These often translate into media headlines, which are found across the globe. Therefore, we are well-informed daily about 'events' within systems. However, we have often limited information on how to solve them and a lack of understanding about the nature of these problems. Traditional thinking is not appropriate for addressing complex chronic social problems; these require an in-depth, long-term knowledge of these systems. In Meadows's words, we need time to observe the system, gathering facts and observing a system's patterns. We return to these ideas in Chapter 8.

Table 2.2 illustrates the basic premises of conventional reductionist approaches and systems thinking and how the two differ. Applying systems thinking principles to crime and safety means recognizing the interconnectedness of various systems elements, such as transportation, energy, communication, and information systems, and understanding how changes in one aspect may impact the entire system.

Conventionally, we deal with each part of the system by itself instead of seeing the interconnectedness of the parts (Meadows, 2008). According to

TABLE 2.2 Conventional versus systems thinking.

Conventional thinking	*Systems thinking*
The connection between problems and their causes is obvious and easy to trace	The relationship between problems and their causes is indirect and not obvious
Others, either within or outside the organization, are to blame for our problems and must be the ones to change	We unwittingly create our problems and have significant control or influence in solving them by changing our behavior
A policy designed to achieve short-term success will also assure long-term success	Most quick fixes have unintended consequences: they make no difference or make matters worse in the long run
To optimize the whole, we must optimize the parts	To optimize the whole, we must improve the relationships among the parts
Aggressively address independent initiatives simultaneously	A few key coordinated changes sustained over time will produce large systems change

Source: Stroh (2015), p. 15.

Stroh (2015), we often address the manifestations of problems instead of their structural causes, partially because most of the solutions seem obvious, which he terms 'the quick fixes.' Therefore, we may realize immediate short-term benefits, but these may be compromised through sustained reductions or offender adaptation and crime increases in the long term. An important principle of systems thinking, as outlined in Table 2.2, is that the most effective approach to optimizing a system involves enhancing the relationships among its components rather than individually optimizing each part. This encompasses knowing what part of the system should be addressed and how. Meadows (2008) suggests as a reference the use of 'leverage points,' which we discussed previously and will return to in Chapter 8.

We now consider how systems thinking concepts apply to the governance of place and the implication of this for crime prevention in risky places. We build on these ideas further in Chapters 7–9 of the book.

2.4 Safety Governance and Elements of the System

In this section, we consider those who can support the development of long-term crime prevention strategies, including, for example, architects, planners, security experts, law enforcement, emergency services, and schools. We introduce some ideas linked to identifying 'opportunities for action,' which we return to in more detail in Chapters 7 and 9. We split these opportunities into two possibilities: those 'prior to the construction of an area' and 'the post-construction phase of an area.'

When planning a new residential area, architects and planners have an optimal opportunity to design the layout of buildings and spaces between them to reduce crime. Law enforcement may contribute with pre-assessments of locations of potential crime risks. There should be steps in place to ensure the community becomes an integral part of the planning process. Given our knowledge about the potential successes of CPTED (Chapter 3), these steps should be introduced during the proactive building phase.

Interactive planning (Ackoff, 1999) can support this by encouraging active participation from relevant practitioners to create a shared vision that fosters a sense of ownership. This requires a divergence from more typical reactive planning approaches. However, events that do happen cause significant issues, and problems may require a hybrid solution. This should include combined strategies based on feedback and changing circumstances, such as implementing feedback loops to assess the effectiveness of interventions and adjust them accordingly.

The development of crime and risky strategies typically occurs in the 'post-construction phase.' This requires devising solutions to fit the existing system. Cities are pre-existing entities with a legacy of established urban fabric, structures, and complexity. To successfully implement interventions, we

must adhere to the frameworks provided by tangible systems, such as housing and transportation networks, and intangible systems, including organizational structures and local, regional, and national policy guidelines that affect the system's functioning. Using Table 2.3 as a reference, we illustrate

TABLE 2.3 Elements, interconnections, and function/purpose of a system and its subsystems.

	Urban planning and community safety system	*Law enforcement system*	*Judicial subsystem*	*Social services and rehabilitation subsystem*
Elements	Community organizations, residents, neighborhood watch groups, CCTV, and other technology infrastructure	Police departments, officers, patrol units, and investigation units	Courts, judges, legal professionals	Social workers, rehabilitation programs, and support services
Inter-connections	Regular meetings and community engagement programs. Data-sharing protocols and integration with law enforcement databases	Communication systems, data-sharing platforms, collaborative task forces	Legal procedures, case management systems, coordination with law enforcement	Collaboration with law enforcement, the judicial system, and referral systems
Function/ purpose	Monitor crime patterns, prevent crime, and promote collaboration between law enforcement and the community. Planning safe new housing. Dealing with conflicting SDG goals	Enforce laws, investigate crimes, and ensure public safety	Adjudicate cases, ensure justice, and impose consequences for offending	Address underlying social issues contributing to crime and prevent recidivism

how elements, interconnection, and purpose of the systems work together to achieve a specific desired goal, in this case, for example, of reducing crime and maintaining public safety. The effectiveness of the entire system relies on the coordination and functionality of these embedded subsystems.

Each subsystem (top row) in the table encompasses specific elements such as community organizations, police departments, courts, and social workers. We seek them all to work towards the common goal of maintaining safety and addressing the structural causes of offending. In a functioning system, these subsystems are interconnected through data-sharing platforms and collaboration, ensuring a cohesive approach to crime prevention. The purpose of these interconnected subsystems is multi-faceted: monitoring and preventing crime, enforcing laws, adjudicating criminal cases, and addressing social issues that contribute to crime, such as by offering rehabilitation programs. This system focuses on the immediate response to crime and long-term strategies to support communities, thus dealing with the complex task of balancing different social goals, such as those outlined in the Sustainable Development Goals (SDGs).

The systems in the table are embedded in regional and national systems, which adopt their own specific programs and policies. At the international level, these subsystems may or may not follow similar policies and guidelines, as we will discuss in Chapter 9. In a city, the criminal justice system can be considered a complex adaptive system, as described earlier in this chapter. Meadows (2008) suggests that these systems exhibit emergent behavior, where the interactions of individual components lead to collective patterns and behaviors. It involves a network of interconnected components, including law enforcement, legal institutions, communities, and offenders.

The purpose (or function) of subcomponents of a system may not be the primary purpose of a system. In fact, Meadows (2008) explicitly indicates that one of the main challenges of systems is that the purposes of their subunits may add a behavior to the system that is not desirable. She reminds us that keeping the purpose of each actor in line and in harmony with the overall purpose of the system is an essential function of successful systems.

An example would be an expectation that removing buskers and homeless people who clean cars in the parking lots of train stations would reduce fear of crime and encourage those fearful back onto public transport. The hypothesis was that by removing buskers and homeless people, passengers would return to trains and buses. The purpose of planners was to decrease the number of fearful residents complaining about homeless people and buskers, even if the 'problem' is moved elsewhere. In the beginning, nobody understood that by removing buskers and homeless people from the parking lots, they were creating other problems. They eliminated the only source of money for this group. They removed 'the eyes on the

parking lot.' Theft from cars increased in the area, and homeless shelters elsewhere became overloaded.

Too often, when identifying opportunities for action, we focus on a system's events rather than its structure. According to Stroh (2015, p. 45), events are problematic because they are just the tip of the iceberg of problems we want to solve. This approach may "lead people to do exactly the wrong thing for all the right reasons." The causes of chronic, complex problems can be found in underlying system structures.

Assessing a system's performance over time requires knowledge about the balancing process of growth, decay stability, and equilibrium (Meadows, 2008). Balancing feedback is crucial for understanding why certain systems do not change despite our efforts. Stroh (2015) highlights three recurrent challenges. The first one is when we stop investing in the solution once the problem appears to be solved. The author mentioned a case of an initiative in Boston, USA, to curb youth crime. When the problem declined after the interventions, community leaders felt the pressure to move funds to other areas in need, and as a result, the problem returned. In this case, it is necessary to learn from this experience by ensuring that solutions can be sustained over time to have a chance to show impact.

Another common problem is failing to identify the time required for a program to realize impact. Changes to the structure of social systems require long-term efforts, and infrequently, there are insufficient resources for extended programs. Stroh demonstrates this through a program to reduce teenage drinking in Massachusetts, which took 11 years to establish a positive impact.

A further obstacle to identifying opportunities for action is a lack of agreement on the goals of the system, which we discuss further in Chapters 7 and 9. The disagreement means that sometimes it is impossible to assess the system when the goals that they were supposed to achieve were not the same from the beginning. This experience demands that it is necessary to establish a clear shared vision of the goals and a common understanding of the reality before developing strategies to change the system's structure.

In summary, systems thinking offers a complementary approach to conventional situational crime prevention applied to risky places. However, there are significant obstacles to recognizing the interconnectedness and interdependencies of urban elements. One important challenge lies in the complexity of urban systems themselves. Moreover, the change from conventional to systems thinking in governance and planning of the safety of risky places for crime necessitates substantial changes. This includes how planners and other safety experts view the problem, the methodologies we use, and institutional structures. The focus on interconnectedness, while a strength, also raises concerns about oversimplification of solutions or the risk of unintended

consequences when interventions in one part of the system inadvertently impact other seemingly unrelated areas. We return to these issues in more depth in Chapters 7 and 9.

2.5 Concluding Remarks

In this chapter, we approach risky places as systems, applying systems thinking to understand and address the complexities inherent in urban safety and crime prevention. Risky places are areas with significantly high crime characterized by fluid dynamics, making intervention challenging. Some are good, others not. Consequently, comprehensively understanding these places is important for long-term planning.

The chapter lays out an essential foundation in systems thinking, positioning it as the central analytical framework of the book. It begins by introducing cities as complex systems, setting the stage to explore critical theoretical principles vital for comprehending high-risk environments and formulating crime prevention strategies. The chapter also acknowledges the potential challenges of applying systems thinking to urban safety. The vast array of variables and the dynamic nature of cities make it hard to predict outcomes accurately.

Despite such challenges, the solution is to step back and recognize ongoing trends or patterns of the system(s) and not react upon the most obvious cause-and-effect relationships that are observable to the eye. This process demands different types of resources and a better understanding of the long-term mechanisms by trying to anticipate the future or, alternatively, to work backward to identify desirable outcomes. Systems thinking requires a comprehensive understanding of these complexities by a group of experts, which we acknowledge may be daunting and resource-intensive. However, current approaches are too localized and do not support sustained prevention.

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3

REVISITING THE THEORETICAL FOUNDATIONS OF RISKY PLACES

3.1 Introduction to Crime and Risky Places

Why is crime high in some places and not in others? No matter the scale or context, whether rural or urban, or which part of the globe we refer to, a clear pattern emerges. Crimes often concentrate disproportionately in small geographical places. Indeed, this led Weisburd (2015) to declare the 'law of crime concentration,' which he links to the criminology of place. The author suggests that within a city, 50% of crime is concentrated within approximately 2–6% of a micro-unit of geography, for example, a street segment. As we demonstrate in Chapters 4 to 6, these risky places with high disproportionate levels of crime are not limited to specific regions but are found in urban and rural areas across the Global North and the Global South, including Africa and Latin and South America. This distribution is referred to as the Pareto distribution or the 80/20 rule. This states approximately 20% of 'something' is responsible for 80% of the results and has been observed in wealth distribution, traffic accidents, book sales, and internet traffic (Koch, 2011).

This chapter explores the salient theories that underpin our knowledge of places that concentrate crime. We propose that this understanding can be enriched by incorporating systems thinking approaches (Chapter 2), which consider the complex interplay of various factors affecting risky places. At the end of this chapter, we consider the applicability of systems thinking for crime prevention in risky places. However, before exploring this further, we consider what we mean by risk in more detail.

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3.2 From Risky Societies to Risky Places

Some origins of the term 'risky' are associated with sailing, for example, 'dangerous' uncharted waters or activity near 'hazardous' cliffs. More recently, this has been linked with 'threat,' 'harm,' and 'immediacy' (Mythen, 2017). Introducing the concept of the 'risk society,' Giddens (1999) suggests that in modern societies, risks are socially produced, including those associated with technology, environmental degradation, and complex social systems. Indeed, Giddens (p3) states, "The idea of risk is bound up with the aspiration to control and particularly with the idea of controlling the future."

The notion of uncertainty here is fundamental as without it, we do not have 'danger.' Modern societies are characterized by high levels of complexity, and technological advancements and globalization have contributed to intricate systems with intertwined risks. Giddens introduces the concept of 'reflexivity,' highlighting the continuous feedback loop between knowledge and action. In a risky society, individuals and institutions are compelled to reassess and adapt their behavior in the face of uncertain and evolving risks. Giddens does not confine risk to local or national boundaries. Beck (1992) expands this to include the global perspective, emphasizing the need for a 'cosmopolitan vision' to address challenges collaboratively.

The Oxford English Dictionary (2023) defines 'risky' as "involving the possibility of injury, loss, or other adverse or unwelcome circumstance; dangerous; hazardous; fraught with risk." It defines 'risk' more specifically as a situation involving exposure to danger, the possibility that something unpleasant will happen, or a threat or likely source of danger. However, risk can also include situations where the probabilities of various outcomes are known in advance, for example, when considering potential losses or threats.

Risk and uncertainty are fundamental concepts in decision-making. 'Risk' is quantifiable and allows for calculated approaches. 'Uncertainty' embodies known and unknown variables, encompassing 'risks' and 'opportunities.' Understanding this distinction is crucial, as it influences how individuals and systems create strategies to prepare for future conditions. "The first requirement for uncertainty resolution is that the uncertainty be recognized by the planner" (Strangert, 1977, p. 32). We return to this topic in Chapter 9.

Risky Places

In this book, we associate 'risky places' with locations that have disproportionately high levels of crime, relative or absolute. Risky places can be found both in large urban centers and on the rural-urban continuum. We

adopt other tangible aspects related to the context of the urban space, such as the concepts of Lynch (1960), who offers a series of tools to understand nodes and paths. From environmental criminology, we strongly draw on the seminal work by Brantingham and Brantingham (1993). Kennedy and Caplan (2012) identify three propositions for risky places: that all places are risky, but due to spatial factors, some are riskier than others; crime occurs at places with high vulnerabilities based on the combinations of different criminogenic features present; and the overall impact of risky places on crime is due to differential vulnerability present and exposure to these.

We consider a place to be an environment of varying size and format and use the place as a general concept, often as a synonym for the environment or area where one or more facilities, nodes, or paths may be located. For pedagogical reasons, risky places are split into three elements: risky facilities, risky nodes, and risky paths. We do not strictly follow the same definitions as Lynch, who identifies five elements of urban place: paths, edges, districts, nodes, and landmarks, nor Brantingham and Brantingham, who include nodes, paths, and edges in their Crime Pattern Theory. Instead, we use both as a reference to make associations between different elements of the urban environment, their morphology, and crime. We link these elements or facilities, nodes, and paths as a method of 'wayfinding' between different elements of the built environment and consider these across multiple geographies and scales. We consider these elements crucial parts of a system that controls and facilitates urban movement. For example, paths can be represented as street segments, which may be part of a public transport route. Nodes can be a shopping center or part of a neighborhood. Facilities tend to represent smaller geographical features, such as libraries or bars. They are interlinked with each other in complex systems such as cities. We represent these ideas in Figure 3.1.

Increasingly, the impacts of globalization and the digital age introduce new challenges and pressures to systems, manifesting through risky places. They can exacerbate existing vulnerabilities in people and places, but they also create new situations that increase opportunities for crime. In today's interconnected world, crime stems from a complex mix of socio-economic inequalities, cultural influences, and social and environmental conditions. It is the convergence of these factors at risky places that influence the manifestation of crime. Even rural areas are not immune to crimes like cyber fraud, identity theft, and online scams.

Individuals or groups may exploit the digital divide and lack of cybersecurity awareness by taking advantage of global connectivity. This allows them to operate internationally at a fast pace and to increase the scale of their operations. In areas with significant disparities in wealth, drug trafficking can become a lucrative way to earn a living, sometimes connecting

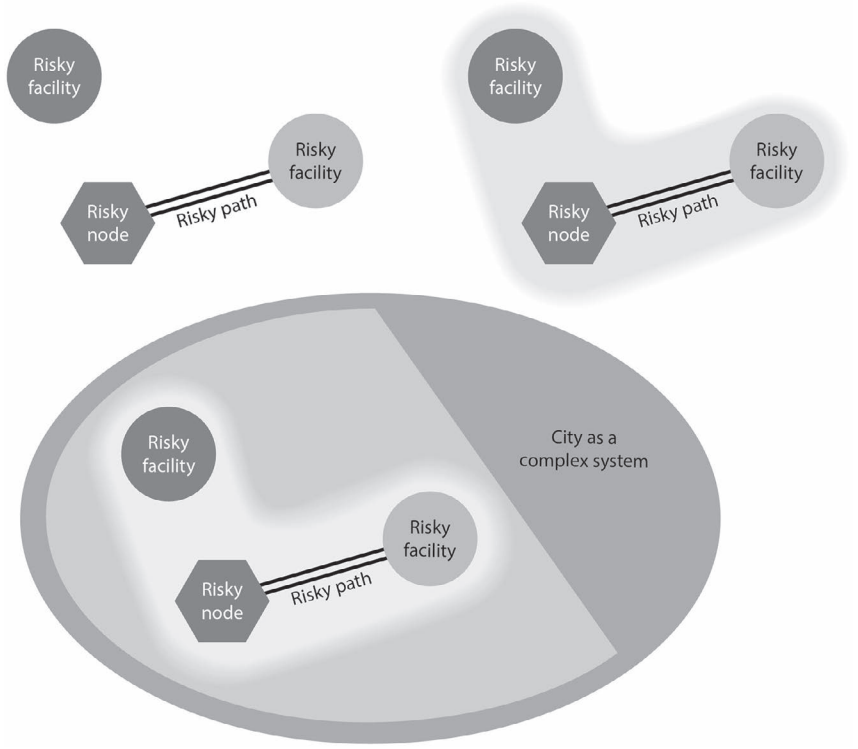

FIGURE 3.1 Facilities, nodes, paths, and nodes that are risky in an interconnected urban system.

Source: Authors.

activities across regional and international borders. 'County lines' are an example of an offense that involves drug trafficking, where offender networks from larger cities expand their operations to smaller towns and rural areas. The name 'county lines' is derived from the use of dedicated mobile phone lines by these networks to facilitate drug orders and distribution across county boundaries. Individuals often exploit the lack of opportunities, promising jobs, and better lives elsewhere, leading to smuggling and human trafficking (Harding, 2020). This includes not only the selling of drugs but also the cultivation or production in some areas of the urban fringe or rural areas.

This highlights the need for a nuanced approach to crime prevention that considers the multifaceted dynamics of globalization, socio-economic disparities, cultural nuances, and environmental factors. The rapid evolution of technology and its influence on emerging and evolving types of crime

demand that crime prevention adapt and evolve accordingly (Ekblom, 2017). Systems thinking is an approach that supports actors in continuously learning, adapting, and iteratively developing strategies that address these challenges.

Studies of risky places have tended to focus on urban cities and large towns. However, there is growing evidence that risky places also appear in areas of the rural-urban continuum (Ceccato & Abraham, 2022). A recent study by Wagner (2020) found that half of crimes occurred in less than 10% of locations across seven areas, with five areas showing crime concentrated in less than 4% of street segments. Areas of this type are continuously evolving as commuting habits and broader access to information and communication technology reshape people's lifestyles. These transformations can introduce new risks, fostering fresh dynamics of crime and fear of crime (Ceccato & Abraham, 2022). This calls for analytical frameworks that capture information about the nature of risky places in the context of the 'space of flows' (Castells, 1989). This perspective is crucial to understanding how spatial and digital connectivity influences patterns of risk and behavior in various settings and informs policing strategies (Yarwood, 2022).

We now return to discuss the key elements of risky places, facilities, nodes, and pathways identified earlier. Each is discussed in more detail in Chapters 4–6 of the book, and we use this opportunity to provide a brief overview of each.

a) Risky Facilities

We use risky facilities to refer to single land parcels, such as a bar, library, bus stop, or restaurant. However, as discussed earlier, it is important that our definitions are not rigid and that they enable flexibility of scale. The concept of 'risky facilities' was developed by Clarke and refined by Clarke and Eck (2007). It describes a small group of facilities that attract the majority of all crime for that facility type and follows the Pareto principle or 80/20 rule. For example, research in a US city found that 1.6% of stores accounted for 70% of all shoplifting, and 18% of schools in an English city reported 50% of all burglaries and vandalism at schools. Several further examples of this are detailed in Chapter 4. In practice, the 80/20 should be treated as a rule of thumb rather than an exact science.

Concentrations of crime at places may not necessarily occur within a risky facility and may manifest near them. By focusing on risky facilities, law enforcement and planners can enhance safety at and in their surrounding environments. For example, 'place managers' (Linning & Eck,

2021) can play a crucial role in preventing crime in risky facilities. We will return to discuss place managers in risky facilities more detail in Chapters 8 and 9.

b) Risky Nodes

Nodes are the second type of environments that concentrate crime, and in this book, we consider nodes as larger than single land parcels. Nodes tend to be areas of convergence, of people, activities or information. They may represent a grouping of facilities such as bars and restaurants in a night-time entertainment zone. We have classed large train stations as nodes due to their high level of connectivity and scale, but we agree they could be considered as large facilities. Lynch (1960, p. 47) states that nodes are "the focus and epitome of a district, over which their influence radiates and of which they stand as a symbol." For example, shops and other services are available at a shopping center or a stadium and its immediate surrounding area. These settings often belong to a larger area, which also attracts a disproportionate amount of crime. In Stockholm, 16% of different types of establishments (bars, clothing stores) in one shopping center experienced 66% of crimes and problems with public order (Ceccato et al., 2018).

Risky nodes are found in rural contexts and across the rural-urban continuum. An example could be a gas station located at a key intersection between a rural area and a nearby urban center or a central square in a village. These intersections can serve as a reference for various flows, including people, goods, and services. They serve as a place of convergence, which can increase opportunities for offending due to strategic importance and the diversity of its users. Interventions in risky nodes demand strategies that alter these interactions and reduce criminal opportunities. We also observe risky nodes in the Global South, such as the case of cargo theft at nodes. 'Resting places' linked to gas stations and warehouses along highways have been identified as key places for cargo theft in Brazil and Mexico (Justus et al., 2018; Hernandez Ramírez, 2024). We will return to explore crime at risky nodes in more detail in Chapter 5.

c) Risky Paths and Journeys

Lynch (1960, p. 47) describes paths as the "channels along which the observer customarily, occasionally, or potentially moves." In this book, paths are loosely defined to incorporate streets, boulevards, and avenues, as well as waterways, railroads, or other means to move across rural and urban places. A dark street between the parking lot and a station can be a risky path, or a bus line itself can be risky or perceived as such. Street segments

form the building blocks of this movement, and international studies have identified crime concentrations at the street segment level. Examples of this are provided in Chapter 6.

Pathways have important temporal dimensions linked to time geography (Hägerstrand, 1970) and Hawley's concepts of rhythm, tempo, and timing (Cohen & Felson, 1979). There are a series of temporal constraints on where, when, and how far individuals and groups of people travel, and we contend these are underexplored when considering risky pathways.

In rural areas, a risky path could be a long, secluded stretch of road connecting small villages or farms. These paths are essential for agricultural transport, making them a potential target for offenders. Risky routes may also occur at borders between countries where trafficking and smuggling are common and 'generate job opportunities' (Ceccato, 2007). In Australia, Barclay et al. (2001) provide examples of tracks that service the mining and pastoral industries that are targeted for vehicle theft and burglary. Addressing the risks associated with these paths involves planning, community involvement, and possibly technological integration to ensure security locally and across these paths.

Risky Places Across the Rural-Urban Continuum and Beyond

The notion of risky places from a regional perspective links to ways local decisions in land use or service provision can have broader implications for regional development, economic structures, and environmental impacts. For example, cities can be considered nodes in a hierarchical network, where major metropolitan areas serve as higher-order central places providing specialized services and goods not available in lower-order towns and villages. Von Thünen's early 19th-century models depict the central city surrounded by concentric rings of agricultural activity. Christaller's 1933 framework placed urban centers as central places that function as nodes in a larger system, including their hinterlands. This structure results in a hierarchy, from the 'more important' central nodes to 'less important' peripheral places (Figure 3.2), and could be applied to risky places.

Nodes are linked by flows of goods, services, information, and people (Getis & Getis, 1966). Smaller nodes, for example, in rural areas, may have an important role in the landscape of organized crime, as discussed earlier in the context of county lines. They are also important in the case of cross-border crime (Shelley & Metz, 2017; Ceccato, 2007). Many types of illicit activities find an ideal base in rural areas due to the lower population density and reduced law enforcement presence. Examples include drug cultivation and synthetic drug production, the production of counterfeit goods, and corridors for smuggling goods and people.

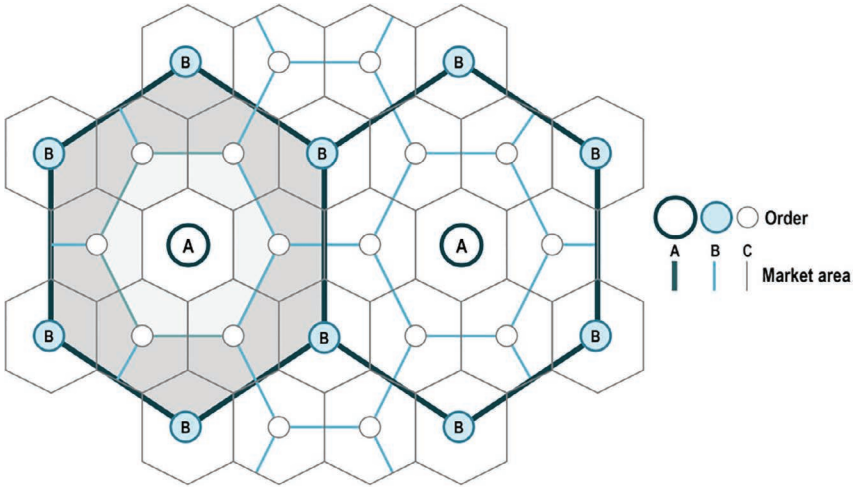

FIGURE 3.2 Central Places Theory market principle.

Source: Rodrigue (2024), adapted from Christaller (1933).

Changes in one part of the system, such as the construction of a commercial area, can impact other parts of the system. The effect of a bridge constructed between Sweden and Denmark in 2000 (Ceccato & Haining, 2004) demonstrates interlinkages between nodes at different system hierarchies, from local to regional to international. A physical change in the connectedness of nodes resulted in a shift in the geography of crime and an increase in selected crime types. Thus, viewing border regions as systems that are influenced by multiple factors, such as economic disparities, cultural differences, and varying enforcement capabilities, can help in designing more comprehensive crime prevention strategies that are adaptive and responsive to local conditions.

Central Place Theory may also support our understanding of where public services, such as police services, are located and their role within a system (Figure 3.3). This shows a hierarchical structure of police stations when examining services available in regional centers compared to smaller towns. Not only do regional centers offer a larger variety of police services, but they also offer more types than elsewhere. As the number of police stations declines, it is important that remaining service points are strategically placed to support police work and adapt to how digitalization changes public interactions with the police.

Systems thinking helps bring together the concepts of risky facilities, risky nodes, and risky pathways as part of a broader system. They offer a framework to consider how decisions made impact affect facilities, nodes,

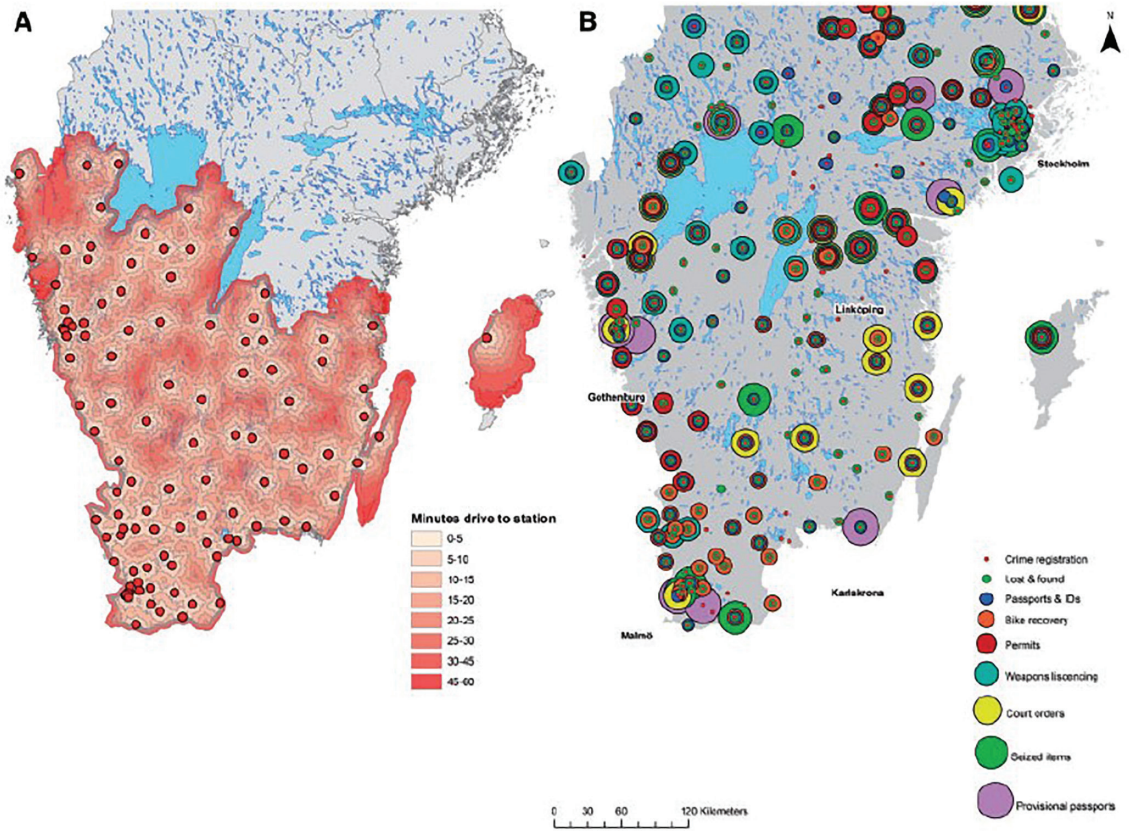

FIGURE 3.3 Drive-time cohorts around police stations in Southern Sweden (A) and the spatial arrangement of police services following the nodes of CPT-like structure (B).

Source: Stassen and Ceccato (2021, p. 10).

and pathways at multiple scales. This is especially relevant in the context of globalization, where they have broader implications for regional development, and environmental impacts, not least for crime, police work, and criminal justice.

3.3 Risky Places: Theoretical Underpinnings

Risky places of crime are multifaceted and complex, and we argue that they cannot be explained through a single discipline or theoretical perspective. In this section, we explore this through a reflection on key theoretical principles pertinent to our understanding of risky places for crime across a range of different contexts.

Human Daily Activities and Crime

People's activities and routines tend to follow a regular rhythm, consisting of patterns that are constantly repeated. This is relevant to understanding where and when activities occur, including crime. Swedish geographer Torsten Hägerstrand (1970) coined the term time-geography to explain that people's decisions are space and time-dependent. Time is a necessary condition for human activity, but it also limits movement. Crime commissioning can be considered an activity like any other, with the same enablers and limitations of time and space. Therefore, crime risks are dependent on people's movement patterns. We observe this when we consider peak and off-peak hours, differences between weekdays and weekends, and winter and summer, especially when there is a large variation in daylight hours. These place constraints on an individual's movements dictate convergence and dispersion in cities. Typical areas of convergence of human activities are, for example, transport nodes, such as bus and train stations. We return to convergence later in this section.

The City Image and Its Elements: Kevin Lynch and Beyond

Crime opportunities are influenced by the design and arrangement of urban spaces and environments. Crimes do not occur randomly, and explanations for this, in part, are found in individual movement and convergence, particularly around work, education, leisure, and retail activities. Lynch (1960) identifies 'anchor points' as key elements of a place that control and facilitate all movement of individuals throughout the city, including paths, edges, districts, nodes, and landmarks (Figure 3.4).

Landmarks are simple, recognizable physical features that stand out in an environment and are often used for navigation. Nodes offer strategic foci and

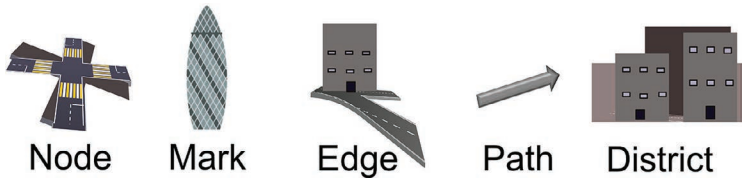

FIGURE 3.4 The city image and its elements.

Source: Artistic illustration adapted from Lynch (1960) by Author.

represent the convergence of people and other flows of strategic importance, such as a train station. Edges represent boundaries that delineate two places and form linear breaks in their continuity. For example, they can be railroading cuttings, the edges of a development, or walls. Paths can be streets, walkways, transit lines, canals, and railroads, representing movement across a place.

The Convergence of People and Targets

Routine activities theory states that for a crime to occur requires the convergence of three elements in time and space: a motivated offender, a suitable target or victim, and the absence of a capable guardian (Cohen & Felson, 1979). A capable guardian is someone or something whose presence prevents crime. Figure 3.5 illustrates these three necessary conditions of crime linked to routine activities, rational choice, and crime pattern theory as the inner part of the 'crime triangle.'

The outer side of the crime triangle relates to situational prevention methods to reduce crime in risky places. A handler supervises the potential offender, a guardian protects the potential target or victim, and the place manager controls the site or location (Clarke & Eck, 2003). Handlers include formal supervisors, such as police officers, security guards, and inspectors, and informal supervisors, including employees, family members, and friends. Place managers can be staff, guards or parking attendants who regulate behavior in the places they control. We discuss their role in more detail in Chapters 7–9 of the book.

Crimes do not occur uniformly in all types of places. A further explanation of this is Crime Pattern Theory, which states that "motivated criminals do not search through a whole city for targets; they look for targets within their more restricted awareness space" (Brantingham & Brantingham, 1984, p. 365). They have also proposed that offenders' daily patterns might influence the location of offending behavior even when the offender is engaging, to some degree, in a search pattern for a suitable target, having already decided in principle to commit an offense (Brantingham & Brantingham, 1984).

FIGURE 3.5 The crime triangle by Clarke and Eck (2003).

Source: Based on Cohen and Felson (1979) and adapted by Clarke and Eck (2003).

An individual's awareness of space stems from their 'anchor points' in urban landscapes, such as places of residence, schools, places of work, and frequently used subway stations (Figure 3.6). These are also referred to as nodes. As people travel between nodes, they develop their knowledge of places or awareness spaces, identifying places that are most suitable for crime. Our awareness spaces can be considered our cognitive maps; the more we visit places, the better our awareness becomes. In crime pattern theory, crimes are most likely to occur where criminal opportunities and offender awareness space intersect. The connectedness of roads and paths can also influence the extent to which people converge and, therefore, crime opportunities. We explore this further in Chapter 6.

These ideas have been extended into the concepts of crime attractors and crime generators (Brantingham & Brantingham, 1995), as well as radiators and absorbers (Bowers, 2014). Crime attractors are areas with a reputation for crime and are known to offenders who plan visits to these sites. They tend to have relatively few targets, and thus, the crime rate is higher. Crime generators are places where lots of people converge, which creates unplanned opportunities for crime. They have a higher number of possible targets, and thus, the crime rate is lower. A crime radiator is a risky place that causes crime in its immediate environment, which radiates outwards from it. An absorber is a place that 'sucks in' or absorbs crime from its nearby locale. We identify research that tests both in Chapters 4–6. This also has implications for how we define the boundary of a risky place (Chapter 8).

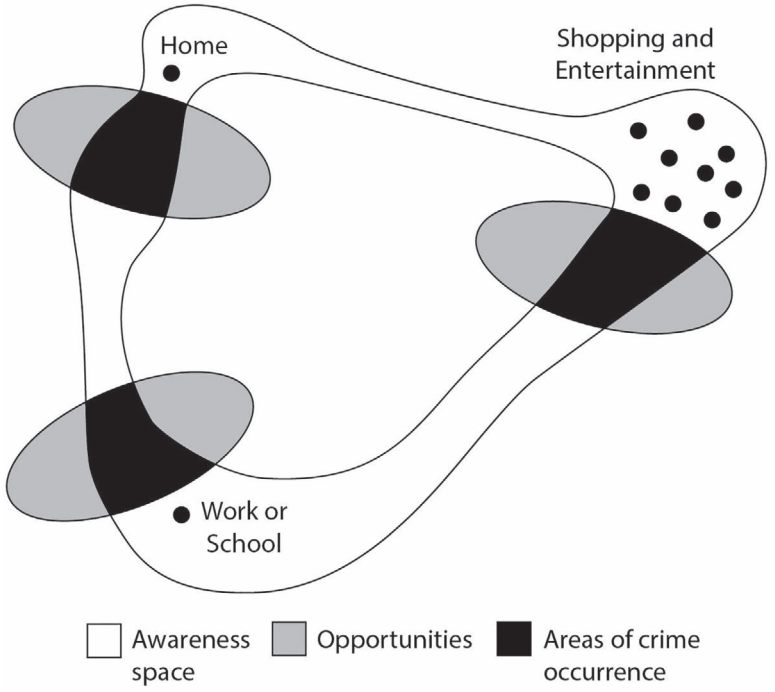

FIGURE 3.6 Brantingham's hypothetical model of the intersection of criminal opportunities with offenders' cognitive awareness space.

Source: Brantingham and Brantingham (1984, p. 362).

Two final important concepts here are Repeat Victimization and Near Repeat Victimization (Townsley et al., 2003). The first is defined as a person being a victim of a crime more than once over a defined time, often 12 months. The second concept suggests that if a crime occurs in one location, the chances of a future crime occurring nearby in a short space of time also increase. Both are essential components of risky places, which tie in with theories of routine activities, crime pattern theory, and convergence of opportunities.

Types of Environments and Neighborhood Contexts

Several studies explore the influence of neighborhood characteristics on crime. For example, poor social control in an area can be a contextual factor contributing to crime. Research into juvenile delinquency identified that socially disorganized neighborhoods have higher levels of crime linked to people's inability to exercise social control in their neighborhoods and

to solve problems together. Social disorganization theory (Shaw & McKay, 1942) and its modern developments, such as social cohesion and collective efficacy (Sampson et al., 1997), offer more structural explanations of crime. More recently, studies have begun to employ multi-level modeling to examine the interaction between individuals and environments since neither on their own fully explains the presence or absence of risky places for crime (Adeniyi et al., 2023).

There is a range of 'natural' and 'designed in' features in places that might deter offenders. Jacobs (1961) introduced the concept of the 'eyes on the street,' emphasizing the influence of neighborhood design on surveillance opportunities. Similarly, Newman (1972) argued that building types affect street activities, specifically through the "capacity of physical design to provide surveillance opportunities for residents and their agents" (Newman, 1972, p. 78). Areas and neighborhoods with adequate surveillance, clear separation of public and private space, and territorial control over personal spaces lead to less delinquency, fear, and victimization (Taylor & Harrell, 1996).

The physical environment can influence levels of surveillance and opportunities for crime, including types of facades, the height and density of buildings, the connectedness and types of streets, whether windows are facing the streets, how connected backyards and gardens are with streets, alleyways and parking spaces, for example, may all create opportunities for surveillance (Ceccato, 2020). The physical environment can also influence what are termed prosocial behaviors. For instance, territoriality can create a sense of ownership by demarcating activity spaces. Target hardening makes it more difficult to steal or damage property, such as padlocks.

Connecting the 'Types of Environments' and 'the Types of People'

Situational action theory (SAT) suggests that individual morality and the ability to exercise self-control explain people's propensity to crime. However, it also recognizes that people are not immune from the influence of their environment. SAT accounts for the mechanisms through which the intersection of individuals and settings may result in a crime. SAT suggests crimes occur when, and only when, certain specific personal traits find themselves in an environment that is conducive to crime. Wikström and Treiber (2017) state that "environments don't commit crimes; only people do. Therefore, crime prevention policies and interventions targeting environmental characteristics are only effective if they promote changes in how people perceive crime as an alternative course of action" (p. 82). The theory suggests that concentrations of crime events in an area are essentially the convergence in both the time and place of crime-prone individuals and criminogenic settings.

The previous section has explored what we consider salient conventional explanations for risky places of crime. However, we acknowledge the need to consider the user perspective and explore the fear of crime in risky places. Indeed, whilst a risky place may not actually have a high level of crime risk, it may have been perceived to be high risk by those who use that place, or vice versa.

3.4 Fear in Risky Places: Why Do They Matter, When, and for Whom?

Not all places that attract disproportionately high crime levels are perceived as unsafe by all users and visitors. In some places, very few crimes occur, yet people avoid them or only use them at certain times of the day because they are perceived as unsafe. Fear of crime may be influenced by an individual's attributes and experiences, cultural factors, media coverage, and other factors. Efforts to address the 'fear' of crime should incorporate both subjective and objective dimensions of safety to develop strategies that promote both physical and psychological well-being. In this section, we discuss what makes people think places are risky and unsafe. We start by defining 'fear' before examining the most salient explanations for fear of crime. We also flag that what we measure may not in itself be fear and may be indicative of other social processes rather than a reflection of the characteristics of a specific risky place.

According to Warr (2000, p. 453), fear is "an emotion, a feeling of alarm or dread caused by awareness of expectation of danger," and feelings of fear of crime cannot be described by "mathematical functions of actual risk but are rather complex products of each individual's experiences, memories, and relations to space" (Koskela, 1997, p. 304). Ferraro (1995, p. 8) defines fear of crime as "an emotional reaction to dread or anxiety to crime or symbols that a person associates with crime," while Brantingham and Brantingham (1995) describe the fear of crime as a complex concept that includes fear of being attacked, suffering physical harm and/or losing privacy and dignity. There are two important concepts that are relevant to risky places, 'dispositional fear' and 'situational fear.' We now discuss each of these concepts in more detail.

Dispositional Fear of Crime

This relates to the differences between individuals' propensities to experience fear of crime in different settings, and most research here has focused on gender and age. Those who declare feeling the most unsafe include women and girls, older adults, LGBQTI, or individuals with disabilities.

However, often, individuals have more than one vulnerable characteristic, for example, gender and disability. In this book, we apply an intersectional perspective on safety (Crenshaw, 1989) that, among other things, considers individuals' multiple identities and experiences as victims of crime. Fear of crime is therefore not seen as a function of a characteristic of the individual but because of the interaction between individuals' various characteristics, such as gender, age, sexual orientation, ethnic background, disability, and socio-economic status.

Situational Fear

This refers to a transitory state of experiencing fear, for example, walking through a tunnel at night. The mechanisms linking fear of crime and place characteristics are poorly understood, but research shows that they are mediated by how crime and disorder affect neighborhoods (Shaw & McKay, 1942; Wilson & Kelling, 1982). Several other environmental characteristics may also produce fear. The lack of clearly defined private-public spaces affects perceived safety (Newman, 1972). At the same time, barriers, walls, and the construction of a fortress environment can create a disruption of the urban fabric and generate suspicion and fear (Landman, 2012). Fear and perceived risk of victimization can also vary temporally. Research evidence shows that safety perceptions may vary over the time of day, from weekdays to weekends or during different seasons. Drawing from evidence from Sweden, Kronkvist (2024) suggest that unsafe locations are concentrated in space; there are also signs of spatial clustering and temporal stability of unsafe locations over time.

In addition to dispositional and situational factors, there are also macro-societal changes that can influence fear. Examples include changes in immigration and xenophobia, concerns about terrorism or contagion, the proliferation of surveillance systems, and the privatization of security (Graham, 2008). Therefore, factors that are far removed from a risky place may cause fear and vulnerability. Mass media coverage also has an important role in this context (Beck, 1992). Indeed, feelings of instability and 'ontological security' can arise from the fast pace of urban life, drastic changes in neighborhoods and cities, or fluidity in the job market (Giddens, 1999).

Environmental Attributes Affecting Fear

Signs of physical deterioration were traditionally considered to be more important determinants of fear of crime than actual incidences of crime. Fear is associated with poor lighting at night, as it increases visibility and reduces potential hiding places for attackers (Lorenc et al., 2013).

Security measures like locks, fencing, or secure entry systems can also reduce fear. Some prevention measures, such as shutters and security gates designed to reduce crime, may increase fear, creating more unpleasant hostile atmospheres. Excessive security measures in the home are also seen as unwelcoming and have been described as fortresses and prisons (Lorenc et al., 2013).

Research has shown that acts of vandalism and disorder signs indicate a neighborhood's decline (Wilson & Kelling, 1982). Increasing fear of crime can be triggered by visible signs of physical deterioration, resulting in individuals withdrawing from communities. This weakens informal processes of social control that inhibit crime and disorder and produces a decline in organizational life and the mobilization capacity of a neighborhood. Fear, in the long run, can change the composition of resident populations stimulated by the cumulative effects of fear. However, as stated earlier, the relationship between disorder, perception of disorder, and fear is not straightforward.

Disorder serves as a visual reminder within a neighborhood that safety may be compromised. However, perceptions of 'disorder' do not necessarily equate to 'actual disorder' as reporting practices vary from place to place. Harcourt and Wallace (2014) argue that it is unreasonable to assume that interpretations of disorder are universally applicable. They suggest that conventional indicators of neighborhood disorder, such as people loitering at street corners, might reflect social control mechanisms that could contribute to community safety. In contrast, perceptions of disorder, often measured through expressed fears, are more likely to indicate the neighborhood's racial composition and the inclusivity of different ethnicities and genders rather than the actual level of danger.

The relationship between disorder and crime is, therefore, particularly problematic in places where disorder is not necessarily indicative of offending. What is known so far is that variations in perceptions of disorder, also called 'incivilities,' are not primarily a result of neighborhood exposure to crime or routine activities. They are a result of how individuals employ racial, gender, or other stereotypes attached to a place to the people who reside or spend time there. The concept of 'othering' helps proliferate fear and is a possible candidate for why a place can be considered feared even if it is not criminogenic. The implications of this are clear. If disorder perceptions and fear are motivated by reasons other than crime rates, reducing disorder will not affect declared levels of fear as this is driven by other visual cues and can vary different types of observers.

Additionally, reduction of the disorder may not even be desirable in certain communities because residents understand that addressing 'disorder' may negatively impact other incomes, for example, panhandling

or negatively affecting a place's identity. Major cities that have plenty of vibrant areas have some level of controlled disorder that, despite the problems, makes these places welcoming, attractive, and perceived as safe. The key is the scale of this controlled 'disorder' that creates the 'right balance' between disorder, inclusiveness, and safety.

The Impact of Fear

Fear of crime can impact individuals, communities, and society in several ways. For individuals, it can lead to heightened anxiety, stress, and psychological distress. Other psychological and emotional effects include symptoms of depression and post-traumatic stress disorder, which can affect levels of mobility. Individuals may change their daily routines and behaviors to avoid potentially dangerous situations, for example, avoiding certain places or only going there at certain times of the day. Gray et al. (2011) distinguish between 'functional' and 'dysfunctional' fear. Dysfunctional fear can paralyze individuals, leading to constrained mobility and avoidance of public spaces. Functional fear leads to precautionary actions that may reduce both fear and risk of victimization, such as carrying a 'rape alarm' or participating in activities such as night patrols or neighborhood watch schemes to increase perceptions of safety.

The impact of fear can also have economic consequences for individuals, businesses, and communities. People may avoid certain neighborhoods or areas, leading to a decline in local businesses and property values. People may not take up jobs if they do not perceive public transport to be safe and do not have access to a car. Fear of crime and discrimination often affects vulnerable populations disproportionately. Certain groups, such as women, the elderly, and marginalized communities, often experience heightened levels of fear. This can further exacerbate existing social inequalities and limit opportunities for these groups. At the societal level, fear of crime may influence public opinion and shape criminal justice policies by imposing increased surveillance measures, stricter laws, and harsher punishments.

There is a strong argument for integrating crime prevention into our sustainability goals. Environmentally sustainable constructions will not attract residents if they are fearful of living there (Paulsen, 2013). Fear of crime is associated with the social, economic, and demographic characteristics of areas and is also linked to the design and maintenance of urban spaces.

The previous two sections discussed conventional explanations for crime and the associated fear of crime in risky places. We now consider some of these approaches' limitations and how systems thinking can help us develop sustainable integrated crime prevention strategies.

3.5 Making Risky Places Safer: From Conventional Approaches to Systems Thinking

Situational Crime Prevention (SCP) is a theoretical framework and practical approach to reducing criminal opportunities by modifying the immediate environment where offending occurs (Clarke, 1995). The idea is to manipulate specific situations that make criminal behavior less attractive, more difficult, or riskier for potential offenders. Situational crime prevention aims to intervene directly in the circumstances surrounding crime events. Examples of situational crime prevention measures include installing surveillance cameras, improving lighting in public spaces, implementing access controls, or changing the design of buildings to minimize potential hiding spots for criminals.

A range of action-oriented problem-solving tools and models have been developed to support situational crime prevention, often referred to by their easily rememberable acronyms. One example is the SARA (Scanning, Analysis, Response, and Assessment) model, which provides a clear pathway for problem-solving in community policing and crime prevention (Eck & Spelman, 1987). Clarke and Webb (1999) suggested that goods that were Concealable, Removable, Available, Valuable, Enjoyable, and Disposable (CRAVED) were more likely to be stolen. Ekblom (2023) has proposed the 5Is framework, which is designed to support best practices for managing the complexities of real-world prevention. Later, Ratcliffe (2018) developed a framework to support crime analysis, which outlined key information analysts should consider, including Victims, Offenders, Locations, Times, Attractors, Groups, and Enhancers (VOLTAGE). Johnson et al. (2015) developed the EMMIE framework to support evaluations of crime prevention interventions. The key elements are the interventions: Effect on crime; the Mechanisms by which it works; the Moderators, which are where and with whom it works best; how to Implement it; and the Economic cost. Chapter 9 discusses the more recent General Problem-Solving Matrix (GPSM) General Problem-Solving Matrix (GPSM). This is not intended as an extensive list, and we may have unintentionally missed several other tools.

Diagrams can offer clear visual representations that clarify complex relationships and crime dynamics. Ekblom devised the Conjunction of Criminal Opportunity (CCO) Framework to clarify the existing opportunity theories for crime. He also broadened the scope to include crime promoters. CCO explicitly focuses on the immediate causes of crime events rather and offers more 'hooks' for wider systems thinking to connect with, for example, how the various crime roles fit into wider society, how offenders acquire dispositions, and the environmental conditions that generate readiness to offend (Ekblom, 2023).

In Figure 3.5, we presented the crime triangle that provides a simple yet powerful representation of the convergence factors necessary for a crime to occur and situational prevention opportunities to address each of these. Another method is the 25 techniques for situational prevention, developed originally by Clarke and refined by Eck and Clarke (2019), to categorize and organize strategies into an easily digestible format. This approach allows for a comprehensive overview of possible interventions, facilitating strategic planning and implementation in crime prevention.

Two related concepts are SCP and Crime Prevention Through Environmental Design (CPTED). Both advocate environmental manipulations intended to reduce opportunities for crime. CPTED originated in the USA and is associated with design solutions in architecture and planning. SCP originated in the UK and is much broader in scope, involving any opportunity-reducing measures, whether of design, management, or even policing, intended to increase the difficulties or risks of offending (Clarke, 1989). More recently, there have also been a second and third generation CPTED that emphasizes the role communities play in shaping their environments to build local capacity for creating and maintaining safe places, see e.g. the SafeGrowth concept in Mihinjac and Saville (2019).

Earlier in this chapter, we also reviewed SAT, which links the prevalence of crime-prone people with the extent of criminogenic settings. This suggests that effective crime prevention interventions must do more than modify environmental conditions. They also need to address how individuals interpret and respond to those conditions. Despite focusing primarily on individuals and not on places, expectations are that the theory can lead to better crime prevention work because it considers the interaction between the individual and the environment.

Criminologists and other professionals who advocate for a broader understanding of crime and delinquency have argued that situational crime prevention models may oversimplify complex social issues, focusing on immediate symptoms rather than structural causes (Clarke & Bowers, 2017). Additionally, there are concerns about the potential displacement of crime to adjacent areas and the unequal impact of interventions on diverse communities (Garland, 2000). Critics contend that an overreliance on specific situational measures may lead to neglecting broader systemic factors contributing to criminal behavior, which, per se, can also be seen as an advantage of the model (Laycock & Tilley, 1995), given the fact that one of the goals of situational crime prevention is to understand why crime happens at particular places at particular times and not explain why people commit crime.

We introduced the premise of situational crime prevention, based on identifying practical and action-focused interventions to reduce opportunities for crime by manipulating a place's built and physical environment. This approach can be considered a conventional or reductionist approach to problem-solving.

In contrast to conventional approaches that address issues in isolation, systems thinking recognizes the need to consider the intricate interconnections within systems. To guide future refinements and foster a more nuanced understanding of systems thinking, we outline in the following some pertinent challenges of the conventional approaches to crime prevention and the potential for systems thinking to alleviate these.

1. Beyond individual parts
2. Long term outcomes
3. The multiple interdependent scale
4. Specify boundaries
5. Leverage points
6. Shared goals
7. Unequal impact
8. Urban centric
9. Disciplinary specialization
10. The individual-environment interaction

1. Beyond Individual Parts

The 'chant of specificity' in problem-solving approaches to crime prevention emphasizes crime-specific, place-specific, time-specific, and context-specific interventions. However, in doing so, there are inherent risks that increase the risk of developing fragmented approaches. Guided by systems thinking, 'reassembly' ensures that specific interventions can fit together into an overarching strategy to address the complexities of crime. It is essential to strike a balance, acknowledging that the reductionist paradigm may, at times, extend too far in isolating elements without capturing the whole picture, which is necessary when interventions are made.

2. Long Term Outcomes

A 'quick fix' might generate future unintended outcomes and make things worse in the long term. Imagine the water level in the bathtub as the overall crime rate in a city. The faucet represents various contributing factors to crime, for example, organized crime and social inequality, constantly adding water to the tub. The drain represents the police and other crime prevention measures, such as removing water from the tub. In this analogy, if the rate of water flowing in (structural causes of crime) exceeds the rate at which the drain (short term crime prevention efforts) can remove it, the water level (overall crime rate) in the bathtub will rise. This analogy emphasizes the importance of not only addressing the immediate symptoms of crime but also understanding the underlying long-term causes.

3. The Multiple Interdependent Scale

In a globalized, increasingly changing world, effective governance should consider the multiple interdependent scales of factors that affect crime opportunities. Some are cultural and historic, deeply embedded in structures far beyond a risky facility or node. One example of how government strategies can address this is acting upon the interlinkages in demand and supply of drugs in countries of the Global North and drug production in countries of the Global South. In the case of drug trafficking, it involves international cooperation, addressing economic disparities, and implementing policies to reduce demand in developed countries.

4. Specific Boundaries

Another issue is that conventional approaches to situational crime prevention may be too specific, and the boundaries may be too rigid. This becomes an issue when the 'parts' do not provide enough information about the whole system. SCP, while effective in the short term in specific situations, does not reflect the broader system of the risky place. The parts, specific interventions, are treated independently, which may miss essential relationships, spillover effects, or unintended consequences.

As identified previously, the primary criticism of situational crime prevention is that crime will be displaced (Guerette & Bowers, 2017). Six types of displacement are identified in the literature, and three key concepts are spatial displacement to another place, temporal displacement to another time, and crime switch to a different type of crime. If an intervention is introduced to a geographically defined place, then this assumes the intervention will only influence that area or zone. However, whether spatial displacement occurs or diffusion of benefit, where positive impacts extend beyond the intervention target areas, this brings into question the defined boundary identified. Both displacement and diffusion of benefit may operate beyond the 'intervention boundary,' and both acknowledge that the 'target area' is part of a broader system. This is before considering whether the timing of the evaluation is appropriate to measure its impact, as discussed further in Chapters 7–9 of this book.

5. Leverage Points

Rather than attempting to alter system behavior by implementing all conceivable solutions, it is more effective to identify those interventions that are most likely to produce a lasting impact. Meadows (2008) describes a 'leverage point' as a place within a system where a small adjustment can lead to substantial and sustained changes in behavior or outcomes. These points are strategic areas for intervention, enabling focused efforts

to foster positive changes or avert negative outcomes (see Chapter 7 for further details). It is crucial to have a thorough understanding of the system in question and to base our intervention choices on robust evidence from previous research.

6. Shared Goals

In many situational interventions, practitioners may have different goals and are not aware of each other's priorities, and intended outcomes are not realized. Authorities may set the police a series of targets to reduce crime, increase arrests, or rank performance across forces. If these targets are not reached, they can result in fear and confusion, a lack of ownership, and even disengagement among police officers. Alternatively, targets may be 'gamed' to ensure they are met. This can result in misalignment between targets and organizational performance, which creates unintended consequences, turning these entities into adversaries and hindering effective collaboration.

7. Unequal Impact

The principles of situational crime prevention are versatile because they can be adapted to various situations and types of crime. However, the impact of these interventions can vary among different city users. While some individuals directly benefit from these measures, others may experience no effect or even negative repercussions. For instance, installing CCTV cameras in public spaces is intended to enhance overall safety and assist in crime prevention. However, the intended beneficiary (the general public) may not perceive a direct personal advantage from such surveillance. Instead, the primary beneficiaries are often law enforcement agencies, who use these tools for crime detection and prevention.

8. Centric

Situational crime prevention has predominantly been applied and studied in urban settings, where the density of opportunities for crime is higher. However, this focus overlooks the fact that rural areas are also vulnerable to crimes like property theft. Implementing situational crime prevention strategies in rural contexts can help safeguard farms, agricultural equipment, and rural homes. The effectiveness of crime prevention interventions may vary across the rural-urban continuum (Ceccato & Abraham, 2022) so solutions may or may not be the same as the ones in cities. Emerging technologies, such as GPS tracking and drones for monitoring agricultural assets, are beginning to be adopted. Nevertheless, evidence regarding their effectiveness remains limited (Aransiola & Ceccato, 2020).

9. Disciplinary Specialization

Situational approaches would benefit from embracing a more interdisciplinary take to address complex, multifaceted issues that often require insights from multiple disciplines. Without interdisciplinary collaboration, opportunities to combine diverse perspectives and approaches are missed, potentially limiting innovation and the development of comprehensive solutions. An example of the challenges and synergies faced by architects, urban planners and criminologists when working in collaborative frameworks were reported by Ceccato and Brantingham (2024).

10. The Individual-Environment Interaction

While the SAT aims to reconcile person and environment-oriented perspectives, its primary focus is on elucidating why certain individuals commit crimes rather than exploring why some places are more prone to crime and become risky. Embracing new perspectives on situational crime prevention involves adopting a receptive mindset and incorporating contemporary insight into the framework. Systems thinking is a way forward. It encourages the search for interdependencies, for example, to explore feedback loops within the system that might explain a particular phenomenon, such as a crime reduction in a place.

In summary, we suggest revising some of the principles of situational crime prevention by moving beyond fragmented approaches and advocating for a complementary long-term strategy through systems thinking. In this chapter, we highlighted the pitfalls of short-term fixes, stressing the importance of addressing crime's underlying causes for sustainable reduction. Effective governance requires understanding the complex, interdependent factors influencing crime, emphasizing strategic interventions or leverage points to obtain expected outcomes. This approach calls for shared goals among users and practitioners to prevent counterproductive effects and demands a vision for the future. Moreover, the urban-centric focus of these interventions overlooks rural contexts, where risky places present specific challenges. An ever-increasing multifaceted nature of crime requires collaboration across various fields, and cross-sectoral collaboration is needed to address the complex dimensions of crime effectively.

3.6 Concluding Remarks

This chapter has reviewed some of our conventional theoretical underpinnings of crime in risky places. We explore factors that help understand why crime concentrates at places and times, as well as the convergence of factors that might influence this and increase potential opportunities for offending. We reviewed how these theories and perspectives help us think about crime at the key elements or risky places, which we break down

into risky facilities, risky nodes, and risky paths and journeys. We consider these to be the building blocks to understanding crime in risky places.

A systems thinking approach requires an appreciation that we will never know a system in its entirety and that we can only ever understand some parts of a system. Indeed, we review the types of thinking needed to develop a systems-rethinking approach and the limitations of our conventional theoretical approaches when doing so. Moreover, this discussion also prompts us to consider the different configurations of these three key elements, risky facilities, nodes, and paths in different geographical contexts. Adapting our understanding and approaches to acknowledge these specificities is crucial, ensuring that prevention and intervention strategies are effectively tailored to these environments.

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4

IDENTIFYING RISKY FACILITIES

4.1 Introduction

In this chapter, we review the first of our three key 'elements' of risky places, namely risky facilities. Chapters 5 and 6 also provide an overview of risky nodes and risky pathways. We provided a longer definition of each of these concepts in Chapter 2. For each of these elements, we seek to review current knowledge and then move to a broader consideration of how they could be framed within a systems thinking approach. As Meadows (2008) reminds us, a system is more than the sum of its parts, and risky facilities, risky nodes, and risky places do not make up an entire system. However, reviewing each of these does enable us to think about the interconnectedness of these elements, their purpose, and the role of these elements within the behavior and characteristics of the system, including stocks and flows, resilience, self-organization, and if any hierarchies exist.

Facilities can be considered as an amenity that provides a particular service or function, for example, a convenience store, a hospital, a bus stop, or an ATM. What we know from multiple studies (Eck et al., 2007) is that the 80/20 Pareto principle will apply, for example, a small percentage of bars (e.g. 20%) accounts for a large percentage of crimes (e.g. 80%) in a city. Therefore, risky facilities are those premises that attract disproportionally high levels of crime.

In this chapter, we present several examples of risky facilities, namely bars, libraries, schools, banks, and bus stops, and review potential reasons for this disproportionality at each. Some of these facilities may be

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considered nodes since they might support several other functions. Nowadays, libraries are examples of multifunctional places constituting a hub, a node of multiple activities beyond the function of lending books. We discussed this in more detail in Chapter 1.

A key question is why only a small proportion of this specific type of facility accounts for most of the crime and disorder problems experienced or produced by the group of facilities as a whole. We also access potential commonalities and differences in types of environments, users, types of available services or products, and spatial and temporal contexts that make these facilities more at a target than others.

Importantly, we extend our analysis to include risky places within rural contexts, where the dynamics of crime and disorder can be distinctly different from urban settings. We also explore examples from the Global North and Global South. With digitalization, new forms of interaction between physical and cyber environments are being created, where new crime opportunities are increasing and taking different forms. By bringing in examples from different country contexts, we critically assess potential similarities and differences that can help discuss the governance of risky facilities in Chapters 7–9 of this book.

We also consider what is known about crime from the perspective of those who use or work at risky facilities, which, using systems thinking, are termed beneficiaries. By considering user perceptions of fear, we demonstrate the need to include user groups when seeking to understand better the problems prevalent and for identifying systemic responses for more sustainable change.

This chapter includes a description of these risky facilities following as much as possible this structure:

1. The overall distribution of crime events in these risky facilities is evidence of crime concentration and/or the search for 80/20, but its applicability to places around the world is unclear.
2. The temporal variations of crime events, for example, a cold spot can become hot depending on the time of day or day of the week.
3. The context of these facilities, namely what the functions of that place are, what types of land use are present, how the land is used, and the types of activities individuals perform at times and places at or near these settings.

4.2 Examples of Risky Facilities

In what follows, we review some of what we know about risky facilities and crime by considering five types of risky facilities: bars, libraries, schools, bus stops, and banks. This is not a comprehensive set of risky facility types;

they have been selected more to show the diversity of types of facilities that demonstrate the 80/20 Pareto principle.

Bars

The presence of bars and other premises that supply alcohol can be controversial for planning and governance. Some are in favor of the separation of bars from residential areas (Roncek & Pravatiner, 1989). Others, building on the work of Jane Jacobs (Chapter 3), suggest that diversity of land use promotes safety by increasing utilization of the area, and removing bars reduces the place managers and can leave streets and sidewalks 'deserted' and unsafe (Linning & Eck, 2021). Bars and other alcohol-selling establishments are different from many other facilities as they are generally open later in the evening and until the early hours of the next morning.

Research has shown that pubs and bars have significantly more violent and property crimes than neighborhoods without (Roncek & Pravatiner, 1989). In Sweden, bars and other facilities that sell alcohol are linked to both crime and car accidents (Levine & Ceccato, 2021). Late-night bars where both drivers and pedestrians are involved were spatially associated with alcohol-related crashes. Homel and Clark (1994) studied 45 locations in 36 bars in Sydney, Australia, to show that 30% of establishments accounted for 83% of physical incidents of aggression. Sherman et al. (1992) showed that 15% of pubs produced over 50% of all pub crime. These issues translate to the Global South; for example, in Namibia, it was demonstrated that alcohol outlets in residential settings could impact neighborhood safety (Kandjinga & Landman, 2023).

Some facilities have been identified as more problematic than others. Madensen (2007) found that 84% of bars (n = 154) in Cincinnati had five or fewer documented crimes, and 24% had no crime. However, 5% of bars (n = 10) had ten or more crimes recorded during a two-year study period. These ten bars accounted for more than 25% of all crime across the entire sample of bars. The distribution of physical violence is presented in Figure 4.1. The study found a strong correlation between venue management and levels of crime and disorder. More specifically, she found a link between bar size, staffing, and staff training. Unprofessional behavior of bar staff and poor management of bars (Homel et al., 1992) had been associated with violent crime in bars in previous studies.

Several explanations exist for why some bars have higher crime rates. There isn't space here to cover the wide range of explanations. We focus on some most closely linked with risky facilities and crime concentrations. One explanation is that bars in neighborhoods with higher crime levels will generate more crime than those in 'quieter' neighborhoods and that there

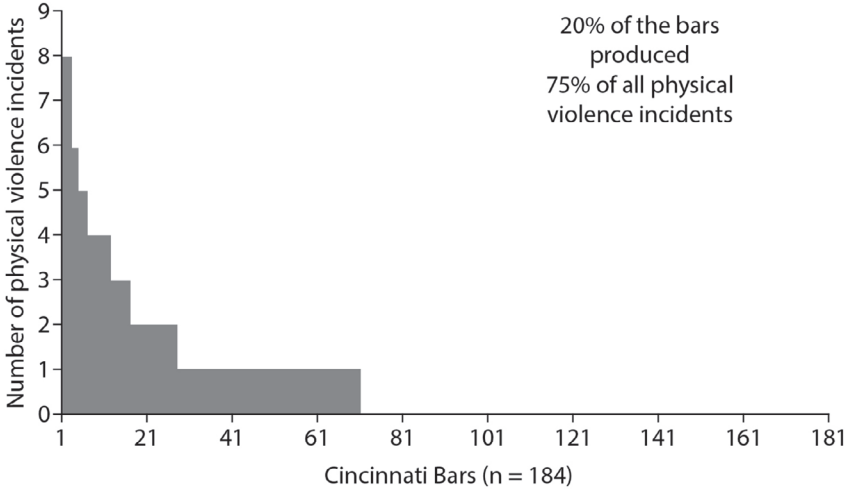

FIGURE 4.1 Concentration of violent incidents in bars in Cincinnati, USA, 2005.
Source: Madensen (2007, pp. 68–69).

is an interaction between a neighborhood and a bar. Studies also suggest that the management of bars will influence who visits the bar and how they behave regardless of neighborhood characteristics (Eck, 1994). Madensen (2007) suggests that the characteristics of the customers, residential area, and management will create a standard of behavior that will encourage or inhibit wrong behavior.

Madensen (2007) suggests steps necessary to support crime prevention at bars, including gathering available documentation related to the business, such as crime statistics, liquor, health, and fire code violations, and permit applications for major renovations. The next step is to interview owners and managers as a guide to develop questions about the history and results of their decision-making processes. Moreover, obtaining financial records or measures of profits/losses for the establishment over time is important, as well as interviewing regulators or local police to assess their perceptions of the business and the professionalism of the owner's and site managers' profiles.

These procedures allow researchers to piece together the history of the establishment to explain the connection between past practices and current conditions. We return to these ideas of getting to the 'beat of the system' in Chapter 8. They are an important aspect of systems thinking that encourages a broader understanding of the environment. This also helps with considering multiple interconnected factors that contribute to the overall dynamics of the risky place. Systems thinking emphasizes the importance

of understanding the perspectives and decisions of different actors within the system to develop comprehensive interventions.

Libraries

Libraries are meeting places where people come to borrow books, read, study, use computers, and socialize. Although they may share similar functions, a small proportion of libraries account for a large proportion of crimes, aligned to the 80/20 Pareto principle. As Figure 4.2 shows, five libraries (12% of the total) in Stockholm concentrate 74% of crime that happened within 25 meters of a library. Two of these five are in Stockholm's inner city or close to subway stations in southern Stockholm (Ceccato et al., 2022).

Libraries contain environments that, under certain situational circumstances, promote crime. Land use near the libraries affects crime in and around all libraries in Stockholm. Libraries located in areas with rental housing tend to have more problems than other areas. However, the location of schools within 50 meters of libraries has a reducing effect on street thefts around libraries.

Libraries can experience various crimes, including theft, assault, property damage and vandalism, public disorder, and inappropriate use of computers (Cromwell et al., 2008). These patterns can also be identified in the Global South (Adewuyi & Adekanye, 2011). In two libraries in Sweden, most records are minor incidents of public disturbance. Aggression, conflicts between visitors and personnel, crimes against property such as thefts and robberies, and vandalism are less commonly reported.

Crimes in libraries do not happen randomly in time or space. According to Simmons (2018), theft of visitors' personal valuables tends to occur when

FIGURE 4.2 Crime concentration in and around Stockholm's libraries, all outdoors police registered offenses 2019–2020.

Source: Ceccato et al., 2022.

they are left unattended, and in this study, almost all thefts occurred during the afternoon visitor rush, from mid-October to the end of December, and mostly between 3 and 5 pm. Crimes in libraries tend to occur during working hours (Cromwell et al., 2008). In two Swedish libraries, most crimes and events of public disturbance peak during the afternoon, around 3 pm after schools close, Wednesdays to Thursdays, and in winter to spring. This can be linked to routine activities and lifestyle theory (Chapter 3).

Crime in a library depends on multi-scale environmental conditions at work at various levels in the building and its immediate surroundings. The crime they are exposed to depends on the library's location and internal and external conditions. These safety components can include good lighting, design, and positions of doors, windows and staircases, entrances, types of targets, working routines, management, and personal training to deal with visitors and safety emergencies. Morris (1986) and Shuman (1999) provide some of the few studies that examine the design and quality of a library's indoor environment.

In Sweden, libraries containing areas with poor natural surveillance have higher numbers of incidents, in part because they are not visible from the reception or main desk. Other sections of libraries that experience crimes are the children's area, drunk people spending time in the children's ward disturbing the visitors, or young men sitting and smoking there. Entry/exit concentrates many events. Stairwells have several safety issues, some of which are also mentioned in the literature (Henrich & Stoddart, 2016). Confined and closed rooms can also be targets for crime and other insecurity problems, as also suggested in the international literature. Violent acts, conflicts, and flights, despite being rare in most libraries, are events that trigger fear among staff.

The design and maintenance of a library can also impact visitors' perceptions of safety. In Sweden, interviewed visitors felt safe in most places in the library, but half think that entrances/exits feel unsafe, and a minor share mentioned that they avoid them. Of those who answered that they felt less safe visiting the library, 33% answered that they felt less safe between 4 pm and 6 pm and during the library's other opening hours. According to Shuman (1999), fear has to do with the fact that libraries have no barriers to protect staff from personal interaction with the public; barriers are either minimal or non-existent.

Being able to find your way around the library easily and having helpful/professional staff is considered very important for feeling safe in the library's internal environment. Attending guards and surveillance cameras are not considered as important to ensure a safe environment of the library, but note that those who responded wished for the need for surveillance cameras and guards.

Applying systems thinking to safety interventions in libraries involves recognizing the interconnected components of the library system and prioritizing the well-being of different beneficiaries (e.g. visitors, staff), whose needs may not always align or may even conflict. In terms of the planning for the future and safety interventions in libraries, more recent studies call for increased knowledge about the role of staff preparedness to deal with challenging safety issues in libraries (Simmons, 2018; Henrich & Stoddart, 2016; Shuman, 1999). Place managers have a key role in preventing crime at libraries, and poorly trained personnel, insufficient behavior rules, and lax enforcement can encourage crime (Linning & Eck, 2021).

A study by Ceccato et al. (2022) demonstrated that well-designed libraries can reduce crime, including clear sightlines, a clear separation of activities, and signage for increased orientability. Many CPTED improvements (Chapter 3) and staff training can be introduced at low cost. These should be evaluated over longer time periods. Systems thinking promotes continuous learning and adaptation. Suggesting research to test the potential effects of safety interventions reflects a systems approach to decision-making. It encourages a controlled and long-term examination of the library's micro-places to inform future strategies.

Schools

International research shows many examples of how most of the crime is concentrated at only a few schools. Burquest et al. (1992) examined 33 schools in the UK and found that 18% reported almost 50% of the crimes, mostly burglary and criminal damage. In Stockholm, Lindström (1997) randomly selected 43 from 62 secondary schools and found that 10% of schools accounted for 37% of all property crimes, 17% of schools experienced 50% of all school crimes, and 8% of schools suffered 50% of violent school crimes. In the US, Snyder and Sickmund (1999) found that 13% of high schools and 12% of middle schools reported a concentration of incidents of attacks or aggravated assaults. A study by Clarke and Martin (1975) showed the importance of school situational conditions. They examined absconding rates in three groups of training schools for juvenile offenders in the United Kingdom. They found that regime variables that indicated differences in the management of schools (rather than random variations or individual variables) were the main determinants of the stability in absconding rates.

According to Thodelius (2019), bullying situations concentrate in corridors, toilets, and changing rooms and take place both during and after class time, while violent situations are concentrated in corridors before and after class time. Environmental conditions in the corridor are conducive to crime

as there is a low risk of detection, and high social density increases the risk of temptation, provocation, and conflict escalation. Nowicki (2020) evaluated a sample of US school shootings from 2009 to 2019 in the US. This found that shootings happen more often in the mornings, more often outside the school building than indoors, although indoor events usually result in more serious injuries, including fatalities.

The interactions between schools and the neighborhoods where they are located are also important to understanding their interconnections (Gaias et al., 2018). In the case of shootings in particular, Nowicki (2020) found that schools in suburban and rural, wealthier, and low-minority schools had more school-targeted shootings (such shootings were the most fatal and most commonly committed by students) while urban, poor, and high-minority schools had relatively more shootings overall, often more motivated by disputes triggered by drug-related/organized crime, which often were committed by non-students or unknown shooters.

In terms of safety perceptions, studies show that boys feel safer in the school environment than girls, and that they perceive to a greater degree that adults in the school act or react when a student has been subjected to a violation compared to girls (Thodelius, 2019). Staying in unsafe school environments has several consequences, including poor school attainment, an increased risk of mental illness, and an increased risk of suicide for those bullied (Kim & Leventhal, 2008). Although most people experience the school as safe on a general level, violence and bullying do occur in the school environment.

Systems thinking emphasizes the interconnectedness of these variables and the need to consider the holistic impact on the overall learning environment. In the context of school building safety, a systems thinking approach involves understanding the intricate dynamics between adult presence, student freedom, and safety measures. Another important point is that safety interventions should be planned as integral components of the larger school building system, recognizing that exclusionary measures can have cascading effects.

Bus Stops

Bus stops are important facilities that constitute an essential part of public transport and are a key component of urban mobility (Chapter 6). They can be considered as with other risk facilities in this chapter; a small proportion of bus stops account for a large percentage of offenses. Newton (2004) identified that 70% of criminal damage occurred at only 25% of bus stops in Liverpool, Merseyside, UK. In Stockholm, Sweden, Ceccato et al. (2015) found that 90% of pickpockets occurred in 3.5% of areas that contained a bus stop.

During peak hours in central locations, some bus stops can be very congested as passengers and potential offenders congregate around them, perhaps for short periods of time. Crime can be facilitated by fluid circumstances such as passengers queueing and then boarding and alighting buses, and people's willingness and ability to exercise social control are low in these circumstances. Increased bus frequency can reduce passengers' waiting time and vulnerability to theft and offer offenders more routes to escape by boarding one of several buses. Where buses are infrequent, the reverse may be true. Ceccato et al. (2015) showed that bus frequency and passenger flow at these transport nodes can be essential for understanding the criminogenic conditions of bus stops.

Previous studies have shown that crime and fear of crime correlate with current crime levels, the surrounding environment, and the overall design quality and characteristics of transportation facilities (Abenoza et al., 2018). Bus stops are far from homogeneous environments (Levine & Wachs, 1986a). North American and British studies have repeatedly shown that areas that contain a bus stop are more criminogenic than those without (Levine & Wachs, 1986a, 1986b; Loukaitou-Sideris, 1999; Smith & Cornish, 2006). However, there is some mixed evidence here. It is important to consider that bus stops are not isolated, and given that they are located close to residential areas, they often have other land uses in proximity. Newton and Bowers (2007) identified that criminal damage to bus shelters was more strongly associated with being close to parks and schools with higher levels of exclusion and not pubs and bars. This suggests that the type of crime, the target, and the time of day are all important factors when examining how criminogenic bus stops are.

In terms of safety perceptions at bus stops, Abenoza et al. (2018) identified that personal characteristics (gender, age, previous experience of victimization, etc.), as well as the physical characteristics of the bus stop, influence levels of fear. Women consistently feel less safe than men. The frequency with which passengers travel was found to have no statistical significance for their safety, suggesting that routine and location recognition do not play a role in perceived safety. The characteristics of the bus stops, the opportunity for natural surveillance, and the availability of real-time information are the most important factors that affect safety. In addition, safety perceptions are strongly influenced by previous experiences of being exposed to crime. The effect of safety turns out to be nuanced by age and gender. Travelers prefer opaque shelters at night and feel safer when the stop is in an area with mixed land use, perhaps because of the guardianship opportunities at all hours of the day. Also, in Sweden, Gerell (2018) revealed that certain facilities, like schools, increase crime risk but not personal victimization risk around bus stop locations. Additionally,

high neighborhood collective efficacy consistently mitigates crime and victimization around bus stops in Malmö.

Drawn from the international literature, we found several types of safety interventions in bus stops, such as enhancing natural surveillance through lighting and design, strategically placing new stops away from desolate areas, and tailoring interventions to specific societal needs (Loukaitou-Sideris et al., 2001). Addressing crime concentrations around bus stops requires rigorous monitoring of incidents and regular field inspections, guiding targeted physical redesigns (Ceccato et al., 2015; Abenoza et al., 2018), selective deployment of security personnel, replacing pedestrian tunnels, and ensuring adequate lighting and visibility. Enhancing natural surveillance involves well-lit environments and thoughtful design to promote visibility. Tailoring interventions involve including the intensity of the flow of passengers and customizing efforts for specific groups of passengers, women, the elderly, and LGBTQI+ individuals (Ceccato & Loukaitou-Sideris, 2020), ensuring their voices are integrated into decision-making for transportation and safety planning. However, this process also demands structural changes. In India, Natarajan (2014) reports that despite the growing number of women in the police force and their involvement in diverse duties, they continue to face negative perceptions from their male colleagues.

An example of a crime prevention initiative from the Global South that was applied to bus stops is called 'Guarded Bus Stop.' Anyone at a bus stop can contact a private security company through a digital screen. The project 'Guarded Bus Stop' primarily focuses on catering for women's safety but can benefit anyone alone at deserted bus stops in Brazil. The tool is even capable of alerting the police in case of emergencies (https://www.youtube.com/watch?v=7VIuoaFWczA). The award-winning technology has already been successfully implemented in Campinas, in Sao Paulo state, with an average of 150 calls per night across the five test points monthly. The product is being expanded to São Paulo and Rio de Janeiro.

Another example is from small municipalities in Sweden. 'NattStopp' embodies a systems thinking approach by including the whole route and city, halting buses for passengers between stops during the evening. Individuals must feel safe in transit, especially in environments susceptible to crime or perceived as unsafe. 'NattStopp' provides a unique chance for solo travelers to alight between regular stops, fostering a sense of safety. The decision to implement 'NattStopp' lies with the driver, considering traffic safety and passenger accessibility (Ceccato, 2024). Initially trialed in specific areas within Kalmar urban areas for a year, NattStopp's impact was assessed through a systems-oriented lens, examining changes in passenger behavior revealed by police safety surveys. In areas where 'NattStopp' was

tested, a marked reduction in individuals avoiding public transportation during the evening became evident.

Banks

The study of the geography of bank robbery provides insights into the spatial patterns and distribution of offending, helping law enforcement and policymakers develop targeted strategies for the prevention of this type of crime. In Great Britain, Austin (1988) found that all successful and attempted burglaries and robberies occurred in 5% of certain types of banks. Matthews et al. (2001) used 1992 and 1994 robbery data to show that 21 of the banks have a robbery rate four to six times higher than other bank branches. In Milan, Italy, Dugato (2014) investigated the relationship between the prevalence of bank branches and bank robberies. The study found that robbery rates were higher in areas with banks compared to the rest of the city, although proximity to a previous bank robbery did not significantly influence the pattern of robberies. Studying bank crimes at different times provides valuable contextual insights. Systems thinking highlights the importance of understanding how various factors interplay in different scenarios, influencing a system's behavior. It emphasizes the interconnected nature of risk, control, and safety within banking environments. Systems thinking also stresses that adjustments to control mechanisms for enhancing safety should consider their potential impact on the entire system, including the surrounding areas where banks operate.

Risky Facilities in Rural Contexts

Rural areas often feature lower population density, fewer law enforcement resources, and greater distances between facilities and emergency services, which can impact the nature and frequency of incidents at these facilities. Rural schools and libraries may serve as central hubs for community activities, thereby increasing the opportunities for crimes like vandalism or theft when perceived as less supervised. Furthermore, the isolation of some rural facilities can make them more vulnerable to crimes such as burglary or illegal dumping, as perpetrators might expect fewer witnesses and a less immediate police response. This isolation also affects the temporal pattern of crime, with risks potentially increasing during times when these facilities are closed or minimally staffed. A rural pub can become a focal point for both social interaction and associated problems such as alcohol-related offenses and violence.

Farms are an example of a risky facility. The literature is rich on rural criminology reporting crimes against farms and farmers (e.g., Donnermeyer &

Barclay, 2005; Bunei et al., 2013). Crimes against farms include property crime, violent crimes against farmers and their families, trespassing, littering, vandalism, and theft/robbery (Ceccato & Abraham, 2022). There are limited studies into levels of fear of crime by farmers. Some studies internationally suggest there is a mistrust of policing and criminal justice. Further research is necessary to examine rural examples of risky facilities alongside their urban counterparts to understand better why some attract disproportionately large amounts of crime and develop strategies for crime reduction, considering the unique challenges and characteristics of different settings in areas on the rural-urban continuum.

4.3 The User Perspective in Risky Facilities

In this section, we review risky facilities from the user perspective, broadening considerations of crime to consider the user and owner of these places. Furthermore, we consider how they may experience cybercrime, which connects the facilities to their broader digital environment. We also consider perceptions of safety and fear of crime, which are also relevant from a wider systems perspective when considering how people use places, particularly away from where they live and reside.

When considering risky facilities of crime, there is a need to consider potential cybercrime at these facilities, and that both the user and the manager/owner may be the target. For example, hotels, bars, and restaurants have been shown as risky facilities for crime. Recent studies have suggested that these hospitality locations may also experience high cyber-attack levels. For example, in a well-documented case, the then Starwood Hotels and Resorts, now Marriott International, revealed a data hack that compromised over 300 million customer records. When thinking about this as a system, this could be considered as an impact on individual hotels as facilities, but also a globally connected chain of hotels under the same owner, and 300 million users who had stayed at these hotels over the time frame in question. This included stealing five million passport numbers (Parsons et al., 2021). Hotels are a typical location for Wi-Fi hacking, whereby customers, often international visitors, log into a fraudulent 'free hotel' Wi-Fi site set up by cyber-attackers within range of the real Wi-Fi service. Offenders are then able to gain access to their data. Non-encrypted accounts are also subject to man-in-the-middle attacks (MITM), which are susceptible to a cyber attacker's unauthorized entry into a network (Parsons et al., 2021). This can lead to theft of personal data, access to bank accounts, or even theft of sensitive company data.

These can be applied to rural areas. For example, Stenbacka (2022) explores the role of technology in the drug market, highlighting that the

marketing of drugs on the Internet has moved drug sales away from traditional locations in urban environments. New technologies impact the drug market system, compressing factors such as time and space, increasing communications, and reducing some distance barriers linked to access to illegal drugs. This also impacts policing as drugs are distributed online, and traditional models of policing are not geared up to respond to this international model.

When considering risky facilities, such as bars, libraries, and shops, it may be important to consider how situations inside or within a facility might vary compared to those adjacent to that facility. What happens inside a premise may be isolated from what happens outside of it, linked to physical design, the management of a premise, and, for example, the extent to which access is controlled. A premise may have privately operated CCTV within it and police or local council/authority surveillance outside it. It may be well-lit inside but poorly lit on the outside. However, it is unlikely that a user of that facility would draw a distinction between the two in terms of fear of crime. Indeed, it is likely that fear of crime would be negatively influenced by any negative perceptions of the inside of a facility and its immediate surroundings. This is supported by Linning and Eck (2021), who suggest expanding the concept of place management/eyes on the street to place managers, including business owners, who regulate both the inside space of their premises and the outside space proximate to their facility.

A good example might be young people hanging out outside a pub or bar and consuming alcohol or drugs. The inside of the bar might be well managed and feel safe, but if the immediate vicinity feels less safe, then fear of crime might be high at the facility. Indeed, one could extend the notion of facilities as radiators or absorbers of crime or as generators and attractors of crime (see Chapter 3). These can perhaps be considered micro-influencers of fear of crime. However, whilst issues to target reducing fear of crime at risky facilities may be achieved through the micro level and targeted situational crime prevention and problem-solving approaches, this perhaps lacks the wider consideration as to the role of these facilities in the wider urban system. Perhaps we need to re-assess how these micro-locations are part of a broader system—and how, perhaps in the longer term, we might achieve a sustained reduction in crime and fear of crime using this systems-based approach. After all, these facilities are not perceived as unsafe at all times of the day by all their users.

In risky places, fear of crime is a systemic response influenced by a complex interplay of environmental, social, and individual factors. Importantly, systems thinking unveils the particulars of this phenomenon, revealing how elements such as location-specific threats, community dynamics, and personal experiences dynamically contribute to the mechanisms shaping

fear in these contexts. Consider fear of crime as a dynamic system with feedback loops. Systems thinking encourages identifying how changes in environmental features, individual characteristics, or societal factors can create feedback loops that either reinforce or alleviate the fear of crime. This supports the connection of CPTED and SCP (Chapter 3) to more complex social processes.

4.4 Similarities and Differences in Risky Facilities

We find evidence for this globally and for multiple types of facilities. Some key commonalities and differences have been identified.

Similarities

1. Location: They are usually located close to key central functions of a place, given that most businesses rely on customers, suppliers, and employees to optimize profits.
2. Opening and closing times: There is a strong temporal component at risky facilities, and often, crime occurs either during opening times or, as is the case for bars and clubs, in the immediate hour or two after premises close.
3. Access: Most risky facilities cannot be accessed outside of opening and closing times as they have controlled access.

Differences

1. Location: Some public services, such as schools and bus stops, are located to minimize travel time for all. Therefore, they are more driven by the size and location of residential communities than profit-driven business optimization.
2. Formal surveillance and guardianship: Facilities have very different levels of formal surveillance and guardianship. For example, banks and bars may have security guards and CCTV, which is less likely in libraries.
3. Access: At some facilities, for example, bus stops may not be controlled, and users can access the facility even when it is not in use, for example, a bus stop when there are no buses running.

While facilities like schools and public services share common features in terms of strategic location and operational timings, they exhibit significant differences in access controls and surveillance levels. These variations directly influence each facility's management practices and, consequently, susceptibility to crime, highlighting the interconnectedness and systemic nature of security needs across diverse settings.

4.5 Concluding Remarks

This chapter has reviewed what we know about a range of different types of risky facilities, including bars, libraries, schools, banks, and bus stops, both in urban and rural contexts. We have examined what we know about risk and concentration and how this disproportionality concentrates at a few facilities. We also discussed commonalities and differences in types of environments that make some facilities more of a target than others, including in rural contexts. We discussed how these facilities can be considered part of a broader system as key elements within risky places. Our discussion of fear demonstrates how the purpose of these facilities and perceptions can vary depending on the user's time of day and the purpose of the visit. Indeed, these facilities, in effect, serve the needs of the nearby communities, who travel to these facilities for various reasons. This lends itself to our broader consideration of interconnectedness. Most of the current crime prevention efforts aim to address the opportunities for crime in these facility settings, and action-oriented problem-solving approaches consider the immediate situation and seek to reduce opportunities for offending. However, we argue that we could and should go further and consider how to develop our prevention measures in a way that takes account of both the immediate situation and the broader system within which these risky facilities are embedded. These ideas are developed in Chapters 8 and 9.

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5

ANALYZING RISKY NODES

5.1 Introduction

In this chapter, we review the second of our three key 'elements' of risky places, namely risky nodes, and present several examples, including parks, stations, stadiums, public housing, and shopping centers. In Chapter 4, we provided an overview of risky facilities, and in Chapter 6, we will explore risky paths. Here, we consider a node to be a central function of an urban place that brings together a range of services and often contains multiple facilities. As stated in the previous chapter, what constitutes a large facility, or a node, is perhaps not strictly defined in the literature. Hence, we have included bus stops in Chapter 4 (facilities) and transport stations in Chapter 5 (nodes). We do not offer these as rigid classifications and suggest the boundaries can be defined at different scales or defined by the system under consideration (Chapter 3).

We explore potential reasons for disproportionate crime levels at a small proportion of nodes, like the analysis of risky facilities in Chapter 4. Why does only a small proportion of one type of node account for most of the crime problems experienced by all nodes of that type? We consider examples from the Global North and Global South, as well as urban and rural areas. Mismatches between crime and fear of crime are also discussed when risky nodes are perceived as safe places. We also explore the impact of digitalization, which creates forms of interaction between the physical and cyber environments, resulting in new crime opportunities, by comparing across a range of different contexts. We can identify commonalities and differences, including types of environments, users, available services or products, and crime's spatial and temporal contexts at these nodes.

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At the end of the chapter, we identify some of the similarities and differences between risky nodes, and these can be seen to overlap with those of risky facilities in the previous chapter—and, indeed, risky pathways in the next chapter. Risky facilities, risky nodes, and places may be defined as systems in themselves but can also be considered part of a broader system. We should consider the interconnectedness of these elements, their purpose, and their role in shaping the behavior and characteristics of the system.

This chapter includes a description of these risky nodes, and where feasible, we try to discuss each of the points for each facility type:

1. The overall distribution of crime events in these risky notes is evidence of crime concentration and/or the search for 80/20, but its applicability to places around the world.
2. The temporal variations of crime events, for example, a cold spot can become hot depending on the time of day or day of the week.
3. The context of these nodes, namely, what the functions of that place are, what types of land use are present, how the land is used, and the types of activities individuals perform at times and places at or near these settings.

5.2 Examples of Risky Facilities

In this section, we provide an overview of what we know about selected risky nodes and crime by considering parks, rail stations, stadiums, shopping centers, nighttime entertainment districts, public housing, and educational campuses. This is not a comprehensive set of risky node types, but we use these to demonstrate the diversity of issues present at these nodes where people converge.

Parks

Parks, like many other types of green areas, are often seen as a source of recreation and aesthetic experiences that contribute to human health (Chiesura, 2004). Recent evidence also shows that being under and around tree coverage is associated with violence, property crimes, gun assault, and total crime (Ye et al., 2018). Green areas vary in function, size, and location, and therefore, their criminogenic conditions may differ (Iqbal & Ceccato, 2015a). Some parks may cause problems such as litter and disorder. In contrast, others may experience more serious crimes such as drugs, robbery, and rape (Troyer & Wright, 1985), impacting the overall housing market (Iqbal & Ceccato, 2015b).

There is not extensive evidence of the Pareto principles being evident at parks, but Walker (2022) shows that a small proportion of parks are responsible for a large proportion of recorded crime and police incidents in a study in a city in the UK. The author shows that 3.6% of parks contributed to 31.1% of crime, 8.9% of parks contributed to 52.1% of crime, and 30.4% of parks contributed to 80.7% of crime.

Green areas can be nodes or areas for walking between different places where people spend time. Crime Pattern Theory (Chapter 3) suggests offenders become familiar with places they travel to for work, leisure, and recreation and the paths they move along between these activities. These nodes and paths constitute an offender's awareness space, and it is within or on the edge of this space that they are most likely to commit a crime. Parks are often open at all times of day, although some have security fencing and man-made perimeters and restrict access at night. Haberman and Ratcliffe (2015) found that parks in Philadelphia were open all day but perhaps were not always used. They found that most street robberies, for example, occurred during the daytime.

Feelings of safety in public parks can also be influenced by the time of day and season, especially in northern Europe, with different daylight hours between summer and winter. In Poland, for example, park users feel safer during the day than at night, but their safety depends on users gender and age. Women tend to report more fear of crime than men in these settings, both in the Global North (Madge, 1997) and Global South (Shackleton et al., 2015). In Vilnius, Lithuania, Ceccato and Hanson (2013) identified that certain groups did not feel safe in the park, for example, the elderly, parents with young children, and young people, especially in the evenings and during the dark months of the year. Appropriate lighting and video surveillance positively impact perceptions of safety while vandalism, the presence of homeless people, and alcohol consumption in the park increase fear (Bogacka, 2020). Maintenance of green areas and parks plays an important role when it comes to the relationship between green areas and crime, and well-managed spaces can have lower levels of crime and increased feelings of safety (Branas et al., 2011; Heinze et al., 2018).

When considering crime prevention interventions in parks, an important issue is who has a right to use and feel/be safe in public parks. This can pose some challenges for governance. Parks are like several public places as they concentrate groups of individuals who are often perceived by some people as 'a safety concern.' Examples include homeless people, individuals who consume alcohol, and drug users. In Stockholm, Sweden, Knutsson (1997) explored the use of police tactics to reduce drug activity and 'illegitimate users' of parks. In Australia, Gray and Novacevski (2015) examined the use of 'inclusive architecture' and highlighted that public discourse combined with 'poor

architecture' can promote a culture of fear, anxiety, and suspicion. In the UK (Barker & Fox, 2023), there has been a drive to co-produce crime prevention with the users of parks, including women and girls. We explore the systems thinking approach to 'involving beneficiaries' in Chapters 7–9.

In rural areas, parks often have lower footfall and monitoring than urban areas. Therefore, they can sometimes feel less safe, especially for women (Ceccato et al., 2024). In many countries, these focal points are popular venues for local events, including festivals and fairs, where alcohol and/or drugs might lead to crime and disorder.

Parks can be considered as a node, but they could also be considered as a place with multiple facilities. As Newton (2018, 507) suggests, they

> may contain: playing fields; children's play areas; restaurants or cafés; tennis courts, and basketball courts. Each of these could be classed as a facility within a larger super-facility [or node], and the activities at each may conflict or even compete. The park may be a crime generator, bringing lots of people together. However, within the actual park itself, there may be smaller subsets or components that have a reputation as a place to offend, such as an individual kiosk.

The complexities are evident within parks as places of convergence, suggesting why they could be considered a system on their own. Park users are interconnected with each other and with the physical and social aspects of the park environment. By planning and modifying public spaces with design principles that reduce crime opportunities, a systems approach can promote security while considering the diverse dynamics at play in these public places.

Stations

A station as a transport node is reflective of the dynamics of the broader urban systems that it is part of. It reflects the 'routine activities' and 'lifestyles' of people (see Chapter 3) regulated by rhythmic movement, which influences the scheduling of trains and other means of transport. Stations have been identified as both crime attractors and crime generators (see Chapter 3). They represent 'people generators' where large numbers of people converge, which in turn may generate an unplanned opportunity for offending (Newton, 2018). They may also be an attractor of crime, such as a well-known place that is conducive to pickpocketing. Stations have also been explored as possible radiators and or absorbers of crime (see Chapter 3). These can pull in and absorb crime from surrounding areas or push out and radiate crime from a central node to the surroundings.

The types of interaction a station has with its surroundings will determine its nature as a criminogenic place. Crime rates and travelers' safety at stations vary over time and space because of the station's physical and social environmental attributes, characteristics of local neighborhoods and nearby environments, and the relative position of the station on the network (Ceccato et al., 2011; Newton, 2018).

Studies have found evidence of crime being disproportionately concentrated at stations. In Stockholm, 62% of all offenses reported to the police take place within a 500-meter radius of a subway station, which equates to one-third of the municipality's area. The area near a station often has mixed land use, for example, where bars, restaurants, and transport nodes interconnect. Population density and residential mobility also influence crime at stations. The highest incidence of crime is at stations near the center of Stockholm, but when passengers are accounted for, the rates in the center are low compared to periphery stations. Most recorded incidents (88%) were for 'social disorder,' non-violent acts such as consumption of alcohol, being drunk/under the influence, toll evasion, jumping barriers, and smoking. Crime accounts for 12% of incidents (Ceccato & Attig, 2020).

Evidence from Canada indicates that a small proportion of offenders are responsible for most incidents in the mass transit system. The study also revealed that 16.3% of transit stations experienced half of all recorded incidents. Specifically, 22% of offenders caused 78% of all incidents, while 3.6% were responsible for half of the total incidents, and 5% accounted for half of the harm caused. The consistency in crime and harm patterns across different metrics suggests that in environments with low crime and harm, 'hot spots' of crime are essentially equivalent to 'harm spots' (Ottaro, 2024).

There are distinct spatial and temporal patterns evident. For example, violence tends to be late at night, property crimes during the afternoon, and vandalism during the early evening (Ceccato et al., 2013; Ceccato & Uittenbogaard, 2014). During off-peak hours, crime occurs in larger, peripheral stations with hiding spots in the lobby area and the presence of drunken people, and without many other people around. For peak hours, overcrowding in transition areas of the station affects crime: higher numbers of people at stations tend to be associated with greater crime levels. There are variations by crime type and season as well (Ceccato et al., 2011). For example, for violent crimes during holidays, variables such as peripheral stations, stations with cash machines, crowded stations, and the presence of social disorder are significant. In the winter, when violence rates are highest, violent acts take place in open stations with many hidden corners and littering. During the spring, higher crime rates are related to stations with alcohol stores nearby but unexpectedly to stations with fewer hiding spots. In Stockholm,

stations with either high or low crime and severity rates tended to maintain their status over time (Ceccato et al., 2013; Ceccato & Attig, 2020). These findings were confirmed by Ottaro (2024).

We also find similar spatio-temporal patterns in the Global South. In São Paulo, sexual violence was concentrated at the busiest central stations. It often takes place during the morning and afternoon rush hours and at stations that also attract violence and public disorder (Ceccato & Paz, 2017). This temporal consistency in transit safety (day/evening) was also indicated by the global study on sexual harassment coordinated by Ceccato and Loukaitou-Sideris (2020).

Another comparative study between the Global North and Global South compared Stockholm and São Paulo's metro systems Ceccato (2018). This found that for both metro systems, opportunities for crime depend on environmental attributes, the type of neighborhood in which they are located, and city context, but that local context was also relevant. Table 5.1 summarizes some of the key factors that influence the criminogenic nature of these nodes. The position of the station on the network, nearby land use types, and internal design strongly influence crime levels.

Fear and perceived risk at stations also vary over time. Several studies confirm that such fear intensifies after dark (Smith & Cornish, 2006). Women often list unstaffed stations among the places that cause fear, whereas peak-hour ridership is positively and significantly related to males' perceived subway safety. For women, there is a risk of sexual crimes at peak hours, such as groping or harassment (Ceccato and Loukaitou-Sideris, 2020). Using the 2008 Stockholm Safety Survey, cluster analysis reveals geographic patterns of perceived safety at stations among foreign-born persons, women, the elderly, and youth (Ceccato, 2013). Notably, both foreign-born persons and women primarily feel unsafe in Stockholm's northwest area (Figure 5.1).

Systems thinking emphasizes that interventions should be viewed as dynamic elements within a larger system. Interventions must be defined

TABLE 5.1 Characteristics of the stations, neighborhood surroundings, and city context.

Stockholm metro	*São Paulo metro*
Objects hindering visibility/ surveillance	Presence of dark corners
Comers, hiding places	Numbers of CCTVs, larger stations
Number of platforms, larger stations	Visible physical and social deterioration
Few people around stations	Peripheral/central stations
Peripheral/central stations	Proximity to bicycle storage
Fewer police stations	Commercial, restaurants
Residential mobility	Surrounded by affluent neighborhoods

Source: Adapted from Ceccato (2013) and Ceccato and Paz (2017).

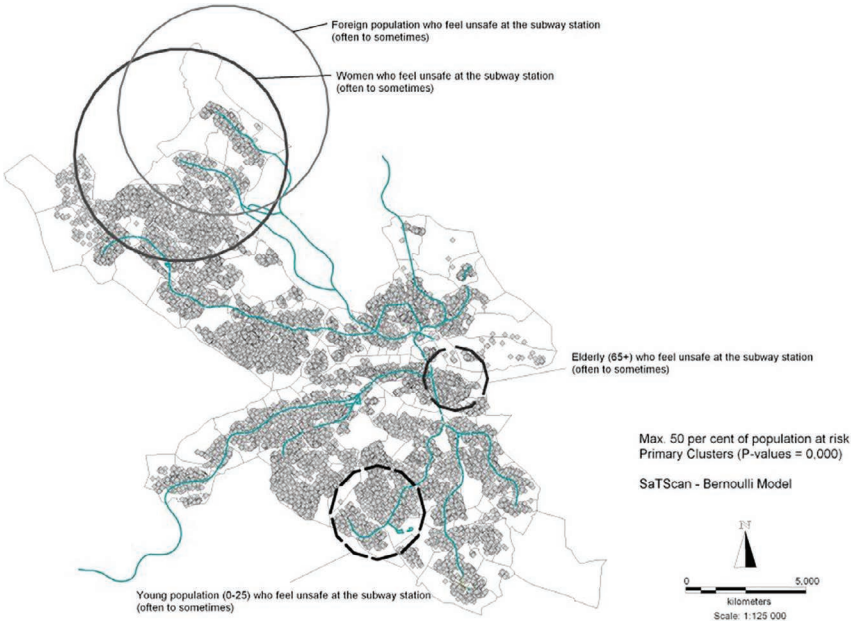


FIGURE 5.1 Clusters of subway stations perceived as unsafe by selected groups of respondents: women, foreign-born, youth, and elderly.

Source: Ceccato (2013, p. 105).

as a function of crime type and location, and no solution will fit all safety problems at stations. However, there will be some common problems. Different stations will have their unique structure, user demographics, and crime profiles. Systems thinking encourages the understanding that solutions must be tailored to the context of each system. Crime prevention interventions must be informed by evidence from specific local conditions of each transit system for different types of offenses and a range of users. Current prevention measures several challenges, including problems with cooperation between actors and the lack of focus on users' needs, particularly from the perspective of gender, age, and disability. A range of preventative measures is discussed by Ceccato (2013), Ceccato and Newton (2015), and Ceccato and Loukaitou-Sideris (2020).

Stadiums

In this chapter, we consider stadiums as a node rather than a facility due to their complexity and the multi-functional purpose of stadiums, including sporting events, music events, conferences, and other events. A feature of stadiums is that they hold events on an episodic basis and, therefore,

during the year, are not open on a regular periodic basis. There may be weekly events such as a team sports fixture, although this can vary and generally only runs for part of the year. Moreover, they can often hold several thousand people together in a relatively small space and thus can have a large-scale impact on their surrounding environments. Traditional stadiums may be 50–100 years old and can be found within local communities, such as long-standing football and cricket grounds in the UK. However, with the demand for ever-growing capacities of stadiums, the infrastructure needed to support this, including transport and parking, has led to a growth of new out-of-town and very large stadiums (50,000 people plus capacity), or even the relocation of sporting teams from older stadiums to new out of town stadiums. Given their scale and episodic event nature, we consider stadiums here to be risky nodes, although they have been termed super or mega facilities (Kurland et al., 2014, 2018; Newton, 2018; Kurland & Johnson, 2021).

Place-based research into crime patterns at stadiums is generally not carried out by comparing crime concentrations across sporting stadiums within a city or urban space. One of the reasons for this is that cities may typically have only two or three stadiums, and therefore, identifying concentrations using the Pareto principles is not appropriate. Most studies have explored crime in and around stadiums, with a particular focus on the timing of crime events and comparing crime patterns between when a venue is open and when it is closed. This is not surprising given the number of people who attend sporting and music events in large capacity venues, as the usual 'resident' population is changed considerably on match/concert days.

Spatial studies of crime at stadiums tend to focus on crime that occurs around the stadiums rather than inside them. Given the large policing and security presence that happens inside and directly outside of these events, this is perhaps unsurprising. Studies also explore the 'magnitude' of stadiums' influence on crime when sporting events take place. Given the number of people they generate, this has a large influence on shifting the dynamics of daily mobility patterns and crime opportunities. This convergence is another reason why we have classed stadiums as nodes rather than facilities, as a large sporting event or concert may have a greater influence on nearby crimes than other smaller risky facilities, as discussed in Chapter 5. We would expect this to influence both scale, number of offenses, and range; in other words, how far away from stadiums a sporting event might have influence.

There have been several studies in the USA and Europe that explore how the impact of stadiums shifts the temporal nature of crime near a stadium across Europe (Kurland & Johnson, 2021), North America (Kurland, 2019), and the Global South (Ge et al., 2021). Figure 5.2 is from a study in São Paulo, Brazil (Rodrigues, 2023), which found elevated

FIGURE 5.2 Satellite image and crime density map showing the area surrounding the football stadium and metro station in São Paulo, Brazil.

Source: Rodrigues (2023, p. 97).

levels of theft and robbery during stadium events. A consistent finding across all these studies was elevated crime levels on 'match days' when sporting events were taking place. This included pickpocketing and theft, robbery, 'disorder' type offenses, and violence and assault. There was evidence of increased offenses the hour before the event started and two to three hours after. Key explanations can be drawn from routine activity theory and lifestyle theory/time geography (see Chapter 3). Before the event starts, there is a steady build-up of people arriving and congregating outside, and then they are queuing to move inside the venue through a limited number of entrances. There are stops in pedestrian flows where tickets are checked, and sometimes bags are searched. After the event, there was a slow dispersal of people from the stadiums. It is this time, pre- and post-sporting and music concerts, that offer the greatest opportunities for offending.

Kurland (2019) pose an interesting hypothesis here—are these offenses mostly crime generators, mostly crime attractors, or a combination of both (see Chapter 3)? They conclude that the episodic nature of these events is likely to be crime-generating rather than crime-attracting. Newton (2018) asks a similar question about stadiums, parks, and stations. Whilst these were also often crime generating, crime type and type of day are important, and at times, these nodes may be crime generators, crime attractors, or even both. Ristea et al. (2018) used spatial analysis and data mining of social media posts near stadiums to identify a significantly significant spatial relationship between crime and Twitter posts, which held for criminal damage, theft and handling, and violence.

Kurland and Johnson (2021) identify that rather than being limited to the immediate vicinity of the football stadium, the influence of large events

can be quite substantial, and they identify changes to crime up to spreading to areas up to 2.5 km away. This effect exceeds what would be expected due to chance and was observed in all study sites for disorder and four of five study sites for crime. They explore the impact of a range of environmental variables close to stadiums on crime. They demonstrate an interaction between a stadium and its surrounding facilities, which reminds us that a stadium is only one element of a system. They explored the locations of pubs and fast-food takeaways near stations. They used these as a proxy for the likely flow or movement of people to and from stadiums, given that people often eat or have a drink before or after a sporting event. They found that crime on match days was elevated, and increased pedestrian flow was estimated to originate from bars and takeaways. By contrast, this was not found for rail stations, the likely explanation being that there was a heavy police presence and guardianship of supporters traveling by rail. The time of arriving trains was known, and spectators and fans were 'funneled' to the stadium, and their movement was restricted to limited routes between the station and the stadium. We consider concepts of risky pathways in more detail in Chapter 6.

Systems thinking can enhance our understanding of crime at stadiums in several ways. One example might be to seek to identify feedback loops; for instance, crowd management strategies can impact the behavior of spectators, which in turn influences security measures. The heavy police and security presence outside of stations, as well as the management of spectators and crowds between major transport hubs and stadiums, are examples of this. Systems thinking encourages understanding these dynamic relationships to implement effective crime prevention measures. Systems thinking involves analyzing how changes in one factor may affect the entire system and contribute to crime trends.

Nighttime Entertainment Zones

In Chapter 4, we have examined how pubs and clubs can be considered risky facilities. However, these are often not located in isolation, particularly in large urban spaces, and indeed, they tend to be co-located to maximize profit based on agglomeration economies. Therefore, in urban areas, nighttime entertainment may occur in planned segmented places, or may have developed through an informal and less regulated growth close to the central business district. These can be found internationally, for example, in the USA (Campo & Ryan, 2008, p. 291) who discuss how entertainment zones in mid- and large-size US downtown areas have tended to occupy "old older vernacular buildings in marginal areas of downtown, the bars, cafes, restaurants, nightclubs and performance spaces of EZs

have developed largely without the large-scale design, planning, government action or subsidy common in formal urban entertainment districts." Hobbs et al. (2000) discuss the emergence of nighttime economies globally due to a change in the development of industrial and post-industrial economies and a shift in urban governance from providing traditional managerial services to supporting a more entrepreneurial profit-driven model of economic growth. Shaw (2014) suggests there is an overrepresentation of studies that consider the nighttime economy as bars, pubs, and clubs. Indeed, when considering risky facilities, these nighttime urban areas may include restaurants, convenience stores that sell alcohol, casinos, theaters, adult entertainment, other live entertainment, and even late-night shops, salons, and barbers. Moreover, there is a need for transport provisions, including rail, bus, tram, taxi ranks, and often late-night takeaway food premises. This mix of business owners and customers creates a diverse setting, including employees across this range of services and businesses.

van Liempt et al. (2015) explore the geographies of the urban night and ask what makes the night so different from the day. Whilst obvious explanations are focused on the absence of daylight, we need to consider broader factors such as a more relaxed permissive social atmosphere than the daytime, although, for some users, nighttime brings emotions such as pleasure, excitement, fear, and distress. Shaw (2014, 87) examines this from the perspective of taxi drivers and street cleaners and reviews the broader functions of urban night, suggesting urban night spaces as an "affective atmosphere, emerging from the arranging of practices, bodies and materials' which he terms 'placed assemblage." This broader perspective lends itself to a systems-thinking approach, which we return to later in this section.

There is a large body of evidence of concentrations of crime in nighttime urban spaces as risky places, what we consider a risky node due to the diversity and complexity of these settings. Crime has been shown to cluster both in space and time, particularly in areas with concentrations of premises serving alcohol, and on Friday and Saturday evenings between 11 pm and 3 am. The literature here is vast, and we only highlight a flavor of it. Several studies have explored disproportionate crime levels in nighttime entertainment areas, with peak hours on Fridays and Saturdays in the late evening and early morning. Newton (2015) identifies spatial and temporal clusters of multiple crime types, including violence, disorder, criminal damage, and drug possession in nighttime zones in an English city. Townsley et al. (2014) identify similar concentrations and patterns of crime in Australia, and these have also been found in New Zealand and the USA (Groff & Lockwood, 2014).

Whilst many of these studies are cross-sectional, there is longitudinal evidence of sustained trends. Livingston (2011) explored the relationship between alcohol outlet density and crime over a 14-year period in Australia, finding evidence of a positive relationship between alcohol outlet density and violence. There is also some variation regarding premises that sell alcohol on and off trade. Lightowlers et al. (2023) explored patterns of crime across premises in nighttime economy areas. They revealed these patterns to be consistent for premises that sold alcohol for on-premise consumption and those that sold for off-premise consumption. A systematic review by Gmel et al. (2016) examined the relationship between alcohol outlet density and harm using 65 eligible studies from an original 420 studies that identified and found a positive relationship between alcohol outlet density and harm (including violence and crime). However, the authors also state that studies aggregating outlet density highlight that aggregations of premises have limited value, given the variation in types of licensed premises. These include the size and capacity of a premise, trading hours, entrance and exit policies, staffing and training, whether sports or live events are shown, whether music is played, and whether table service is offered.

The governance of nighttime entertainment spaces has received considerable attention in academic literature, especially in terms of how to reduce and prevent crime and harm around these concentrations of nighttime venues. We highlighted some of the policies focused on improving the management of individual facilities (for example, better place management of bars) in Chapter 5. However, whilst these individual facilities are privately owned, the broad range of provisions offered in nighttime entertainment zones has led to policies and strategies to target these areas from a broader perspective. Again, the literature here is extensive, and we offer some reflections on some of the key types of strategies that have been implemented. Several cities and countries have attempted to limit the availability and amount of alcohol consumed using restricted trading hours available when granting licenses to sell alcohol. These policies have been introduced in various cities, including Australia, Canada, the Netherlands, Brazil, Russia, Lithuania, and New Zealand. Studies have demonstrated some success in reducing crime rates, although these locations are still focal points for crime and disorder. A variation here applied in the UK was to extend trading hours to try and create staggered closing hours, and the impact of this policy is discussed in more detail as a case study in Chapter 7. Alternative policies include saturation policies that seek to reduce the density of licensed premises within a defined geographical size; lockouts or one-way doors (not allowing persons to move from one venue to another after a certain time); minimum unit pricing and higher

pricing; patron bans to present identified individuals entering all premises in an area; and drink promotion restrictions, for example blanket bans on 'happy hours' or restricting the strength of alcoholic beverages served after a particular time (Taylor et al., 2018).

Systems thinking can support our understanding of crime at risky entertainment nodes in several ways. For example, when policies are introduced to increase the price of alcohol, a potential feedback loop is an increase in pre-loading, whereby patrons tend to consume higher levels of alcohol before they visit nighttime entertainment centers. Alternatively, patrons may try to smuggle alcohol into the venue (for example, vodka or other spirits) to add to drinks purchased within the premises. Venues may then have to monitor intoxicated persons who have pre-loaded from trying to enter the premises, which can result in confrontation, aggression, and potential violence and harm outside of the premises. It also places a burden on transport authorities if intoxicated persons pre-load and use public transport to travel into nighttime entertainment zones. In the UK, the introduction of extended trading hours impacted policing, as some police forces had to respond to this policy by changing officer shift patterns and the hours they worked, which had knock-on consequences for their broader response to resource allocation outside of nighttime entertainment zones.

Shopping Centers

Shopping centers attract thousands of shoppers who visit their premises each day, bringing large amounts of cash and credit cards and then leaving with valuable products, which makes them attractive to offenders. Shopping centers can experience a high number of crime incidents due to their context. They are often linked to major transportation hubs and represent places of convergence with multiple opportunities for offending. Large shopping centers can be considered to have their own ecosystem, from internal paths and corridors to stairs and elevators, from stores, bathrooms, cinemas, and restaurants. Indeed, like other large-scale nodes in this chapter, they could be examined as a system within their own right.

In a Swedish shopping center, Ceccato et al. (2018) found that 64% of all crimes occurred in 10% of the establishments/areas in the shopping center, particularly the food court, two fast food restaurants, and two entrances (Figure 5.3). The most frequent crime incidents were public disorder and vandalism (68%), which mainly took place in the food court; violence and threats (16%), mostly around entrances and bars; and shoplifting (16%). Visitors generally felt safe (85%), although entrances and some shops were identified as unsafe. As with other types of nodes, crime varied by type of crime and time of day. Crimes peaked at 2 pm and then in the early

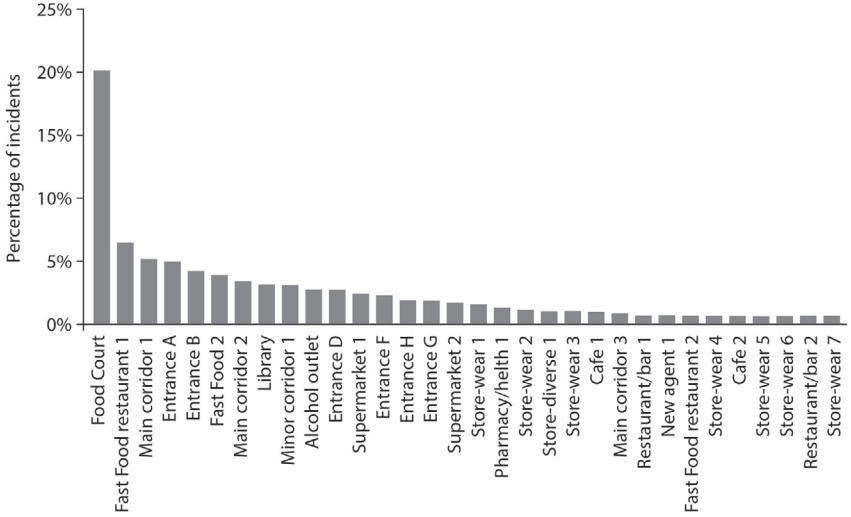


FIGURE 5.3 Safety incidents in a shopping center in Stockholm, Sweden, 2017. N = 5,010, 86% of events were mapped out of 5,768.

Source: Authors.

evening. Violence, vandalism, and disorder peaked between 6 and 8 pm. There is a sharp drop after 10 pm. These peaks can be linked to routine activities and lifestyle theory (see Chapter 3).

Following previous research (Maxfield, 1984), visitors who frequently visit the shopping center and are more familiar with them feel safer than infrequent shoppers. Although shoplifting was the most common type of crime witnessed by shopping visitors, followed by violence, serious robberies against stores were often pointed out as a source of fear. Visitors' perceptions are formed by serious incidents that happen in jewelry and electronic stores and not by minor events at entrances or food courts, such as public disturbances. Fear is triggered by the process of othering, or 'fear of others' (Sandercock, 2005). Homeless people blocking entrances, drug/alcohol addicts, and noisy youth trigger feelings of worry. Moreover, shopping center visitors adopt behavior avoidance, either by avoiding certain areas in the shopping mall or, more often, at certain times of the day, such as late evening hours.

Good planning and well-considered practices can increase the odds that major retail environments, such as shopping centers, are safe for both visitors and personnel. Kajalo and Lindblom (2016) in Finland suggest that visitors have different preferences regarding the improvement of safety conditions in the context of shopping malls: surveillance, anonymity reduction

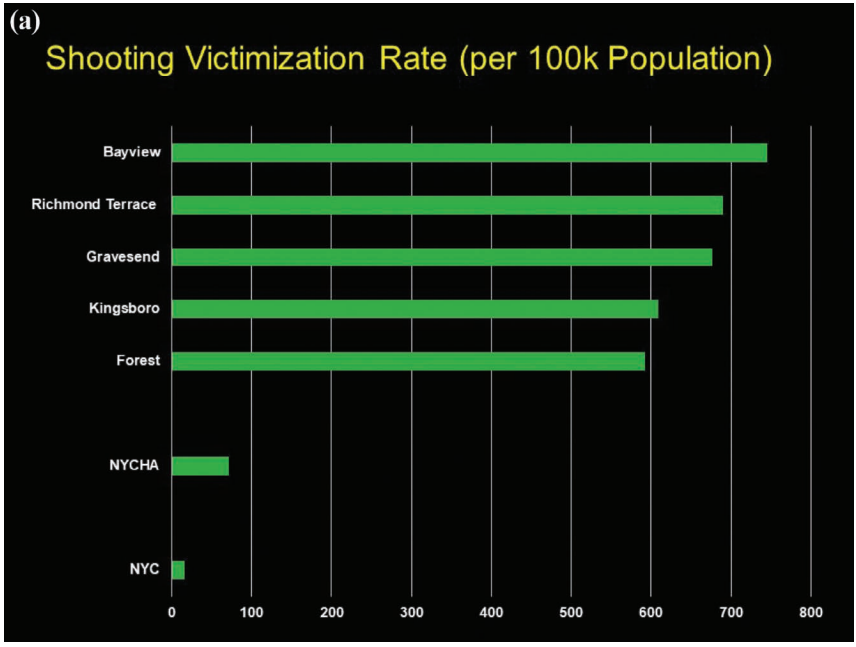
measures, and target hardening. However, these groups do not differ in all respects. Most suggestions relate to improving formal and informal surveillance (by implementing CCTV cameras, security guards, entrance hosts, no physical barriers and disruption in the field of view, staff in toilets).

Systems thinking involves considering the broader impact of implementing these preferences. It is important to recognize the interconnected preferences of visitors regarding safety improvements. Measures like surveillance, anonymity reduction, and target hardening are interrelated and may influence each other. Shopping centers should be viewed as 'holistic' systems incorporating physical infrastructure, security measures, personnel, and visitor behavior. Systems thinking emphasizes understanding the interdependencies among these elements and their collective impact on the safety of the shopping model, its parts, and the surrounding areas.

Public Housing and Educational Campuses

In the United States, Clarke and Bichler-Robertson (1998) found that two apartment properties owned by one landlord had an annual average service visit that was two to three times that of the other apartment properties owned by that landlord. Eck and Wartell (1998) believe that if the residents are not inclined to engage in disruptive behavior and if no one informs the residents that the behavior is disruptive to harmony and peace, the problem can only escalate. In another study in the USA, Rephann (2009) found that a small percentage of rental properties generate most crime incidents for drugs, assault, and social disorder. Rephann (2009) also shows that the distance that the owner lives from the rental property and the size of the rental property stock affect crime incidents. These results support the view that crime in apartment buildings is strongly influenced by management and that poorly managed apartments can contribute to crime and problems of disorder. International research has identified important factors that lead to the emergence of crime concentration in residential areas.

Herrmann (2021) points out that certain residential areas, especially public housing developments, are particularly plagued by gang violence, often associated with drug-related activities. In these locales, the rates of shooting victimization can reach levels up to 90 times higher than the citywide average, disproportionately affecting ethnic minorities. These severe disparities mark these public housing developments as some of the 'riskiest places' in NYC. Drawing parallels between NYC and Swedish cities like Stockholm, Malmö, and Gothenburg (Sturup et al., 2020), it becomes evident that certain urban areas worldwide, beset by socio-economic challenges and spatial segregation, emerge as centers for violent offending, particularly gang-related and drug-fueled violence. Figure 5.4 illustrates the



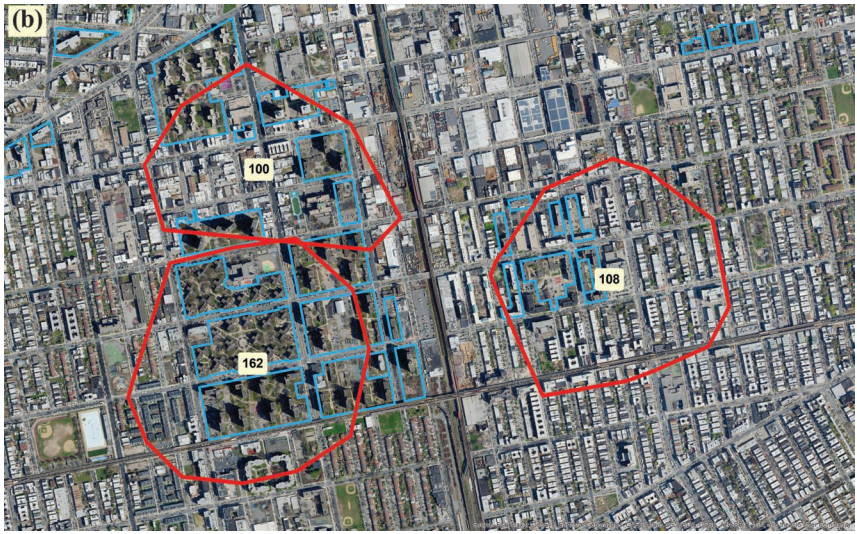


FIGURE 5.4 Shootings in NYC public housing in relation to NYC's average (a). More than 100 cases of gun violence in small areas in NYC public housing (b).

Source: Herrmann (2021, n.p.), at https://play.kth.se/media/Risky+places+%26+public+housingA+Gun+violence+in+NYC+by+Dr.+Christopher+Herrmann./0_nhxiycsz/353618.

concentration of gang violence in NYC public housing. Despite the reduction of crime in large cities in early pandemic crimes, cities such as NYC, São Paulo, and Stockholm, gun violence continues to be concentrated in these highly violent areas (Ceccato et al., 2022).

Systems thinking can be used to design interventions, considering the broader community dynamics influenced by these housing areas, including local businesses, transportation systems, and residential areas. A further step is to engage a diverse group of practitioners in the analysis and decision-making process, including stadium management, law enforcement, local businesses, and the community.

Safety issues on college campuses concern many individuals, including students, staff, and campus-based officials. Campus safety risks arise from a convergence of factors such as large, open spaces and limited security measures. Social events and parties, often marked by alcohol consumption, challenge crowd control and monitoring behavior (Regehr et al., 2017). Fox and Hellman (1985) investigated components of the campus profile associated with elevated campus crime rates at over 200 US institutions. They identified strong correlations between crime rates and campus size, low academic quality, and, notably, the campus location's link to the proportion of violent crime. This study provides an updated and expanded analysis, examining crime on 543 campuses and incorporating a broader range of variables. Sloan (1994) analyzed the correlates of crime at over 500 college and university campuses in the United States and found that crime predominantly involves theft on campuses rather than serious violence. They also found that the size of the campus was related to thefts/burglaries and total crime but inversely related to drinking/drug offenses and vandalism. More recently, Jacobsen (2017) found that campuses characterized by heightened security measures and a male-dominated enrollment tend to exhibit elevated reports of violent crime. Conversely, campuses with increased security measures and a higher proportion of women enrolled demonstrate a lower incidence of violent crime reports.

Crime and fear do not happen at random on campuses. More interestingly, some places on campus do not attract crime but are perceived as unsafe, with problems of violence, property crime, and accidents (Figure 5.5). Using reports of safety perceptions of university students (N= 196 university students), Huang et al. (2022) studied the perception of safety, focusing on the risk of crime and traffic incidents on university campuses in South China. They showed that safety perceptions were affected by lighting conditions, the presence of other people, the installation of CCTV, and the mix of vehicles and pedestrians. They suggest that enhancing the walkability and visibility of insecure areas is crucial for fostering natural surveillance and establishing a secure, welcoming university campus. Students often identify unsafe locations near the campus but beyond its official boundaries, underscoring the significance of a comprehensive 'whole journey approach' in safety planning. They propose a systemic

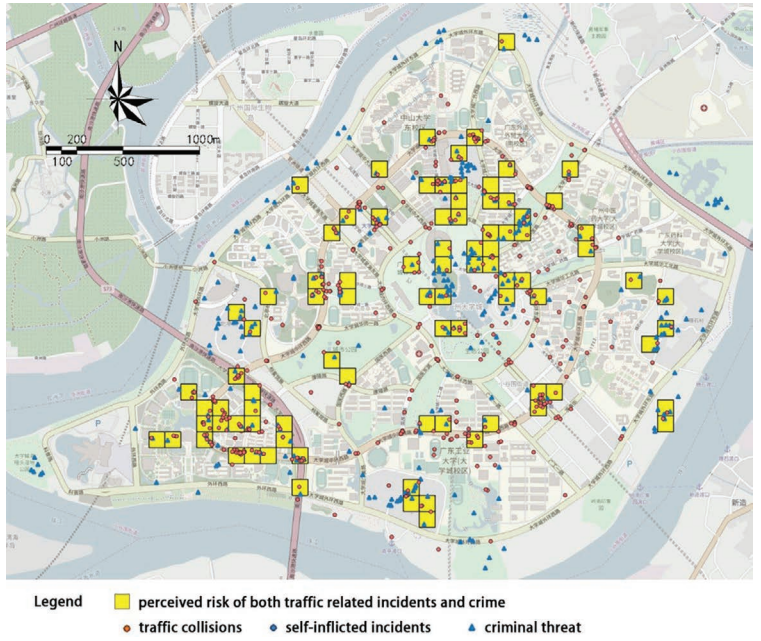


FIGURE 5.5 Overlap of declared unsafe places of traffic-related incidents and crime according to students on the university campuses in South China, N = 798.

Source: Huang et al. (2022, p. 277).

approach to students' safety concerns. Collaboration among practitioners, including those providing essential campus services to students, is essential. They also call for coordinated efforts with housing companies, transportation operators, the municipality, and law enforcement to address the safety concerns of students more effectively. Extending the focus beyond the campus borders, this approach seeks to create a safer and more inclusive university environment, promoting students' well-being and the community's overall vibrancy.

In Nigeria, Badiora (2017) found significant differences in crime perceptions and feelings of safety between on and off-campus areas, particularly among male and female students. Approximately 70% of women reported avoidance behaviors, compared to 20% of men. Recommendations include enhancing visibility and implementing more effective security measures to address campus security issues.

5.3 User Perspectives on Risky Nodes

From a systems thinking perspective, it is important to consider the perspective of the 'beneficiaries' (Chapter 2) of risky nodes, widening our

understanding of how users, owners, workers, and managers of places experience them. This may not just be physical space but also cyber-crime, linking nodes to the wider digital environment. We also explore fear of crime and perceptions of safety at risky nodes.

In May 2018 in Denmark, a distributed denial-of-service (DDoS) impacted the ticketing systems of DSB (Danske Statsbaner), a Danish rail passenger company, which prevented passengers from purchasing travel tickets at automatic ticket machines at stations, but also online applications and at manned ticket offices. It is estimated that this impacted 15,000 customers (Predescu et al., 2022). Another potential risk at rail stations and shopping centers is the risk of juice jacking, particularly for those with older versions of smartphones. This is an attack that generally uses public USB charging points, whereby either data is stolen via devices connected to USB ports or malware is installed on a user's device (Singh et al., 2022).

Stadiums are another risky node that is also susceptible to cybercrime. Today's stadiums are highly digitally connected for live streaming, CCTV monitoring, 5G, sensor devices, and a host of other technologies. Indeed, many modern stadiums could be considered smart stadiums (Wan et al., 2022). As a result, they are also open to a large range of potential cybercrimes. The National Cyber Security Centre in the UK identified that sports stadiums hosting major events could be susceptible to 'spear phishing' and 'ticketing scams.' It is estimated that the 2018 Winter Olympics in South Korea was subject to 12 million cyber-attacks per day. Whilst not all at stadiums/events, this demonstrates the scale of the problem and the interconnectedness of these nodes to a large, wide-scale system. At the Qatar Football World Cup, Microsoft monitored over 100,000 endpoints, 144,000 identities, 14.6 million email flows, and 4.35 billion network connections. There is, therefore, a large potential for these to be insecure, given the scale of digital activity occurring.

These examples demonstrate how a systems thinking approach lets us reconsider the connectedness and boundaries of risky nodes, as well as their role within the wider digital environment. In the previous chapter, we highlighted how the Internet might impact the drug market in rural areas by opening new methods of communication and sales. Indeed, the traditional concept of open-air drug markets where frequent drug sale meetups are concentrated in urban spaces and previously shown as a risky node for crime (Rengert et al., 2005) is less prevalent as the system has expanded into the cyber world.

Building on the discussion of fear of crime at risky facilities in the previous chapter, we now switch attention to nodes. As a reminder, we know the fear of crime is influenced by the individual characteristics of a person and the physical environment of a place, and these will vary across risky facilities, nodes, and pathways. However, this section focused on why risky nodes might be an important driver of fear in places. Indeed, from victimization surveys, nodes are often some of the most places for fear of crime, and parks, the nighttime

economy, shopping malls, and transport hubs, for example, are frequently cited as places where people feel unsafe. Places in residential areas can also be perceived as risky places. Residents of a neighborhood may perceive sections of it as more dangerous than those living there, especially near the commercial center and transport hubs. Ceccato and Snickars (2000) highlight the geographical differences between patterns of crime statistics and people's perception of safety in Stockholm. Ceccato and Lukyte (2011) explore how factors such as population density and anonymity, environmental design, familiarity, and media influence all contribute to a complex relationship between where crime happens and where people feel most at risk in risky places. This illustrates the importance of addressing crime and its perception to improve safety and ensure long-term sustainability, particularly in these risky nodes.

Nodes are often recognized as hot spots where fear of crime is heightened. Nasar and Fisher (1993) identified three key factors that contribute to this fear on university campuses: prospect, concealment, and boundedness. 'Prospect' refers to visibility within an area, and blocked prospects, such as blind spots and hidden areas, are more common in nodes due to their larger geographic size than smaller facilities. This can increase the likelihood of fear-inducing areas. The concept of 'concealment' also plays a role, as it provides offenders with anonymity, reduces the risk of being identified or captured, and allows more time to select targets. Additionally, 'boundedness' refers to the physical constraints on the boundaries of nodes, such as limited entrances and exits or restricted movement within the nodes, which can further intensify fear by reducing escape options. Together, these factors, prospect, concealment, and boundedness, can undermine effective guardianship in an area and increase the fear of crime.

From a systems perspective, nodes, such as parks and green areas are considered important functions of urban places for well-being and health and to encourage walkability. However, several studies identify parks and green spaces as places where women and the elderly feel unsafe, particularly at night. This is frequently linked to lighting and poor natural surveillance. However, perhaps one of the challenges here is that these spaces are often designed by males for daytime usage, and limited attention is given to the usability of these spaces for women and girls and or the safety of these spaces during the hours of darkness. Moreover, these green spaces often occur between facilities and nodes and often represent pathways and journeys, which are considered further in Chapter 6.

5.4 Similarities and Differences in Risky Nodes

This chapter has reviewed what we know about various types of risky nodes, including parks, stations, shopping malls, stadiums, public housing, and university campuses. We have examined what we know about risk and concentration. Some key commonalities and differences have been identified.

Similarities:

1. Location: Due to economies of agglomeration, there is often a clustering of business facilities, such as bars and restaurants or shops, in proximity. Therefore, risky nodes tend to be busy places that bring together many customers and users and can be considered people generators.
2. Opening times and busyness: Crime at risky nodes is often linked to peak times, which may be rhythmic. For example, transport hubs during morning and evening rush hour, especially on weekdays, and parks tend to be used after school and on weekends. Shops are also busiest at weekends and evenings.
3. Formal surveillance and guardianship: Risky nodes tend to have security guards and/or formal/informal policing, CCTV, or other formal surveillance.

Differences

1. Opening times and busyness: Some facilities have less regular opening times and usage—for example, stadiums are busy during sporting events and concerts, which are used more infrequently than other nodes.
2. Access: Some risky nodes, such as parks, urban shopping centers, or nighttime economy centers, can be accessed outside of opening hours. While some individual facilities cannot be entered, the general areas are accessible and not restricted. By comparison, some risky nodes, such as transport hubs, out-of-town shopping centers, and stadiums, are not accessible outside of opening hours.
3. Multi-purpose: Nodes tend to have a mix of different facilities, and they are, therefore, often multi-purpose with a range of different users and customers. They are also more likely to experience several crime types; for example, at transport nodes pickpocketing is more common at busy, congested times, whereas sexual assaults such as rape tend to happen at less congested times in more secluded areas within the nodes.

In summary, risky nodes such as parks, stations, and malls share common risks and characteristics. They are busy centers attracting large crowds, often due to the proximity of businesses like bars and shops. Crime typically peaks during busy times. However, differences exist; for example, stadiums are used sporadically compared to other nodes, affecting not only crime levels in these nodes but also in the areas where they are located. Additionally, these nodes serve multiple purposes, host various facilities, and are prone to different types of crime, from pickpocketing during congested times to more severe offenses in quieter areas. These differences affect the selection of the interventions needed in these nodes.

5.5 Concluding Remarks

We have reviewed how risky nodes can be considered key elements within risky places as part of a broader system. Our discussion of fear demonstrates how the purpose of these facilities and perceptions can vary depending on the user, the time of day, and the purpose of the visit. Indeed, these nodes serve the needs of nearby communities, who travel to these nodes for a range of reasons. This lends itself to our broader consideration of interconnectedness. Indeed, a node could be considered as a setting for multiple facilities. Most of the current crime prevention efforts are aimed at addressing the opportunities for crime that are present within these nodes, and action-oriented problem-solving approaches consider the immediate situation and seek to reduce opportunities for offending. However, we argue that we could and should go further and that we should seek to consider how to develop our prevention measures in a way that takes account of both the immediate situation and the broader system within which these risky nodes are embedded. These ideas are developed in Chapters 7–9.

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6

UNRAVELING RISKY PATHS AND JOURNEYS

6.1 Introduction

The basic building blocks of paths and journeys are street segments, and in this chapter, we consider risky streets as an element of risky places. A central tenet of systems thinking (Chapter 2) is interconnectedness. Risky facilities, risky nodes (Chapters 4 and 5), and risky streets should not be considered isolated settings distinct from their nearby environs. They connect and are connected to other nearby facilities, nodes, and streets through a series of connected corridors. These corridors can be considered key pathways and routes that form the mobility networks of urban centers and connect these to other nearby towns and cities. They also connect rural places.

Whilst not new, this reminds us of the concept of connected places, traditionally considered as physical connections such as roads and paths or even rivers and waterways. In today's modern society, we can also consider social and digital connections. The movements between these connected places are driven by urban mobility, the flows that connect communities with recreational and employment spaces in urban spaces. This chapter explores the current understanding of risky paths and how systems thinking can complement and add value to current approaches to crime reduction along risky pathways.

The reasons why people travel to and from facilities and nodes differ substantially; for example, consider trips taken by commuters, tourists, school children, shoppers, or for leisure. For each single-stage journey, there will be multiple individuals who have their own starting point, generally towards facilities and nodes, at which people eventually converge. However, there

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will be some commonality in the paths used on these journeys where individuals overlap. Travel can be via different modes of transport, for example, walking and cycling; public transport, including buses, trains, and trams; and by car or taxi. HGVs heavy goods vehicle and commercial vans are used for commercial business trips, and the growth of online shopping has necessitated growth in home delivery, or people will travel to convenient pick-up locations. Moreover, as we move towards smart cities, we may observe a growth of micro-mobility, for example, e-scooters and e-bikes, or even potentially autonomous vehicles, transporting both people and goods.

Urban mobility flow along paths is often bi-directional. For example, suppose a city has a centrally located CBD. In that case, people predominantly travel inwards to the city center for work and then outwards to more peripheral residential areas on their commute home at the end of the day. The quintessential example of this is from the Chicago School and Burgess (1925), who provided the concept of concentric zones, although travel distances and times would have been very different nearly 100 years ago. Felson and Boivin (2015) explore the notion of a 'funnel hypothesis' of crime. They identify that the daily movement of commuters and visitors to a city will have a major impact on violent and property crimes and that these daily spatiotemporal shifts may be more important for distributing crime across cities than fixed residential characteristics. This funneling is predominantly along key arterial routes along a city's existing pathways via well-trafficked paths. However, a CBD is not the only driver of urban flow. For example, the location of large schools, night-time economy nodes, large shopping malls, or stadiums may generate similar 'mobility funnels' or flows. Therefore, urban mobility can be considered as part of a network, with interlinkages at various levels.

Cities have been described as polycentric and monocentric (Figure 6.1) and are brought together through a series of primary arterial routes and secondary corridors (Rodrigue, 2020), in what is sometimes called the 'pulse' of an urban center. Indeed, the street network can be considered one of the fundamental elements of an urban space.

> The street network is one of the primary determinants of the configuration of cities: it is the substrate around which buildings and facilities are arranged, and it is the structure on which people move. As such, it provides a means to understand the organization of human activity, and to characterize particular places.
>
> *(Davies & Bowers, 2020, p. 798)*

The pathways between connected places are crucial for the connection of risky places to wider systems. Paths are also one of the key components of Crime Pattern Theory (Chapter 3) and are featured in Lynch's depiction

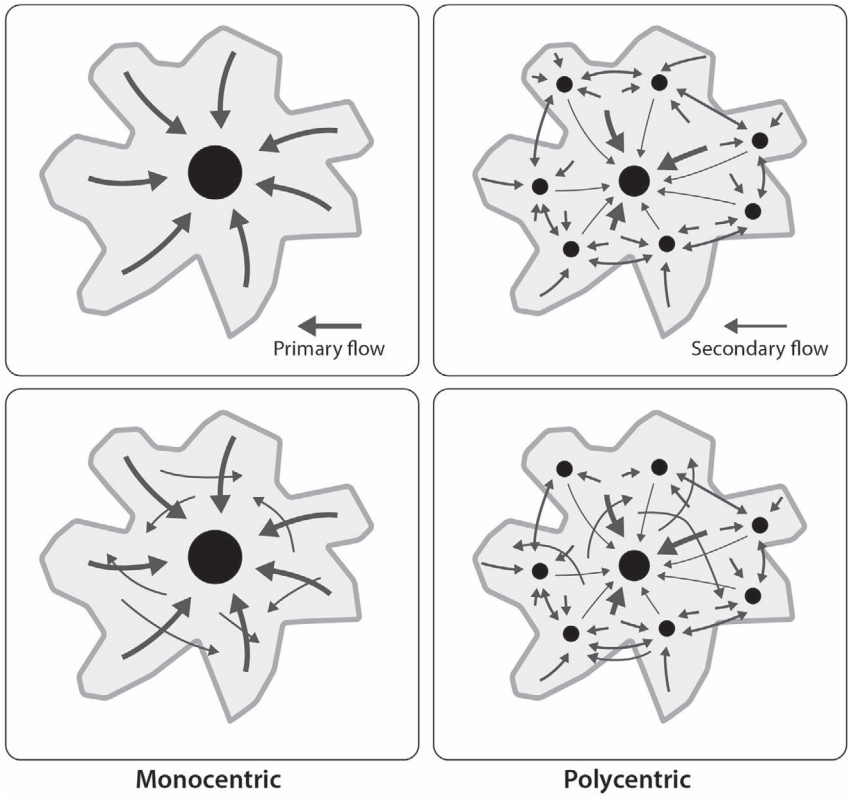

FIGURE 6.1 Possible urban mobility patterns.

Source: Adapted from Rodrigue (2020).

of urban space (Chapter 3). In these theories, paths evolve into key routes within the city, which can be considered customary travel or well-trafficked paths. This also links to Routine Activities Theory and Lifestyle Theory (Chapter 3). Some paths may have concentrations of certain types of activities or users, and as people regularly use these paths, they increase their 'awareness space' of these routes, akin to developing cognitive maps.

Routine Activities Theory (Chapter 3) also draws from the work of Amos Hawley and ecological concepts of rhythm, timing, and tempo. Rhythm refers to the normal recurrence of events, for example, going to work or school; tempo, which is the number of events in a certain time window; for example, often people travel to and from work five times a week; and timing, which denotes how different behaviors co-ordinate or intersect. Hägerstrand's 1970s space-time geography (Chapter 3) provides a theory for human mobility behavior, suggesting that the movement of people is

limited or constrained by three factors, classed as capability, coupling, and authority constraints. Capability constraints are physical barriers to movement; coupling constraints are linked to key social roles such as work or school and restrict freedom of movement; authority constraints refer to where people are permitted access to by those who own or manage a place. Coupling constraints have been explored in relation to crime and can be considered as obligatory routines that people must do, as well as discretionary ones they choose to do (LeBeau, 1994). These temporal constraints have a major influence on spatiotemporal patterns of crime, and urban flows and mobility patterns are bounded by these constraints on human behavior, which in turn influence travel paths.

The positionality of key facilities and nodes on a street network and the movement of people along pathways via a range of transport modes provide a further layer of complexity. As we discussed in Chapter 6, studies on public transport have demonstrated considerable differences in crime levels between end-of-line or peripheral stations and stops and those that have a more central position. We find this in the Global North (Newton et al., 2014) and Global South (Ceccato & Moreira, 2020). Facilities and nodes can be considered people generators (Newton, 2018), with considerable variation in ambient populations by time of day, day of week, weekday versus weekend, school holiday versus non-school holiday, and by season. To understand the nature of risky places, it is perhaps necessary to understand urban mobility flow as part of a systems perspective of the city. This links to existing concepts such as crime attractors and crime generators, as well as crime radiators and crime absorbers (see Chapter 3). These ideas of crime and urban mobility flow are explored further in two journal special issues (Newton & Felson, 2015; Newton et al., 2021).

Given the necessity for people to move about a city between these connected places, urban planners, transport planners, geographers, criminologists, and others have explored the fundamental role of paths within urban systems. We suggest that there is much commonality between the ideas developed within these disciplines. Integrating these disciplines is a further concept required to adopt a systems thinking approach to understanding risky places for crime.

Street Networks

Street segments are the basic building block of the street network and a unit of analysis that has increasingly been explored at the micro level. The next section explores what we know about disproportionate crime concentrations at the street segment unit, which we term risky streets.

Risky Streets

Weisburd et al. (2012) carried out longitudinal research in Seattle, USA, and examined crime concentrations over a 16-year period. They found that crime occurred at 47–53% of street segments each year, and less than 5% of streets accounted for over 50% of all crime. He then identified the 'law of crime concentration' (Chapter 3), which suggested that approximately 50% of crime is concentrated within approximately 2–6% of the streets. This has been replicated and tested in the Global North, including Northern America, Western Europe, Australia, India, and Japan (Braga et al., 2017). There are also several examples from the Global South, including Latin America (Jaitman & Ajzenman, 2016; Chainey et al., 2019), South Africa (Breetzke & Edelstein, 2019), and Nigeria (Umar et al., 2021). As an example, Figure 6.2. shows an example of hot streets for knife crime. In this anonymized dataset from a police force in England, 20% of knife-enabled offenses occurred at 0.5% of street segments, and 80% of offenses occurred at less than 5% of all street segments. As many as 93% of street segments did not have a recorded knife crime offense.

A limitation of analyzing the street segment as a risky place is that risky streets could represent high levels of risk, but this is driven by just one or two land parcels or facilities on the street. Therefore, clustering at street segments could represent the clustering of risky facilities. However, spatial clusters are represented visually on a line instead of point analysis of individual land parcels. We think there are advantages to this, given it represents movement across urban space. A further limitation is how concentration is measured; for example, street-level crime concentrations may not be any more concentrated than non-crime phenomena (Eck et al., 2017). Alternative suggestions for measuring crime concentration include the generalized Gini coefficient and Lorenz curve to account for over-estimation, which are more explicitly designed to measure the degree of inequality in a distribution.

Connectivity, Accessibility, and Betweenness

Some studies have explored the connectivity of street segments and their relevance to crime risk. An important metric here is space syntax (Hillier, 2007), which was developed more broadly to measure the spatial properties of a city. It can be thought of as a measure of 'through movement potential,' of the flow of pedestrians and vehicles. It captures three measures: connectivity, the number of connections a street has to its direct neighboring streets; integration, the accessibility to other streets based on the number of directional changes; for example, a high integration street would be highly inter-accessible with a longer axial line and fewer 'turns'; and choice, which is the number of times each street segment falls on the shortest path

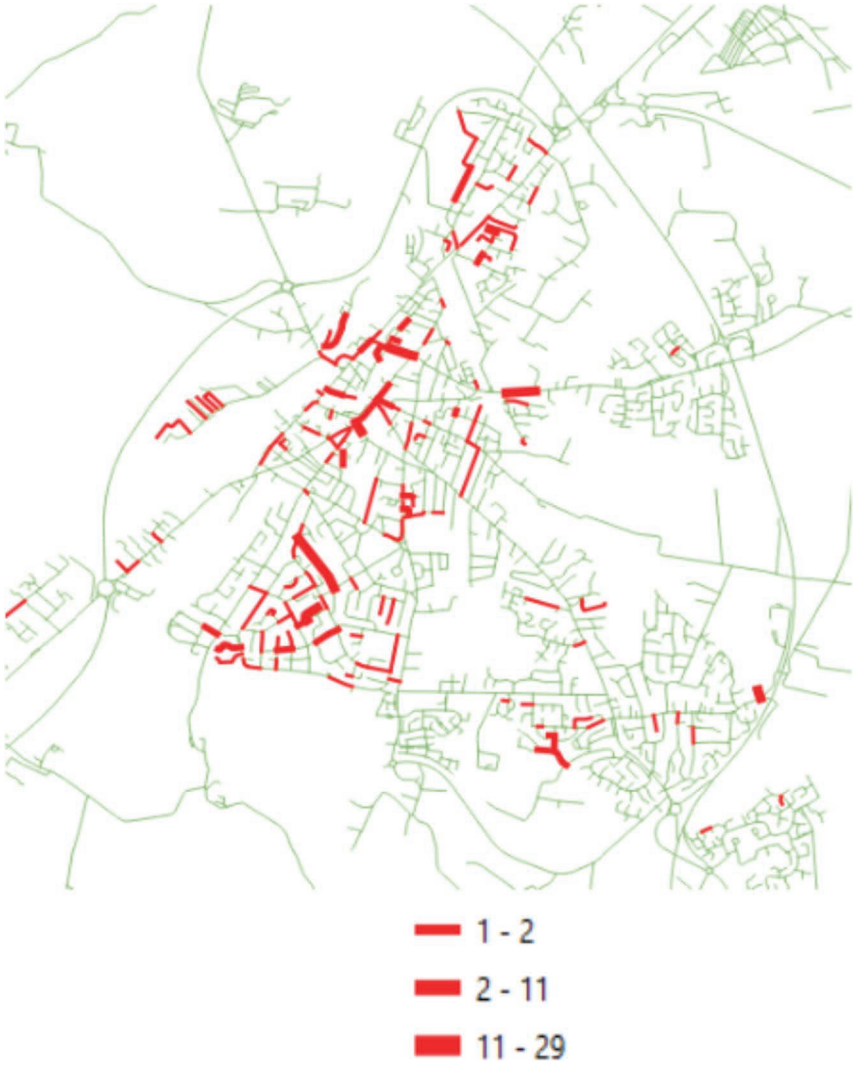

FIGURE 6.2 Risky streets and knife crime.

Source: Authors.

between all pairs of segments within a selected distance, termed 'radius.' The 'shortest path' refers to the path of least angular deviation or the 'straightest' route through the system (Hillier & Iida, 2005).

Studies have generally found accessibility to be positively correlated with crime (Summers & Johnson, 2017). They note a limitation of street syntax, which is that whilst it accounts for the permeability of places, it fails

to account for land use, which may increase movement. When attempting to account for both, they find integration and choice are associated with a higher crime risk, and connectivity is negatively associated with crime. Davies and Johnson (2015) propose an alternative measure, which they term 'betweenness,' and found this was a highly significant predictor of burglary victimization. Wuschke et al. (2021) examined crime concentration along urban roadways using location quotients to determine how representative levels of crime were in different classifications of the road networks, including freeways, highways, and motorways. They found consistent over-representations of crime on arterial roads.

This demonstrates the relevance and importance of the street network in shaping risky places. Indeed, "street networks shape day-to-day activities in complex ways, dictating where, when, and in what contexts potential victims, offenders, and crime preventers interact with one another" (Birks & Davies, 2017, p. 900*)*. However, a challenge here is we need to better understand the nature of this movement across urban systems, given that "the overall patterns of movement in a city are formed through the accumulation of individual journeys, each of which involves the selection of a path through the network" (Davies & Bowers, 2020, p. 800). Therefore, our understanding of risky paths requires a better understanding of individual and aggregate movement across the city and their relationship with crime.

6.2 Pathways and Journeys

We have considered crime concentration at the street segment level and demonstrated the importance of the connectedness and betweenness of street segments. However, journeys generally consist of travel along multiple street segments from start to endpoint. Theoretically, and methodologically, street segments may represent convergence points or pathways. We, therefore, need to move beyond analysis at the street segment level to think about pathways across the broader street network. When considering crime risk using the pathways or journeys approach, there are three distinct issues to consider.

- Whether the pathway itself is a risk for crime?
- The proximity between the riskiest parts of a pathway and nearby high-level risky facilities and nodes.
- Does the pathway provide a route for offenders and victims to travel between risky facilities and nodes, but is it not risky in itself?

Pathway Choice

A simple journey might be to travel along just one or two street segments. However, as previously identified in this chapter, the pathways people take

are often reflective of longer journeys within an urban system, and thus, whilst a street segment may be considered a basic building block of a pathway, it is likely only to represent a small proportion of each pathway. Useful concepts here are route choice modeling and optimal travel time to identify likely or best journeys between two points. Today's route planners can be refined to different modes of travel, seeking fuel efficiency, the lowest cost journeys, and the fastest routes, which can then be updated via live traffic feeds to avoid new areas of congestion during a journey. However, whilst choice modeling can support individual-centric models and identify some common paths, it does not sufficiently capture the complexity of human behavior and mobility. Alternative methods for understanding this are linked to spatial cognition research. In this approach, particular features in urban space are important for wayfinding and navigation, and these key settings can be used to create anchor-based models of route choice guided by the transition between prominent landmarks. Prior research suggests these are more accurate representations of real-time route choice.

Are Paths Themselves Risky?

Perhaps an obvious starting point is to consider whether pathways themselves are risky. Whilst there have been limited studies into crime along pathways, there have been some efforts to explore this. Barker and Wright (1966) provided a detailed verbatim record of observations of the life of a young boy over a single 14-hour period during a single day. Whilst not specifically focused on paths, it paved the way for future studies to track the activities of individuals and their behavior. More detailed activity budgets have been developed (see Chapter 3), such as in the Peterborough Adolescent and Young Adult Development Study (PADS).

Journey to Offending

Bernasco (2014) suggests a range of factors influence individual 'journey to crime' choices that can be linked to optimal foraging. These include motivations for travel, the origin and destination, where they commit a crime, the routes they usually take, the time of day they travel, how long the journey takes, how far they travel, in which directions they travel, their modes of travel, and who they travel with. There may also be two types of journeys: those that were taken originally with legal intentions versus those embarked on with criminal intent at the outset. Both may end up causing a person to commit an offense, but the paths taken and types of places visited may vary considerably between the two. A further consideration is the mode of transport, and a study of commercial robbery found over half of offenders used a car, about one-third walked, and bicycles, motorcycles, and public transport accounted for about one-fifth of offenses.

Ecological studies have shown strong associations between characteristics of urban places and the locations of crime offenses, but there are limited studies that examine how exposure to different urban environments along a journey might influence decisions to commit crime. Situational Action Theory suggests crime-prone individuals would be more exposed to risky settings and paths, and Figure 6.3 is based on data from the PADS+ longitudinal study of young people (Chapter 3). This illustrates individual activity patterns in two and three-dimensional space-time prisms and activity density surfaces created from individual data on individual's whereabouts collected using space-time budgets (Chapter 3).

White et al. (2022) use multilevel models to examine micro-level features of the environment, for example, land use with structural characteristics of communities such as poverty and social cohesion. They demonstrate that risky lifestyles, the micro-geographic context of streets, and community measures all play a role in both property and violence victimization. They also flag that an understanding of street segments was shown to be particularly informative.

Since the 1980s, studies have been devoted to capturing digital activity-travel behavior and accessibility about individuals' lifestyles, activity patterns in time and space, and space-time visualizations of a group of people (Janelle et al., 1998; Huisman & Forer, 1998; Kwan, 2000). More recently, real-time location data has supported the analysis of mobile communications to track urban activity paths over time, for example, MIT's Senseable City Lab, UrbanSense at UCLA, Spatial Information Design Lab at Columbia University, and the i-Mobility Lab at KTH, Sweden.

An alternative method to understand travel is to identify how long people spend on different activities, including creating a time-adjusted activity rate for victimization. Lemieux and Felson (2012) developed time-adjusted rates in the US, categorizing activities into sleeping, other activities at home, work, attending school, shopping, leisure, going to and from school, and going to other places. They found the risk of violence was five times higher when traveling to and from school than when in school. Vaughan et al. (2021) compared data from the US, Canada, and Australia and found further evidence that victimization risk increases during leisure and travel activities when people are not in their homes. Ruiter and Bernasco (2018) explore whether travel itself is risky. They use a smartphone app with young adults and found sleeping the safest activity while shopping to have the highest risk. The risk during public transport journeys was significantly higher than when sleeping.

Hot Routes

Newton (2004) examined spatial concentrations of crime along bus routes in Merseyside, England, and found concentrations of crime in line

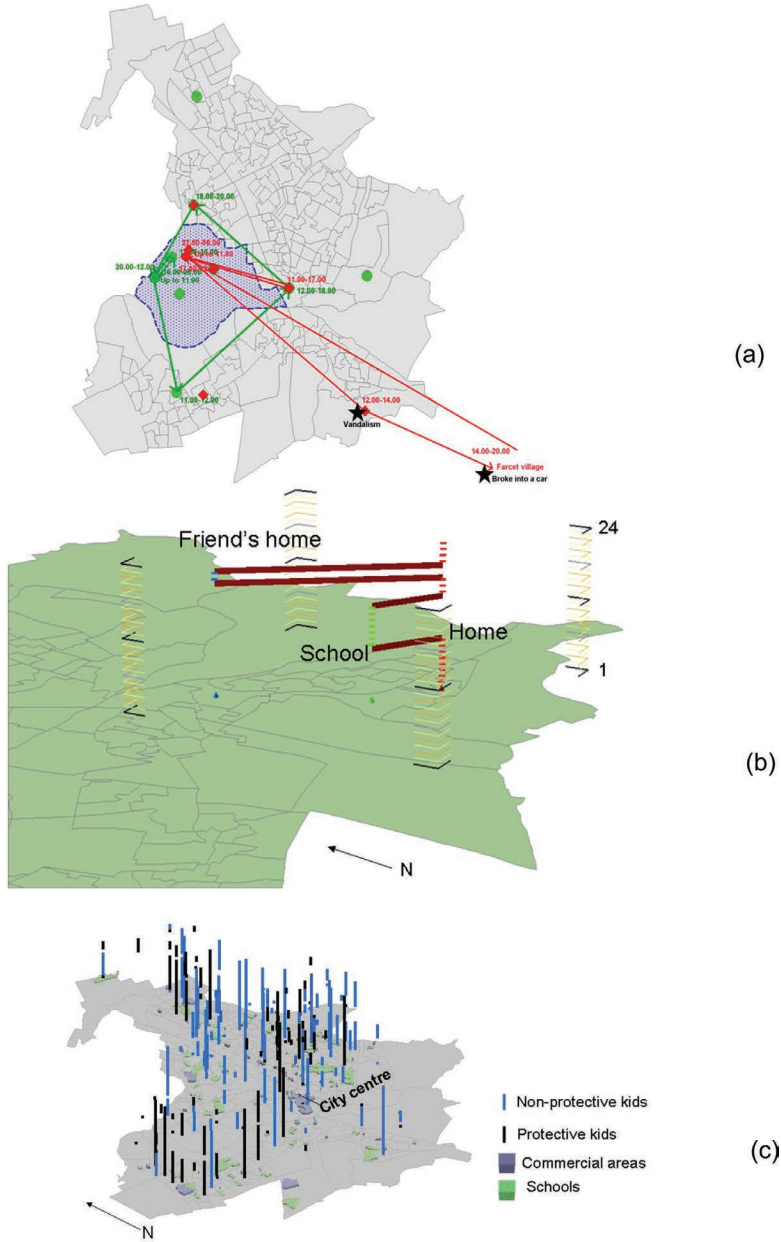

FIGURE 6.3 (a) Activity paths and crimes in risky settings over the day; (b) paths in space-time prism with space-time path of an adolescent on a Monday; and (c) number of hours spent in settings by types of kids in Peterborough, UK.

Source: Ceccato and Wikström (2012, pp. 175, 177 and 182).

with the Pareto principles (Chapter 4). The top 15 routes for crime, less than 2% of all routes, accounted for 45% of all offenses on the bus network (Figure 6.4). These tend to follow the main arterial routes or the 'well-trodden' pathways identified by Lynch (Chapter 3). Similar patterns were found in London, South Yorkshire, and Lancashire (Newton, 2008). In London, the top 15 bus routes, 2% of routes, accounted for 10% of all crimes, and 45% and 75% of all crimes recorded were along 40% of

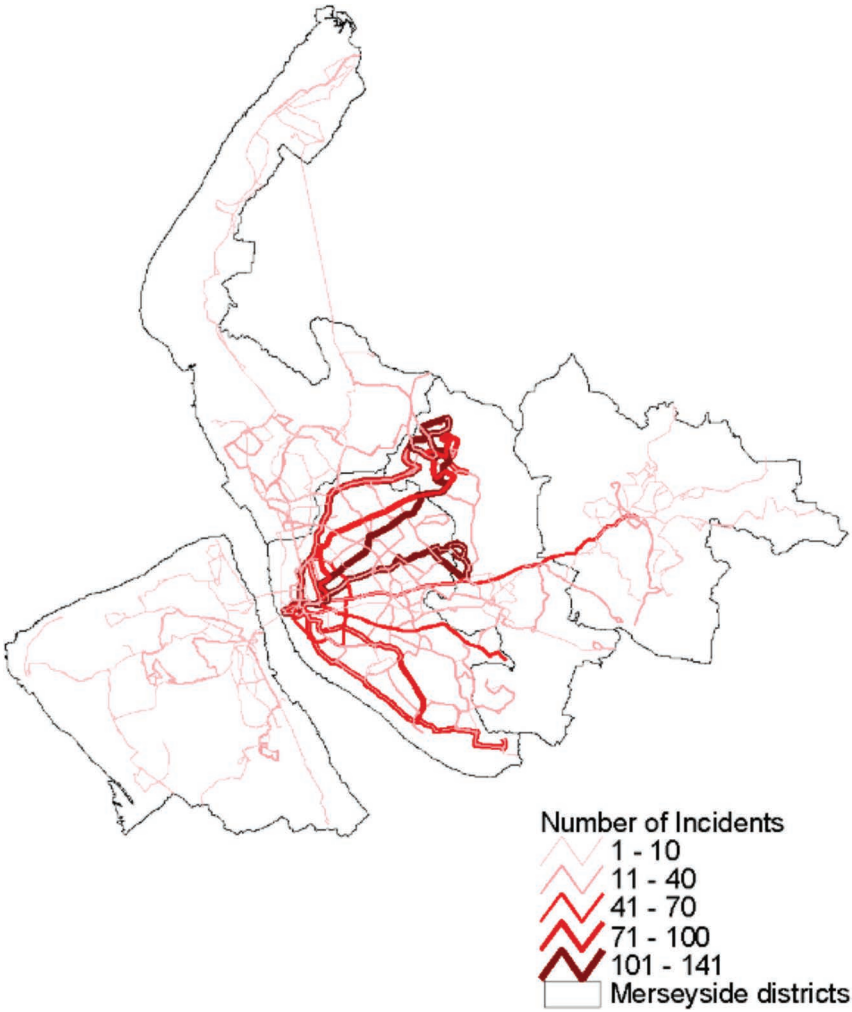

FIGURE 6.4 Hot routes: Crime on Bus Routes in Merseyside, 2001–2003.

Source: Authors.

routes. In Lancashire, 10% of incidents occurred along 2% of routes, and 80% of offenses occurred along 50% of all routes. Some of these hot routes are roads where cargo theft/robbery occurs. An example is from Sao Paulo State in Brazil written about cargo thefts and robbery (Justus et al., 2018) that shows the nature, causes, and consequences of cargo theft, highlighting how this crime affects supply chains and local economies.

This analysis demonstrates the presence of hot routes (Newton, 2004, 2008; Tompson et al., 2009) on public transport, which could be considered as an example of a risky pathway. This raises questions as to the factors along a route that might increase levels of risk at different parts along these pathways, as risk is unlikely to be evenly distributed across a linear transport journey. There is an interaction between transport and its nearby environs, and Newton (2004, 2008) identified that routes that travel through high-crime areas generally have higher levels of crime and that those that stop more frequently in high-crime areas have higher levels of risk. This suggests that different inputs and outputs influence a route, and this will vary spatially and temporally. Therefore, the evidence points to a spatial interplay between the route a vehicle takes and the environs of that route and likely victimization during that journey (Robinson & Giordano, 2011). This suggests that risky paths may also function not only on the street by which a person travels but also on the immediate environs of that street.

Hot 'Underpasses'

Paths at risk of crime often include poorly lit alleyways, secluded jogging trails, underpasses, tunnels, quiet residential streets with minimal foot traffic, and abandoned industrial areas. These locations typically lack surveillance and natural oversight, making them attractive spots for offending due to their isolation and reduced visibility. These are designed as enclosed pathways, primarily for pedestrians or cyclists, providing a safe route through obstacles such as busy roads or waterways. They have not been extensively studied, but an examination of graffiti on more than 1,000 tunnels in Sweden (Ceccato et al., 2024) found that 25% of tunnels had graffiti, which was most common near underground stations, highlighting the challenges of graffiti management.

Journey to Victimization

Wiebe et al. (2016) conducted a detailed analysis of young people's activity paths, examining approximately 250 young people who received shot wounds and 283 community control young people. On the day of their

assault, they identified the movement of each young person from when they woke up, at 15-minute intervals, until their assault. This included the location and type of activity, the mode of transport, how safe they felt, substance use, and who they were with. These activity paths were compared to the physical and social characteristics of the environments they traveled through. They examined 27 potential risk and protective factors including the presence of alcohol outlets, police stations, structural disorder, per capita education, vacant lots, and feelings of neighborhood connectedness. A key finding was that

> individuals' activities were constrained in space and time as a function of their daily routines, and those who were assaulted differed considerably from those who were not assaulted in terms of the amount of time they spent in different types of activities, locations, and modes of transportation.
>
> *(p. 39–40)*

For young people aged 18–24 risk of gunshot assault increased when they were alone, when outdoors on foot, and in areas with high levels of vacant properties and vandalism, and higher levels of gun ownership. For those under 18, the risk was higher when outdoors on foot and when using motorized transportation and lower when riding a bus or trolley than when indoors and in areas of high gun ownership. This study identified an interaction between the socio-demographic and physical/land use characteristics of places traveled, as well as individual risk factors of study participants.

Female Journeys to Victimization

The previous example examined young people's journey to victimization, and other studies have considered this for women and girls, particularly when using public transport. When taking a whole journey approach, this starts with the path from the home to the transport stop or station. If this is poorly designed, it may affect willingness to travel. They can also attract several crimes, including sexual violence. Research has found in some cities, especially those in the Global South, a large percentage of women are what has been termed 'transit captives.' They have limited access to other forms of transport and are reliant on public transport. A study in the Global South in Bogota, Colombia, found women were more likely than men to avoid certain routes and stations. They also suggested they had to remain alert, walk fast, or use alternative paths when using transport during the evening (Pérez-Trujillo, 2020). A study in Stockholm (Ceccato,

2014), Sweden identified more than half of outdoor rape cases happen within 1 km of victims' residences, and 60% of outdoor rapes happen within 2 km of victims' residences, often from the walking path back home from public transportation (Figure 6.5).

In another study of rape in Stockholm, Ceccato et al. (2020) showed that a secluded pedestrian path is more prone to rape than an open street where cars and people may pass more frequently. Using medical records of 147 rape victims between 2012 and 2013, they constructed detailed records of the locations and times women spent time at or traveled through, the activities they engaged in, and the people they interacted with sequentially over the course of the day they were raped. Rape occurred most frequently in forested areas (27%), vehicles/taxis (21%), and street settings/secluded pathways (17%). One-quarter of rapes occurred relatively close to women's homes (within 3.2 km). Half occurred further, beyond 9.6 km.

One question might be whether a large presence of unfamiliar people could impact perceptions and feelings of safety (Zahnow & Corcoran, 2024). Alternatively, at these nodes, there are also times when there are few people present, around closing time or just after closing time when fewer people remain. Indeed, studies of fear of sexual violence and harassment flag parks and transport nodes as places where women feel unsafe (Solymosi et al., 2018; Lundrigan et al., 2024; Ceccato & Loukaitou-Sideris, 2022). Again, there are differences between busy and quieter times, as sexual groping is more likely when places are congested and busy, and rape and other violent sexual offenses may occur on the journey home away from nodes after closing times as people make their way home.

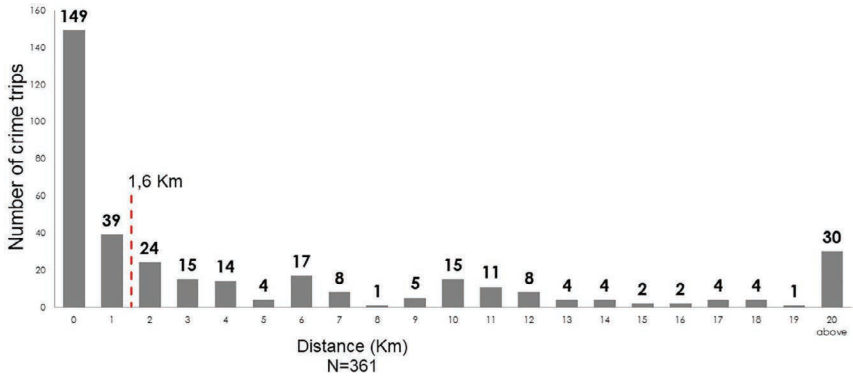

FIGURE 6.5 Rapes on the path back home: 60% of outdoor rapes happen within 2 km of victims' residences in Stockholm, Sweden.

Source: Ceccato (2012, n.p.)

6.3 Connecting Risk

There have been several studies that attempt to explore distances traveled by offenders and victims, effectively connecting their key nodes and pathways. Most studies have found offenders commit crimes close to but not immediately adjacent to where they reside and that as the distance from home increases, the likelihood of offending is reduced. This is known as distance decay. However, this distance varies by age, gender, vehicle access, and deprivation (Wiles & Costello, 2000). Studies have also identified a 'directionality' to repeat offending (Frank et al., 2012), in that routes traveled tend to be in a consistent direction (e.g., West to East). The authors explored which targets appeal more to offenders through discrete location choice models and developed a framework to better understand the choices offenders make in identifying appropriate targets. This helps extend our thinking away from the location of the crime event (risky place) and towards the pathways and journeys offenders may take as part of a broader systems thinking approach to risky places.

Beyond individual risky paths, mobility triangles (Groff & McEwen, 2007) are a useful tool for understanding risky places, although they have had low adoption. They map out the location of the offender's home address, the victim's home address, and the address of the crime. By incorporating an analysis of these three locations and the area this bounds, we can start to consider the interaction between risky paths and risky facilities and nodes. They identified 2,773 mobility triangles to examine patterns of risk. The growth of big data facilitates more comprehensive analyses of mobility triangles, which might support moving towards a systems thinking approach, which moves away from just exploring the location of the crime event.

An important point to consider is that the pathway itself may not be risky, but it is a means of connecting places as a potential offender travels along a pathway to identify an appropriate opportunity for offending. The pathway could be considered to form part of the 'whole crime journey' event, but the pathway itself may not be risky for crime. Suppose an individual with a propensity to commit crime travels on a path, whilst they may not have offended on that path. This may be because a suitable opportunity was not identified, or the offender anticipated that the facility or node they were traveling to would offer a better opportunity for offending than those they encountered on their journey. This also demonstrates the importance of considering the interaction between a pathway and a node or facility, as well as the interconnection between those who use these places and pathways.

Beyond physical connectedness, we can also consider the digital connectedness of risky places. As we move towards smart and connected systems,

new challenges emerge. Bichler (2019) considers the relevance of what she terms hyperspaces, the intersection between the online world and the physical world (Figure 6.6). When considering risky facilities (Chapter 4), we can connect to chat rooms, cyber markets, social media, and Wi-Fi connections at risky facilities. Technological advancements enable us to be connected to the internet when we travel. Therefore, as we move between physical spaces, we can continue to be connected to similar digital spaces. If we have mobile smart devices, their security may continually change. Our devices may interact with other new devices. Cyber pickpocketing can occur, for example, but our digital data and footprint can also be extended during our journeys. Indeed, we may need to reconsider our concept or risky pathways to include the physical and digital environments we traverse during journeys.

As human activity continues to cross domains between the physical and online domains, and this happens on a more routine basis, the concept of hyperspace becomes more important to urban systems. This may call for a reconceptualization of traditional ideas such as those of Kevin Lynch—does

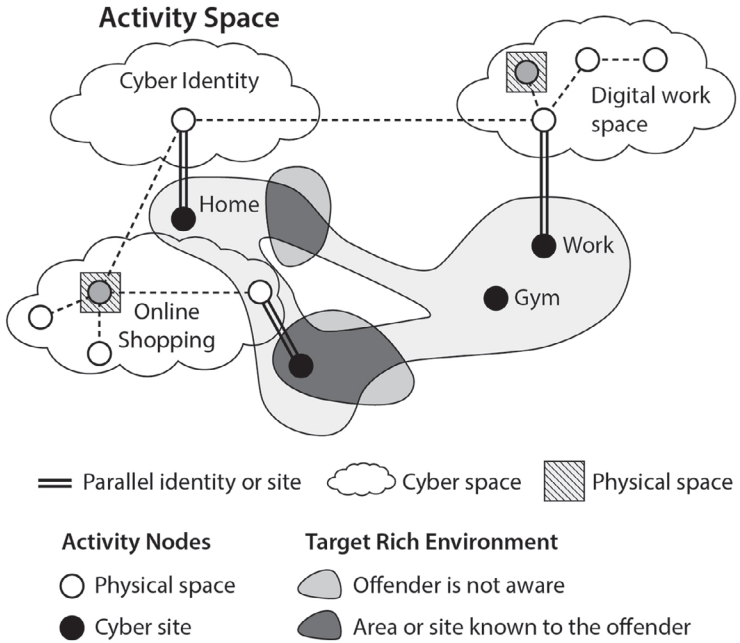

FIGURE 6.6 Understanding criminal networks.

Source: Adapted from Bichler (2019).

virtual space become an additional dimension to place, and how is it experienced? Moreover, to what extent are risky facilities, nodes, and paths present in hyperspace, and how concentrated is activity? Emerging studies are beginning to note the 80/20 rule, for example, applies to cyber-crime, with servers experiencing higher levels of cyber-crime.

In rural areas, especially the remote ones, crime-prone paths can include wooded hiking trails, remote dirt roads, secluded farm access lanes, unpatrolled wildlife reserves, and poorly maintained back roads. The lack of regular traffic, minimal lighting, and the absence of nearby residences or businesses heighten their vulnerability to offending in these isolated locations (Weisheit & Donnermeyer, 2000). However, there are other roads that become criminogenic due to factors such as seasonal use, proximity to border crossings or smuggling routes, and areas with limited law enforcement presence. Additionally, routes that connect disparate communities can also harbor increased risks, particularly if they serve as shortcuts or bypasses around controlled checkpoints or are known for illicit activities like drug trafficking.

6.4 User Perspectives of Risky Paths and Journeys

In Chapters 4 and 5, we considered how risky facilities and nodes might influence fear of crime. This section now considers the context of fear of crime and risky pathways. As per previous discussions, it is important to acknowledge that individual traits such as age, gender, ethnicity, and physical characteristics of a setting, such as lighting, natural surveillance, and signs of neglect, will all influence perceptions and fears of crime. This section considers feelings of safety along pathways, acknowledging that most fear of crime literature on risky pathways is focused on public transport journeys (Ceccato & Loukaitou-Sideris, 2022; Ceccato et al., 2023). A study by Ceccato and Nalla (2020) found inadequate lighting and poor maintenance increased fear. Studies have suggested users take a range of precautionary measures or avoidance strategies (Newton et al, 2020) to address their fear of crime concerns. They may carry personal alarms, travel with friends, or even avoid certain routes during the dark.

Most surveys identify public transport, particularly after dark, as a setting with increased levels of fear of crime. However, what they fail to do is consider the dynamic nature of this fear along pathways and routes, and cross-sectional surveys have limited usefulness for prevention in terms of identifying where and when risk is increased along risky pathways. More recently, fear crime surveys have moved to integrate Ecological Momentary Assessments (EMAs) to understand the dynamic nature of determinants of fear (Solymosi et al., 2021; Irvin-Eriksson, 2021). These can record better

spatial and temporal data of fear, linked to information about the individual and the nearby environment at the moment, thereby offering more insights into the nature of fear of crime on pathways and how they influence travel choice behavior.

Studies have explored how transport mode influences fear of crime, for example, by comparing pedestrian journeys with bicycles or public transport. Fear tends to be higher on pedestrian journeys and cycling. Fear also tends to be higher for bus journeys than rail, although this is not always the case and can vary by country (Newton et al., 2020). One potential explanation is the level of exposure to the immediate situation and perceived risks encountered during the journey. Buses, for example, tend to be more local and stop more frequently than trains. However, when trains or buses are staffed with ticket inspectors rather than drivers, this may impact crime levels. A further factor that is likely to be relevant to fear of crime on journeys is a user's familiarity with the places they travel through and how frequently they pass travel nodes. Women, for example, may have different routines than men.

> Women typically make fewer job and business trips, but more shopping trips and trips related to parental duties, elder care, and household obligations than men do. They also have more varied and complex activity patterns . . . . and [a] higher overall numbers of trips.
>
> *(Ceccato & Loukaitou-Sideris, 2022, p. 28)*

This will also apply to different age profiles of travelers and commuters versus tourists. These routines will inform a user's mental and cognitive map of places, and this will, therefore, influence their feelings of safety. Hence, there is a need to understand the dynamic nature of fear along risky pathways.

When considering fear of crime at risky facilities, risky nodes, and risky pathways from a systems approach, the interconnectivity of these becomes more apparent. The dynamic nature of urban systems congregates people together at certain places and times of the day and dissipates people at other times of the day as they move away from these places. Overcrowdedness can diminish feelings of safety when people feel trapped or confined in congested places. Alternatively, when people are exposed to feeling isolated with few guardians nearby and or in unfamiliar locations, this can also cause increased feelings of fear. In the context of urban planning and sustainability, there is a need to reconsider the spatial configuration of fear of crime and the interconnectedness of the micro and meso (facilities, nodes, and pathways) and the macro context within which this is set—as these dictate policy-level decisions. Putra et al.

(2023) have proposed a novel framework against which to consider this, and this begins to map out characteristics at the micro level (building type, physical design, and layout) with the meso level (distribution of open spaces, neighborhood shape, and design, the infrastructure of the built environment (the connection between land parcels), and the macro-level (urban development patterns).

6.5 Similarities and Differences in Risky Paths/Journeys

Recognizing commonalities and differences is essential for effective urban planning of risky pathways. In what follows, we discuss a few examples:

1. Access: Access is usually unrestricted, and most pathways can be navigated without barriers or restrictions.
2. Connected Nodes: Risky pathways often connect risky nodes or facilities and provide pathways in and out of the local urban environment and between communities.
3. Risky pathways tend to have low levels of surveillance and low guardianship. Willingness to intervene, for example, bystander intervention, is also likely to be low when users are less familiar with pathways outside their usual activity nodes.
4. Time and Location: Risk tends to be highest on the parts of pathways nearest to risky nodes—for example, on the journey home from the night-time economy or when walking home after traveling on a bus or train in three late evenings. Risk is increased when nearby facilities and nodes are closed. For women, in particular, the trip between home and transport nodes can be risky and fearful.

Differences

1. Public transport journeys require tickets and controlled access and are limited to available public transport routes. Users have less flexibility about where and when to travel than other pathways.
2. Pathways can be bi-directional and reflect mobility patterns. For example, crime on pathways is more likely in the morning in central places on a network and more likely towards the periphery of a network of connected pathways towards the end of the day. Therefore, the location of risk along a pathway can be highly varied.
3. Speed of travel along pathways can vary considerably, from on foot/walking to cycling or bikes/e-scooters, to public and private modes of transportation, for example, bus, tram, rail, and car. Risk is generally highest when vehicles are stationary.

4. On public transport, the entry and exit points to a pathway are more limited than when traveling by private transit, and at each stop, new users board and alight carriages, which may increase or reduce risk. Users are more at risk of this moving internal environment on public transport vehicles and to external environments when on foot or using private transport.

These pathways often connect risky nodes and have low surveillance. Risks are heightened near these nodes, especially for women and during certain times, like late evenings. Differences include public transport's controlled access and the varying speeds of travel modes, which impact risk levels. In summary, effective urban planning must consider commonalities and differences in risky pathways.

6.6 Concluding Remarks

In conclusion, the interplay of factors like unrestricted access, connections to risky nodes, low surveillance, and time/location dynamics shapes the overall risk profile of pathways. Differences in controlled access, bi-directional patterns, varied speeds, and dynamic entry/exit points in public transport highlight the complexity of the urban system, of which risky pathways are part. Recognizing these interconnected aspects, including governance of risky paths, is crucial to enhance safety and mitigate risks along pathways.

Systems thinking can support our understanding of risky paths in several ways. For example, urban flows can be reframed or classed as multidimensional human mobility patterns, and from a systems thinking approach, these form complex elements and interactions in urban spaces. The behavior and purpose of these journeys and paths can rapidly change, creating new mobility patterns. For example, a temporary or permanent obstacle on a road or temporary road works may result in users taking alternative routes or avoiding a particularly congested place in the short term. Police may set up a speed camera, and due to social media, users may be able to identify where this route is and travel via alternative paths. Police may set up a new foot patrol, or knife arch metal detectors in a particular location. Offenders are rapidly informed of this via encrypted message chats, and they avoid this area for a short time or use alternative travel means.

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7

DISCOVERING OPPORTUNITIES FOR ACTIONS IN RISKY PLACES

7.1 Introduction

Exploring risky places for crime is challenging from a governance perspective, as it requires a balance between immediate crime reduction action and long-term sustainable intervention. Indeed, current organizational structures pose several challenges for introducing systems thinking. Beyond this, there are many situations where well-intended policies produce unintended and often adverse outcomes, often called system archetypes. These are recurring patterns of behavior that can be observed in our organizations, ecosystems, and social systems.

In this chapter, we examine the challenges of integrating systems thinking in our governance structures and provide a road map for more sustainable working with situational interventions. Understanding these dynamics and embracing a systems thinking approach involves recognizing the interconnected nature of systems and accounting for the complexity and uncertainty in the real world. It emphasizes the importance of continuous learning, adaptability, and a nuanced understanding of the systems at play when designing and implementing policies.

Policies with good intentions can sometimes lead to unexpected results. This paradoxical situation arises in many ways, such as natural delays in implementation, limitations in resources, and issues tied to the systems' objectives, such as divergent goals between practitioners. Considering these challenges, we identify and illustrate situations when these problems manifest, but we do so constructively to demonstrate opportunities for action to address this.

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In the first part of the chapter, we highlight how current organizational structures are an obstacle to integrating systems thinking for delivering crime prevention. In the second part, we adopt Meadows's (2008) systems archetypes to discuss how, despite best intentions, our practices can have unintended consequences. These are both important, as even if we address the first part of the problem, the organizational structures in place, we may still be unable to achieve our intended goals due to system traps.

We conclude this chapter with two examples of how well-intentioned policies for crime prevention may not always achieve their intended goal of crime reduction. The first considers an example from the Global South, the case of drug prevention and violence in Brazil. The second from the Global North is a legislative change to the UK licensing laws intended to reduce crime. Whilst both approaches considered the mechanisms by which they wished to achieve change, they did not consider system traps and were unable to achieve the desired results.

7.2 Barriers to Integrating Systems Thinking in Crime Prevention

Numerous obstacles hinder the integration of systems thinking into our daily tasks, including institutional and resource-related challenges. Others relate to ongoing cultures that permeate short-term perspectives. In this section, we discuss a range of barriers to integrating systems thinking into crime prevention (Figure 7.1).

Far too often, crime and safety issues are omitted from the urban planning process on the assumption that these problems fall outside the responsibility of planners and architects. Instead, they are considered concerns to

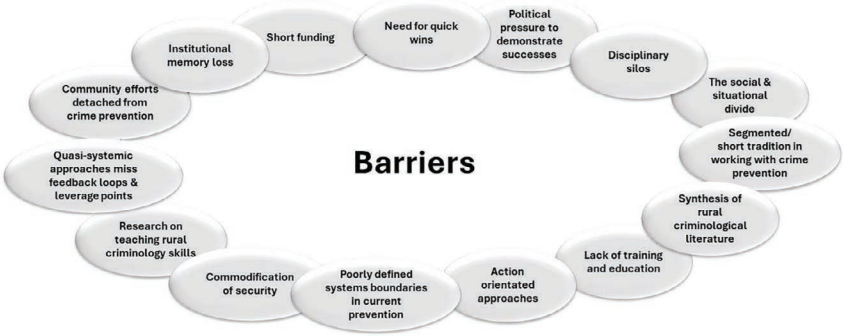

FIGURE 7.1 Barriers to sustainable approaches for crime prevention.

Source: Authors.

be addressed by the police, the criminal justice system, and, in some countries, the military. This division illustrates a compartmentalized approach where the responsibility for public safety is allocated to specific sectors, overlooking the potential for integrated strategies incorporating crime prevention and safety into urban development and design. This perspective perpetuates working in silos, disregarding the interlinked role of 'shapers' of the urban environment at multiple levels of governance (see Chapter 9), and is not sustainable nor reflective of systems thinking.

One major obstacle to employing systems thinking here is the challenge of defining the systems' boundaries. Situational prevention typically focuses on specific targets (see Chapters 4 to 6) without considering their role within a broader, interconnected system. This narrow focus misses the complexity of how different elements, for example, physical and cyber, local and global, all interact and influence each other. The phenomenon of open drug markets in Sweden cannot be fully understood or addressed without considering its connections to international drug supply chains, sometimes connected to other continents and influenced by globalization and digitalization. Similarly, the phenomenon of 'county lines' and drug trafficking in the UK (Williams & Finlay, 2019), which describes the distribution of drugs from larger cities to smaller towns, demands an understanding of the interconnections that go far beyond rural English villages and the young people being exploited.

Limited adoption of systems thinking often stems from insufficient knowledge about the roles of place managers, controllers, and supercontrollers in municipalities. These are crucial for managing spaces and enforcing crime prevention regulations, but knowledge of these is often fragmented and, therefore, less effective. Understanding their responsibilities and interplay is vital for effectively implementing systems thinking, as they directly influence the operational environment and overall crime rates through their actions and policies.

Another structural barrier is the current divide between situational and social crime prevention. There have been some efforts to address this, such as Situational Action Theory (SAT) and the Conjunction of Criminal Opportunity (CCO), as discussed in Chapter 3. However, this divide continues to reflect a broader issue of the split in academia and practice, which contradicts the integrated perspective required by systems thinking. This hinders the development of comprehensive strategies that address the immediate environments and the underlying social factors contributing to crime. The result of separating situational and social crime prevention into distinct approaches, and by extension, into silo academic disciplines, is that those who work with situational crime prevention often do not collaborate with those who work with issues of why individuals choose to offend.

Interventions tend to evaluate and showcase immediate successes. This is linked to the necessity of validating financial support and keeping users involved. This is problematic because systems thinking typically unfolds through gradual, step-by-step modifications that build up gradually and demand a long-term perspective. This focus on 'quick wins' can be contrary to enduring, sustainable solutions central to systems thinking approaches.

One of the main reasons for this is that researchers and practitioners depend on funding that is allocated on a short-term basis. This focuses efforts on those interventions likely to gain immediate traction and demonstrate success within the funding period. Systems thinking requires long-term investment and analysis to understand and manipulate complex systems. This mismatch discourages the adoption of systems thinking, as it may not produce the immediate results that funding bodies often demand. This is also linked to political pressure to demonstrate success. Systems thinking may not fit within short-term political timelines, making them less attractive to those seeking to demonstrate their effectiveness to constituents or superiors. Politicians and policymakers face pressure to show progress and success within their terms of office. This creates a bias towards initiatives that can yield visible, short-term successes rather than those requiring long-term commitment without short-term outcomes.

Another barrier to implementing systems thinking is associated with training, which is generally focused on adopting direct, action-oriented approaches to problem-solving that aim for immediate impact. Again, those who fund the training must demonstrate their effectiveness. These approaches fail to consider the feedback loops and interactions within systems that can lead to unintended consequences. Related to the training, there is a tendency for evaluations to be short-term, often considered 12 months post-intervention, which is a relatively short time window for change to embed. This timeframe is generally insufficient to capture long-term effects and feedback loops that are important to understanding the success or failure of an approach within a complex system. Evaluations also fail to take account of programs with multiple objectives, as impact evaluation is rarely designed to consider multiple criteria (Ekblom, 2023).

In some cases, evaluations are carried out too early, sometimes too late. Therefore, it would be desirable to keep interventions running longer. One of the few examples that have considered sustained impact is an evaluation of 'alleygating,' a target-hardening scheme to reduce burglary in England (Armitage & Smithson, 2007). This demonstrated initial successes in the first 12 months regarding crime reduction and perceptions of safety. Four years later, the scheme was re-evaluated, and it demonstrated sustained success in terms of resident satisfaction, but crime changes were not explored. There was no continuous monitoring over the four-year period,

so it is unclear if there were system adaptations or feedback loops because of the scheme.

Systems thinking requires a multidisciplinary approach that many current training programs in criminology, policing, or urban planning do not fully provide. The disparity in training and education among professionals contributes to a lack of unified methodology or understanding in addressing complex issues. However, globally, there are good examples of this path being possible. For example, in the US, MIT specializes in system dynamics for better decision-making in complex environments. IIASA in Austria uses systems thinking to develop interdisciplinary research on global issues like environmental, economic, technological, and social challenges. In Sweden, Stockholm University, particularly the Stockholm Resilience Centre, focuses on sustainable development, focusing on ecological, economic, and social interactions. The Systems Thinking Institute in Australia promotes systems thinking application across sectors such as education, health, and public policy. These institutions showcase the diverse application of systems thinking in solving multifaceted problems across different domains.

Systems thinking within the public sector is predominantly utilized as a tool for understanding complex issues, often with the assistance of external experts, rather than being a routine aspect of daily decision-making and action. However, currently, "there is little clarity on who should promote systems thinking in public organizations and who should assure their capacity" (OECD, 2020, p. 143). Therefore, despite individual policymakers potentially adept at systems thinking, the policies they create may become embedded without institutional support for systems-thinking policymaking. A further challenge is that existing systems cannot simply be switched off, redesigned, and restarted, given the need to function key services continuously. Therefore, change needs to be brought about iteratively.

In local governments, high staff turnover disrupts the continuity of long-term projects. There is often a reliance on individual knowledge, exacerbating institutional memory loss and making it difficult to accumulate and apply systemic insights over time. In the long run, this hampers the ability to build on past insights and failures, leading to repeated mistakes or missed opportunities. This cycle of institutional memory loss creates a barrier to applying systemic insights, which is important for combating crime and planning for safe and sustainable environments, resulting in fragmented and inefficient planning processes.

The security industry's commodification of products and services, from padlocks, CCTV cameras, and digital solutions to gated communities, is focused on short-term successes. The industry emphasizes products and services that promise immediate improvements in buyers' security and safety. This focus on short-term successes can detract from adopting systems

thinking and long-term shared goals that involve solutions to problems beyond target hardening, for instance.

Whilst conventional situational crime prevention has been evaluated for four to five decades, at least in the short term, there are few interventions that use long-term systems thinking that can be evaluated. Therefore, there is no 'evidence base' from which to convince senior leaders to adopt it. Although systems thinking can build on the legacy of our conventional approaches, adoption may require changes in how organizations operate. There may be resistance within organizations as the proposed approach demands the breaking down of silos, the fostering of cross-sector collaboration, and the adoption of long-term perspectives.

There is a risk that systems thinking approaches may not be evaluated, as this is classed by those who are responsible for the intervention as 'too difficult.' How can we directly attribute and measure systems change compared to more targeted and focused situational interventions? This makes it challenging to secure and sustain funding and support for system-level initiatives. However, previous approaches from the past have adopted approaches more akin to systematic thinking (Ekblom, 2011). Recent efforts to adopt public health approaches to violence reduction suggest a broader approach is worth pursuing. Calls for a more systemic perspective to crime prevention (see, for instance, Rosenbaum, 2006; Ceccato, 2020; Eck et al., 2024; Sidebottom & Tilley, 2023) demonstrate that other authors are thinking about the need to reframe issues of crime prevention towards a longer-term perspective. The growth of these broader approaches, such as those used in public health offer support for systems thinking, although we would suggest these are not true systems thinking approaches as they do not always consider feedback loops and leverage points for example. However, these approaches are emerging as viable alternatives to tightly focused situational prevention and problem solving, signaling a shift towards more integrated solutions to complex problems.

- *Is the risk of crime displacement in situational crime prevention the only issue?*

One of the most common criticisms against situational crime prevention is the concern that specific interventions in one area may simply cause crime to shift either geographically to a nearby location, temporally, by occurring at different times, by target, when crime can be directed away from one target to another; tactically, when one method of committing crime is substituted for another; and finally, when offenders switching to different types of crime (Clarke, 1998). This occurs not just in physical spaces but also in cyberspace (Ladegaard, 2019). The literature shows examples of studies with evidence

of crime displacement but acknowledges that it is difficult to establish causal effects (Weisburd & Green, 1995; Weisburd et al., 2006; Ratcliffe et al., 2011). A systematic review identified that crime displacement only occurs in a small proportion of cases tested for this, slightly outpaced by instances of diffusion of benefit (Guerette & Bowers, 2017). This is when the impacts of an intervention 'spillover' and go beyond where it was initially intended. Their analysis of a subset of these studies showed that even when displacement happened, it was generally less impactful than the positive outcomes of the intervention; in other words, there was an overall net reduction in crime. Current evidence highlights the necessity for comprehensive crime prevention strategies that consider potential displacement effects across multiple dimensions and demand a review of the boundaries of the system and the methods used to assess such impact. They also need to consider the long-term impact of these interventions. In the next section, we discuss in more detail the challenges in implementing and assessing the impact of localized, short-term situational crime prevention measures.

7.3 Systems Traps—Why Do Things Go Wrong?

Systems may exhibit time delays between the implementation of a policy and the observable effects. Some are related to communication, such as team members' different skills and communication styles. This can result in misunderstanding, slow information flow, and difficulty coordinating action. Lack of skills can also be a limitation, given the complexity or scope of systems thinking approaches. Differences in culture may limit the acceptance of new ideas or ways of working, causing further delay. Moreover, budgetary constraints can affect the resources available for implementation and innovation. Another common limitation is that projects must be completed within a short timeframe. Existing technology may impose limitations, impacting the scope and efficiency of the project.

There are other constraints that relate to a system's purpose or function, which tend to be more difficult to address, and some are discussed in more detail at the end of this chapter. Meadows (2008) calls them 'systems traps' while Stroh (2015) uses the term 'systems archetypes,' and they are discussed using examples in what follows.

1. Shifting the burden
2. Accidental adversaries
3. Gaming the system
4. Limits to growth
5. Eroding goals
6. Escalation

7. Tragedy of commons
8. Success to the successful
9. Seeking the wrong goal
10. Policy resistant system

When systems thinking is applied to criminology and crime prevention, various archetypal patterns emerge, reflecting the complex interplay of factors that contribute to crime and hinder its prevention. Note that they are by no means mutually exclusive, and considerable overlap can be identified.

1. Shifting the Burden

This happens when 'a quick fix' is chosen for a chronic problem. This is evident when cities opt for short-term solutions to manage the visible symptoms rather than addressing the underlying causes of their problems. There are many examples in international literature. Stroh (2015) discusses the problem of homelessness in the US. International literature shows evidence that short-term approaches run the risk of exacerbating the issue over time as they fail to address the systemic factors contributing to homelessness (Darrah-Okike et al., 2018). To overcome the issue, a more effective strategy would involve long-term initiatives that address the causes of homelessness, such as unemployment, lack of affordable housing, and mental health challenges.

When a quick fix is applied to address a problem, but the fix itself leads to new, more severe problems, it is an example of the 'fixes that fail' archetype. For instance, implementing stringent 'zero-tolerance' policing strategies to combat drug-related offenses might lead to mass arrests and incarceration. However, this quick fix may inadvertently exacerbate social issues, disproportionately affecting marginalized communities and contributing to a cycle of poverty and crime. The initial attempt to address drug-related crimes through a simplistic and aggressive approach may result in unintended consequences, such as increased social unrest, heightened crime rates in affected communities, and a strained criminal justice system.

It is important to reconsider the timeline for evaluating crime prevention interventions (Figure 7.2). Generally, this is too short to consider sustainability, leading to the conclusion that the intervention produced significant changes results (expected feedback loops), as shown in Figure 7.2a. In other evaluations, the timeframe may be too late and miss key outcomes or many not predict that the problem will return as intervention stopped (Figure 7.2b). We argue that interventions should broaden the timeline to longer time periods in order to incorporate potential sustainability reductions and capture potential feedback loops and system adaptability.

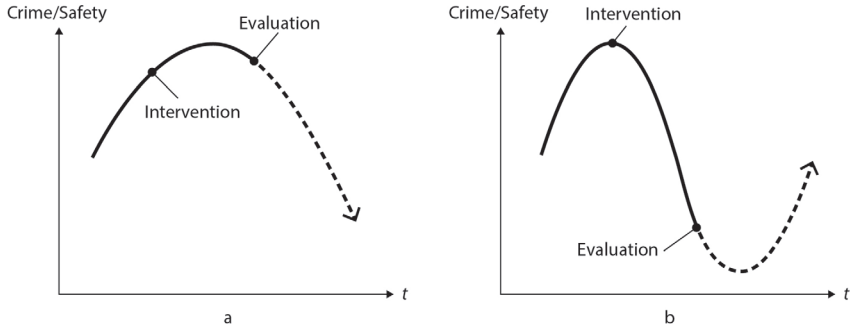

FIGURE 7.2 Timeline of interventions and evaluation.

Source: Adapted Clarke and Eck (2006, p. 104).

Beyond considering the timeframe of an evaluation, there are challenges in framing the concept of 'what works,' and it is problematic to divide interventions and programs into those that are 'successful' and 'unsuccessful. Instead, we should measure how successful programs have been to date, for example, what worked for the first year after the intervention or two years after. We also should include specific contexts of where it worked and specific groups (how and for whom the intervention has worked). The EMMIE framework identified in Chapter 2 supports some of this context. Unexpected outcomes might have a 'positive impact' on some groups within the first year or two but negatively affect others, perhaps five years later, or vice versa. As mentioned earlier, we also need to be able to account for multi-evaluation criteria when programs have multiple objectives. Understanding the long-term mechanisms behind these 'failures' and 'successes' can be just as valuable for understanding the dynamics that render certain areas resistant to change.

2. Accidental Adversaries

This occurs when two or more organizations that should be working together towards a common goal inadvertently work against each other due to misaligned incentives or conflicting actions. An example of this might be public health and police seeking to work together in partnership to reduce drug problems in a risky place. On the face of it, they have similar goals. However, a typical police response might be enforcement, by increased patrols, seizing of drugs, increasing arrests, and trying to increase fear amongst drug sellers. It has been recognized that this approach may serve to criminalize individuals who are likely to operate toward the bottom end of organized gangs. Thus, interventions are short-term and do

little to disrupt the organized networks operating in the area or drug supply. Public health might adopt a harm reduction approach, for example, syringe exchange programs, overdose prevention programs, or opioid substitution treatment. Whilst both would seek to reduce drug problems in a risky place, there are several conflicts that arise in this type of program.

In this dynamic, the police and public health inadvertently become adversaries, hindering the collaboration needed for public safety. A shift in the incentive structure towards an approach that prioritizes the causes of crime over mere statistical achievements is necessary to avoid this situation. Examples of this can be identified in harm reduction approaches to policing. However, this is not without challenges due to the statutory duties of each organization, public health to improve people's health, which is difficult from within the criminal justice system, and policing to prevent and detect criminal offenses.

3. Gaming the System

Gaming the system (or rule beating) refers to the manipulation or exploitation of rules and regulations to achieve outcomes that may not align with the intended goals of the system, for example, to exploit loopholes, distort metrics, or engage in behavior that, on the surface, appears to conform to the rules but ultimately subverts the purpose of the system. When authorities set police targets and goals to reduce crime in a neighborhood, this can result in gaming. Officers aiming to demonstrate success and becoming disheartened with failing to meet targets may reclassify offenses into a different crime type, downplay crime severity, discourage citizens from reporting incidents, or change the date of an offense to achieve the appearance of reduced crime rates.

4. Limits to Growth

This involves a system that grows beyond its limits, leading to a decline or collapse. It is often associated with resource depletion and environmental degradation but can also be used in criminology. For instance, Stroh (2015) mentions the example of overreliance on incarceration as a quick fix to address rising crime rates. The system grows beyond its limits, leading to a decline in effectiveness in the justice system due to the unsustainable growth of the incarcerated population, and families and communities are affected in the long run.

The heavy reliance on surveillance technology in cities of the Global South is an example. Cities in the past have experienced substantial increases in crime, especially violent crimes, leading to public outcry and demands for

action. In response, the city authorities have invested heavily in surveillance technologies such as cameras, drones, and predictive policing algorithms to monitor and control offending (Lippert & Wood, 2012). In more affluent residential areas, citizens will likely have the resources to purchase their own security systems, but this is impossible for deprived communities. Maintenance costs have escalated, and privacy concerns have increased. Moreover, extreme cases of violence have made the population distrustful of the potential of technology, leading to strained relations between residents, the municipality authorities, and the police. Over time, the heavy reliance on surveillance technology has shown signs of unsustainability. The reliance on surveillance technology may provide a temporary reduction in certain types of crimes, but it fails to address long-term problems (Figure 7.3).

5. Eroding Goals

This occurs when short-term actions or decisions undermine long-term goals. The pursuit of immediate gains may lead to unintended consequences that erode the achievement of broader objectives. An example can

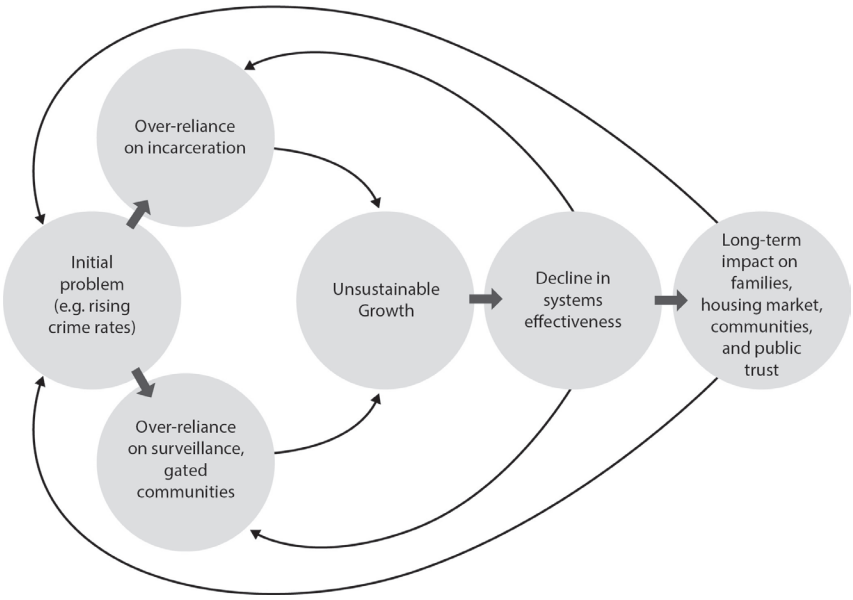

FIGURE 7.3 The progression from the initial problem through the "quick fix" to the unsustainable growth.

Source: Authors.

be the adoption of stop-and-frisk (stop-and-search) tactics. In New York City, for instance, the use of pedestrian stops increased dramatically in the 1990s as urban police departments transitioned from 'reactive' to 'proactive' policing strategies (Tebes & Fagan, 2022). In some neighborhoods, it is suggested that this short-term intervention has inadvertently eroded the long-term goal of the city, which is to build trust and positive relationships between law enforcement and the community. Over time, this erosion may result in reduced cooperation with law enforcement, making it challenging to prevent and solve crimes, ultimately leading to a decline in overall public safety and impeding the realization of the city's long-term safety goals.

6. Escalation

Escalation happens when two or more parties engage in competitive or conflictual behavior, each trying to outdo the other. This can lead to a destructive cycle of escalation with negative outcomes for all involved. In Sweden, cities like Stockholm, Malmö, and Gothenburg have experienced issues related to gang violence, shootings, and criminal conflicts (Sturup et al., 2020). These incidents are often linked to disputes over territory, drug trafficking, or other criminal enterprises. An initial conflict or violence between rival gangs can trigger retaliatory actions, leading to an intensifying cycle of aggression. This escalation not only poses risks to those directly involved but also has broader implications for community safety and social cohesion (Figure 7.4). Parallel circumstances are observed in New York City (NYC), where Herrmann (2021) identifies certain residential areas,

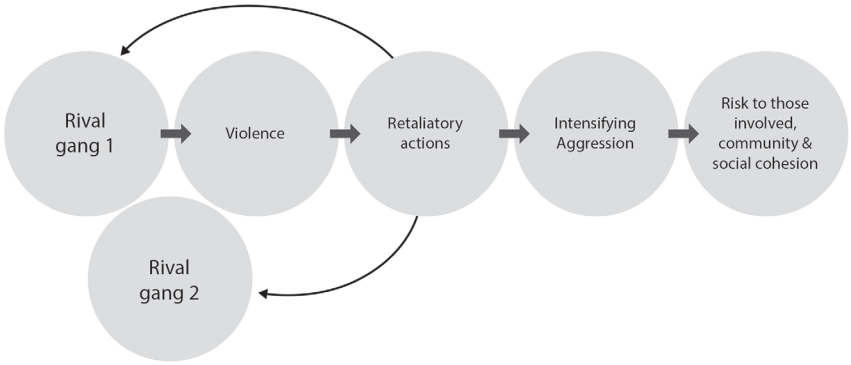

FIGURE 7.4 Escalation in extreme competitive behavior and gang violence.

Source: Authors.

particularly public housing developments, as exceptionally problematic related to gang violence. In these areas, rates of shooting victimization can be as much as 90 times higher than the citywide average (often affecting ethnic minorities). Such extreme disparities designate these public housing developments as some of the 'riskiest places' in NYC. The comparison between these two contexts underscores a global urban issue where specific areas in cities, impacted by socio-economic challenges and spatial segregation, become the focus of violent acts. Both cases illustrate the critical need for targeted urban policy and community-focused interventions to mitigate these high-risk places and enhance safety in deprived areas of big cities.

7. Tragedy of the Commons

This archetype involves the overuse or depletion of shared resources because individuals or groups act in their self-interest without considering the impact on the common good. For example, in rural areas with declining populations, there may be movements to combine smaller police services into larger ones to share resources and reduce financial constraints in times of austerity. If each municipality competes for a larger share of police resources, the collective demand can lead to the depletion of the shared police force's capacity. The overuse of law enforcement in individual municipalities without considering the overall impact potentially led to increased crime across the entire area due to the depletion of the shared resource. Therefore, it is necessary to balance the self-interest of individual rural municipalities with the collective need for effective and equitable law enforcement to avoid the tragedy of commons.

8. Success to the Successful

This occurs when those who are already successful or have an initial advantage are more likely to succeed further, creating a reinforcing loop that widens the gap between the successful and the less successful. Consider a scenario where law enforcement channels crime prevention efforts predominantly into neighborhoods with high crime rates, allocating additional resources to address prevalent issues. While this strategy aims to combat crime in its most acute form, it unintentionally reinforces existing disparities. Initial success in lowering crime rates in these targeted areas can attract more resources, funding, and attention, establishing a reinforcing loop. Consequently, these neighborhoods may witness further reductions in crime, heightened community engagement, and improved infrastructure. However, a challenge is that this success is not evenly distributed among all communities. Areas with initially lower crime rates might receive fewer

resources and less attention, perpetuating their disadvantage. Perhaps more problematic, some of these areas might have low crime rates but have a high proportion of violence against women and girls incidents as a total of all crime in their local area. Therefore, this type of crime is over-represented compared to the rest of the force. For local communities' violence against women and girls is considered highly problematic. However, this is not picked up at a strategic level due to the use of crime rates as a metric for deploying resources, which are ultimately only deployed to more urban locations. This reinforcing loop widens the gap between successful and less successful neighborhoods, creating an imbalance in the distribution of crime prevention resources and potentially exacerbating socio-economic disparities over the long term.

9. Seeking the Wrong Goal

This system trap involves pursuing a goal that, when achieved, does not address the structural cause of the problem or may even make the situation worse. Consider a busy train station that experiences a rise in pickpocketing (or pocket-picking). One response might be installing signage stating, 'Pickpockets are in operation in this area.' The goal is to reduce pickpocketing by raising public awareness about pickpocketing and changing passenger behavior to become more vigilant. Unfortunately, increasing awareness is the wrong goal. Offenders may use this signage to their advantage by placing themselves close to the signs. As passengers walk past the sign, they check that they have their wallet or phone by tapping their pockets where their valuables are, checking their bags, or even lifting an item out to check that they have it. Offenders are then able to visually see exactly where the passenger stores their valuables or who has the latest, most desirable, high-value phone. In this case, installing signage may not align with the goal of reducing pickpocketing.

10. Policy Resistant System

It is common in social systems to have situations when policy-resistant systems arise. According to Meadows (2008), this occurs when the subsystem's goals are inconsistent. In other words, if there is a discrepancy between goals, each actor will seek to correct the situation. To exemplify this problem, she cites the case of the drug markets in a hypothetical city, where various actors attempt to influence the stock of drugs in different ways. Drug addicts want to keep supply high to reduce costs; border enforcement and local law enforcement want to keep supply low, which increases costs; drug sellers want to keep prices stable to reduce conflict and reassure

buyers; and most citizens want to feel safe from robbery and other crime. All actors attempt to maintain their objectives. When one succeeds, they gain an advantage and shift the trajectory of the situation, such as making it challenging to smuggle drugs across borders. The other actors redouble their efforts to counteract this shift. This results in an escalation; street prices for drugs may rise, leading addicts to resort to increasing their offending levels to sustain their daily habits. The heightened prices generate more profits, enabling suppliers to acquire planes and boats to circumvent border controls. The collective counter-movements culminate in a stalemate, with the overall stock of drugs remaining largely unchanged (Figure 7.5).

This outcome is undesirable for all parties involved. In a system resistant to policy changes, where actors exert opposing forces, a considerable collective effort is required to maintain a state that none of the participants desires. If any actor eases their efforts, others will pull the system closer to their objectives, diverging further from the goals of the one who loosened their grip. The intensification of actions begets an escalation in responses from all other actors. Meadows (2008) warns us that the existence of

FIGURE 7.5 Meadows's example of a policy-resistant system with conflicting goals.
Source: Authors.

policy-resistant systems can be counter to overall intended goals, and therefore, recognizing and addressing the discrepancy between subsystem goals and overall goals is crucial for achieving systemic resilience and sustainability. It requires a shift from reactive, symptom-focused solutions to proactive, structural cause interventions that consider the long-term well-being of the entire system.

7.4 Examples of Less Successful Crime Prevention Programs

Two real-life examples of crime prevention programs are now discussed, which, whilst not explicitly systems thinking, reveal many of the common challenges faced by crime prevention initiatives that do not fully consider the complexity of adaptive systems. The first case is related to the case of drug crime prevention and violence programs in Brazil, and the second example from the UK is about changes to the licensing laws and violence in the nighttime economy.

From the Global South: The Case of Drug Prevention and Violence in Brazil

The PROERD (Programa Educacional de Resistência às Drogas e à Violência), akin to D.A.R.E in the United States, faced challenges in Brazil due to lack of consistency, long-term impact studies, difficulties in adapting the program to local contexts and needs, limited resources for comprehensive training and implementation, and the complex nature of drug abuse and violence prevention that requires multifaceted approaches beyond school-based programs. The aim of PROERD was to prevent drug use and violence among children and adolescents by educating students about the dangers of drug use, teaching them decision-making skills, and providing strategies to resist peer pressure (Sanchez et al., 2020).

The program offered temporary relief without fostering long-term resilience among the target population, what we normally call 'shifting the burden.' The problem was the pressure for a 'quick win' by focusing primarily on drug resistance education within schools. PROERD has not fully addressed the broader social, economic, and familial factors contributing to drug use and violence. Moreover, there have been solutions that initially seem to solve a problem but resulted in unforeseen consequences that worsened the situation, often called 'fixes that fail.' PROERD's implementation was not adequately adapted to the local context and lacked the necessary support structures such as community and parental involvement. The program's effectiveness diminished over time, failing to achieve its preventive goals. Finally, according to Sanchez et al. (2020), the program

faced challenges in consistently demonstrating its impact; it might have suffered from reduced expectations, drifting away from its initial objectives. Thus, addressing these problems requires a comprehensive approach that includes continuous evaluation and adaptation of the program and involvement of a broader set of practitioners and users, including families and communities. This project is still ongoing, with more than 8,000 followers, and may show positive results in the future, but this requires long-term assessment.

From the Global North: The Case of Changing the Licensing Laws in the UK

In November 2005, the new Licensing Act 2003 (LA03) was rolled out in England and Wales after gaining royal assent in July 2003. This abolished set licensing hours, which had been in place for over 50 years. Previously, pubs and bars typically closed at 11 pm, and nightclubs were closed at 2 am. It also brought together a set of separate regulations and moved licensing decisions from the police to local authorities. The intention was that this would give local people more say in licensing decisions and enable closing times to be staggered throughout the evening. The hope was to change the status quo and move away from two distinct closing times when violence offenses tended to peak (11 pm and 2 am) and 'drinking up' periods whereby higher volumes of alcohol were consumed by patrons just before closing time ('last orders'). Instead, the hope was for a more benign drinking culture to emerge. LA03 set out four clear objectives: to prevent crime and disorder, to promote public safety, to prevent public nuisance, and to protect children from harm. However, at the time of the Act, there were large concerns in the media and political pressures about the potential harm that might be caused by '24-hour drinking.'

The initial evaluation presented a mixed picture of change following this legislative change. In some cities, crime increased; in some, it reduced, and there was an overall small shift in the proportion of violent offenses happening in the early hours (3–5 am) in small localized places where only a few venues remained open. Therefore, the anticipated change in crime reductions was not realized, nor were the fears around the 24-hour drinking increasing crime and disorder observed. There are a range of potential explanations for this, including extraneous factors such as the UK smoking ban and the economic recession at the time. Other explanations include the impact of localized regulation and enforcement and how much of a change this had. However, one could argue that the most plausible explanation for the lack of change is that the "average increase in trading hours post LA03 for pubs and clubs was 21 minutes, and only 1% of premises that had

not previously closed after midnight extended closing hours beyond this" (Newton, 2011, p. 23). It can be argued that a change in policy to enable a staggered closing of pubs does not necessarily change drinking culture, and indeed, drinking cultures are ingrained within wider historical, cultural, and socio-economic characteristics of the place.

This policy change demonstrates several of the system traps identified by Meadows. For example, this could be considered a case whereby one or all of the following apply: accidental adversaries, a policy-resistant system, and seeking the wrong goal. When thinking about whose responsibility it is to maintain safe nighttime economies, there is a range of groups, including individual/groups of consumers; licensees and owners; the wider alcohol industry, including brewers; the licensing authorities; and those designated as responsible authorities by the LA03 (Police et al., Planning, Environmental Health, Child Protection, and Trading Standards). Did these organizations have shared goals? Indeed, there are several international examples whereby the police have argued for reduced trading hours, resulting in them changing their shift patterns to accommodate the changes. Those in public health have long campaigned for a minimum unit price and were potentially less supportive of a more relaxed trading policy. The alcohol industry and those who own licensed premises are driven by market forces; their goal is to make their business profitable. Therefore, they are likely not to stagger hours for the good of the community, as they need to employ staff and pay for the cost of utilities when they open, and thus, they are likely to seek opportunities to maximize their profits. Individual consumers also have their usual lifestyles and routines; they have their commitments to work and leisure or family, and thus are unlikely to stay out drinking in the early hours of the morning when they are at work, education, or training the next day.

7.5 Concluding Remarks

This chapter emphasizes the role of systems thinking in city governance, particularly in the contexts of crime and safety. By exploring the principles of systems thinking, the chapter provides practical examples to address challenges that arise when diverse groups struggle to align their efforts despite shared intentions, emphasizing the significance of considering systems traps such as feedback loops, unintended consequences, and policy resistance. We also present examples of risky places, such as schools and nighttime entertainment zones, in different contexts and continents, which we use to exemplify two case studies of the challenges faced. There are also some similarities in the systems traps that have been identified despite these two case studies being from two very different places. Both introduced

policies that sought to bring about behavioral change without properly considering the historical and cultural context of the places where they were carried out. They can perhaps both be viewed as a 'quick fix' to the problems evident, and whilst they sought longer-term change, they perhaps did not develop a consistent set of shared goals that included the beneficiaries and all agencies involved in implementing this change.

Integrating systems thinking emerges as an indispensable tool for fostering a shared understanding, addressing persistent problems, coordinating diverse initiatives, and avoiding rigid solutions. This knowledge proves instrumental in empowering local practice to collectively bridge the gap between people's aspirations and the reality of governance, contributing to more effective and sustainable city planning while addressing issues of crime and safety. In the remaining chapters of this book, we will explore how this can be achieved.

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8

RE-FRAMING METHODS FOR SYSTEMS THINKING FOR RISKY PLACES

8.1 Introduction

There are multiple benefits of using systems thinking to enhance conventional situational approaches for crime prevention at risky places. Systems thinking generates a common understanding of why problems persist. It moves beyond narrowly focused action-oriented approaches that often result in only short-term success, particularly in persistent high-crime areas. It helps to understand the different and sometimes conflicting priorities of multiple organizations and actors in operation. Indeed, isolated prevention efforts can undermine well-intentioned interventions. Systems thinking prompts individuals to evaluate their own priorities critically and supports them in identifying a shared language for communication. Integrating systems thinking is most needed when organizations seek to develop multiple disparate initiates at the same time without coordination. Ultimately, systems thinking empowers practitioners to establish a collective systematic theory of change. Stroh (2015) reminds us that integrating systems thinking is especially effective when people are pressurized towards solutions, for example, currently identified 'best practice,' which restricts, for example, engagement in continuous learning.

Complex systems such as risky places for crime are often superficially understood, resistant to control, and adapt rapidly to change. This makes it challenging to implement traditional situational crime prevention successfully in a sustainable way. However, combining these conventional strategies with systems thinking enables us to envision, design, and redesign systems to maximize the knowledge already at our disposal. Conventional

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situational crime prevention includes several tools and strategies, for example, environmental manipulation, police practices, community engagement, and innovative data science for advanced statistical analysis. Combining these approaches with systems thinking offers a powerful tool to enable comprehensive analysis of the complex set of interconnected factors that contribute to crime in risky places. By understanding the interdependencies in the system, interventions can be designed to address long-term change.

Systems thinking focuses efforts on 'leverage points' within a system, circumventing the need to dilute prevention efforts across entire systems. This enables practitioners to engage with uncertainty and adaptation. In practice, we may not have control over unexpected events, but with systems thinking, we can anticipate these and gain insights to help us embrace uncertainty. As Meadows (2008) suggests, this recognition frees up to develop new thinking. When we do not achieve the results we initially hope for, we are compelled to use more imaginative approaches. This then supports us in developing more effective, sustainable, and nuanced strategies to reduce crime and alleviate fear in risky places, which ultimately may support our efforts to achieve a more sustainable, safer world.

As previously highlighted (Chapter 3), situational crime prevention aims to reduce crime by focusing on environmental changes that increase effort and risks for the perpetrator and or reduce rewards by tailoring preventive measures to specific situations, such as improving surveillance, strengthening security, and managing access to targets. Systems thinking is a broader comprehensive approach that offers a longer-term perspective through which to consider the complex interplay of the built environment and social and economic dynamics. This approach identifies and mitigates risks more effectively by addressing the causes and interconnected factors that contribute to crime. Furthermore, it ensures proactive and sustainable interventions, enhancing safety by preventing crime before it occurs.

In this chapter, our goal is to re-frame our conventional methods of crime analysis for risky places. We seek to broaden these conventional approaches to support systems thinking and propose a skeleton structure to do so. A key step here is to assess the goals behind planning objectives and identify the primary beneficiaries of these. The effectiveness of an intervention should not simply be categorized into 'what is successful' and 'what is not.' It should be assessed by 'the degree of its success' and 'who it benefits and how.' Adopting systems thinking ensures each action and decision is inclusive and robustly researched, and inclusive. We believe this offers a more nuanced way to evaluate community safety interventions, moving beyond the simplistic categorization of what works and promoting a balanced examination of all strategies. Embracing reasons for failure can be equally helpful in understanding the long-term mechanisms that make places resistant to interventions.

This chapter provides the fundamental stepping stones for researchers and practitioners to achieve broader insights into the complexities inherent in high-risk places. While many of these tools may be familiar to the reader, we advocate the use of these tools in new ways. Data and resources permitting, we encourage practitioners to adopt more interconnected, long-term approaches in addressing the challenges of these environments. Given these challenges, before jumping into solution development, it is important to consider essential questions that should be addressed at the outset.

8.2 A Framework to Apply Systems Thinking to Study Risky Places

In what follows, we suggest the following steps as a framework to apply systems thinking to understand crime problems at risky places. We will describe each in more detail in the next section. This includes consideration as to how conventional situational crime analysis techniques could be integrated into systems thinking and the limitations of conventional methods for this. The steps are to:

- Envision the desirable system.
- Get 'the beat of the system.'
- Create well-informed models of the problem.
- Promote resilience, self-organization, and hierarchy.
- Focus on leverage points.
- Create forms of systems interventions.
- Include the beneficiaries.
- Expand the boundaries.
- Assess consequences and impact.

Envision the Desirable System

Knowing what we want involves having a long-term vision, and this, in turn, requires clear goals to be set on what is 'desirable' (Ackoff, 1994). Indeed, effective planning should focus on determining what actions to take rather than what actions to avoid. This framing helps generate creative and constructive solutions and broadens action beyond well-defined but narrowly focused interventions. The focus should be on solutions that recognize systems and incorporate system beneficiaries. Interactive planning supports this by using models and visualization tools to aid communication and understanding among participants. Its objectives go beyond generating ideas and support the translation of these ideas into actionable steps. By adopting Ackoff's principle, safety experts, police, and planners can go beyond reactive measures and envision a safer community.

Participatory methods in urban planning have a long history in Scandinavia (Ranhagen et al., 2017) and elsewhere, but their integration into crime and prevention is less developed (Ceccato, 2016). There are some examples of success here, for example, ongoing developments like Malmö's Western Harbor (Västra Hamnen) and Stockholm's Royal Seaport (Norra Djurgårdsstaden) in Sweden. These exemplify how participatory planning can effectively blend sustainability with community well-being (Bibri & Krogstie, 2020). However, despite their success, these projects raise some important questions. Perhaps the most pertinent is how we can better engage professionals with interests in fostering safer environments in crime prevention when this is not their primary focus.

Most multi-agency approaches to crime reduction focus on reactive measures. The traditional approach is to monitor crime change, identify new and relevant patterns, problem-solve at emergent risky places, and develop appropriate interventions. Whilst these move away from problematic silo approaches of single agency work, systems thinking offers substantial benefits to enhance partnership working. Questions that should be asked at multi-agency meetings are not about what problems are evident but what a city or neighborhood should look like in an idealized world. A potential methodology to support this is horizon scanning. This has been applied to crime reduction and policing more broadly (Johnson, 2024; College of Policing, 2020) but not specifically to risky places for crime. Visualizing alternative planning scenarios using virtual reality models, computer vision, and machine learning algorithms can be a way to support the process of creating a shared vision for a place, engaging experts and users (see examples at the end of this chapter).

Get 'The Beat of the System'

Systems thinking demands an in-depth understanding of the problems evident in risky places. Before formulating solutions, key questions need to be addressed at the outset. We shouldn't define problems based on the behavior of systems. Instead, we should consider the factors behind the absence of our preferred solution (Meadows, 2008). Extending this logic, we can't currently find appropriate solutions for crime prevention in risky places because we think we already know what the problem is and the best response for it. Instead of mapping out all possible alternatives, we frequently jump to a collective conclusion about how best to respond based on a loose collection of 'what works' evidence and seek to evaluate that response without paying sufficient consideration to both the problem and how the places and people who use them may evolve and adapt over time.

We should ask questions that better discern the nature of the problem, examining the different elements of the system and how they have

changed over time. How did crime, or fear of crime, become so high in that place, when did it start, and what are the underlying structures that led to this? Additionally, it is vital to understand the geographical and temporal aspects of the problem, the different demographics of those present, when and why they use that place, and with whom. These inquiries play a crucial role in shaping the choice of interventions and are integral to a broader problem-solving process.

Systems thinking approaches encourage us to explore a place's dynamics as it relates to its beneficiaries. Some possible ways to do this include safety walks and fieldwork protocols, which we return to at the end of the chapter. It is also useful to consider a system's 'strength,' what is working well, what isn't, and what factors underpin it. This may require examining these factors simultaneously, as it is often the interconnectedness of these elements of the system that underpins this.

Our conventional methods have supported an in-depth understanding of the short-term 'beat' of risky places (Chapters 4–6). We identified the 80/20 principles applied to several types of risky facilities, nodes, and paths across the Global North and South. Several methods for identifying spatial concentrations and clusters of crime exist, so-called hot spots. These include hierarchical clustering/partition or K-means clustering, kernel density estimation (KDE), Moran's I, and the Getis Ord. Figure 8.1 provides an example of hot spots created using the KDE method.

Risky facilities may be found within hot spots on a crime map. However, a hot spot of violence may be driven by several factors and not just one type of facility, such as a bar. The detection of a hot spot on a crime map helps focus our attention but does not identify underpinning drivers of risk. These might include an increase in the number of possible targets, an increase in the number of offenders, or decreasing levels of control. At train stations, the beat of the system is driven by peak and off-peak travel times, which create different opportunities for offending. For example, pickpocketing and unwanted sexual touching during crowded, busy times, and more violent offenses at off-peak times when fewer guardians are present. A recent study demonstrated evidence of a two-way transmission of crime between stations and their surroundings (Figure 8.2). This is an example of a metro station in the Global South that acts as a crime radiator and crime absorber (Chapter 3), as well as a two-way transmission of offending.

Whilst hot spots are a useful way to map the clustering of crimes, one further limitation is they do not represent underlying mobility networks (Chapter 6). Pathways are important as they reflect the movement in and out of and between risky and non-risky places. Indeed, a pathway itself might be risky. One way to analyze this is to examine hot routes of crime, originally proposed by Newton (Chapter 6). By delineating the street

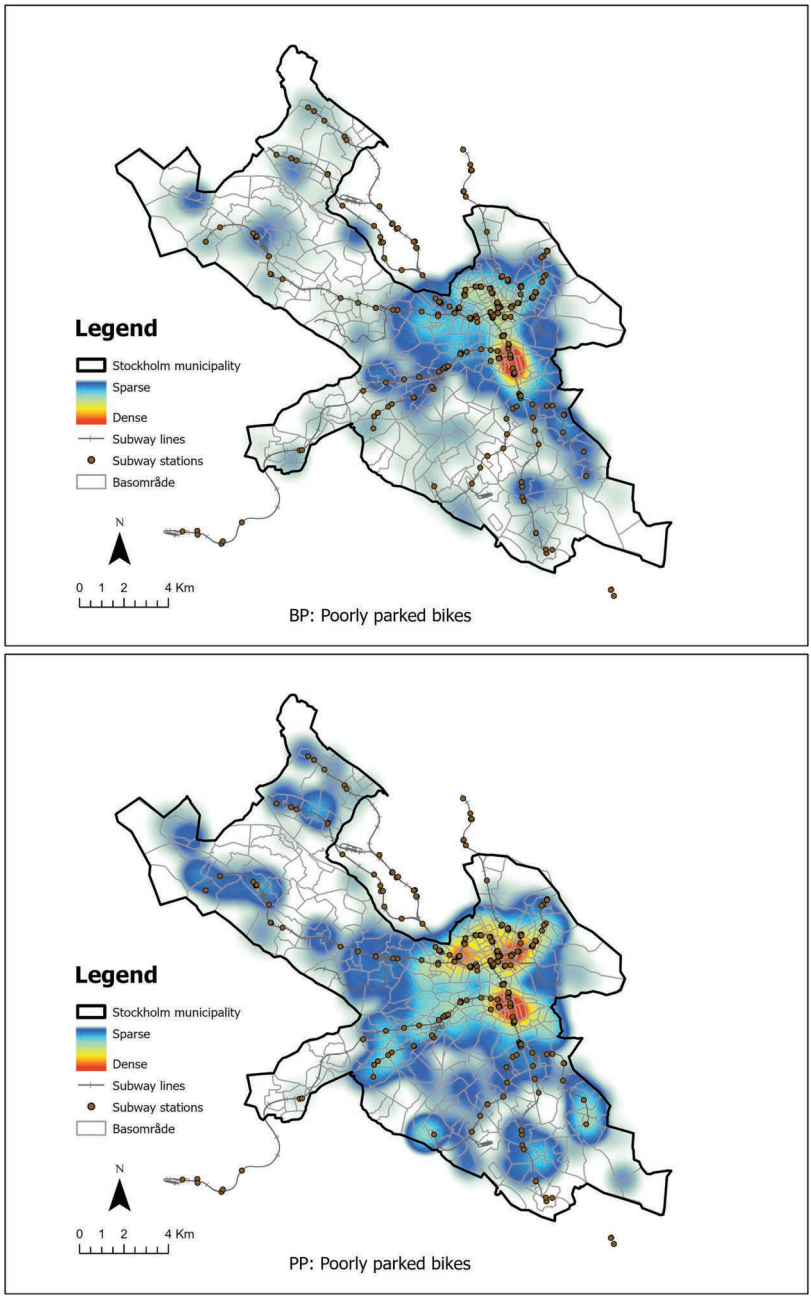

FIGURE 8.1 Example of Kernel density estimation (KDE) of poorly parked bikes around risky nodes in Stockholm, before and after stay-home orders. BP = Before pandemic restrictions (a) and PP = After pandemic restrictions (b).

Source: Ceccato et al. (2023).

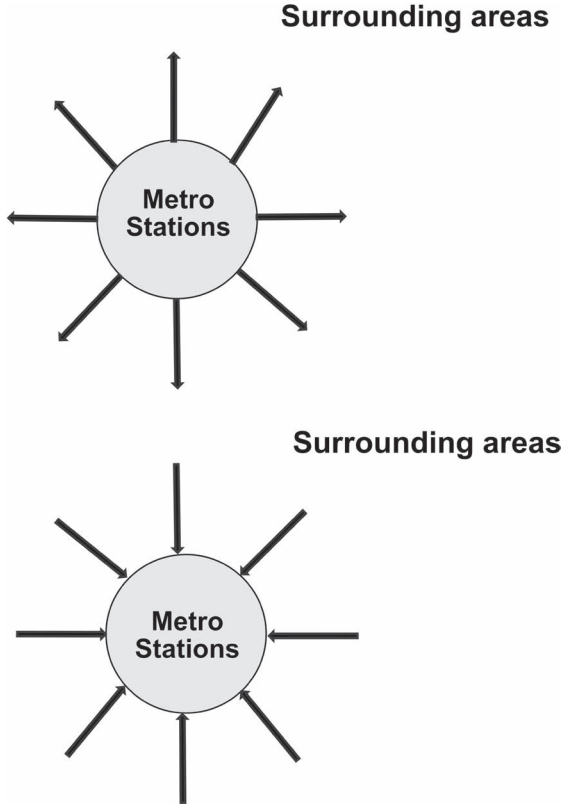

FIGURE 8.2 Crime transmission in and around São Paulo metro stations, Brazil. *Source:* Moreira and Ceccato (2021, p. 3).

network into street segments, it may be possible to identify the paths taken by users of the system and how they inform risky places.

We are aware of several other spatial and temporal approaches to analyzing and detecting crime in risky places. Examples include location quotients, the crime harm index, and risk terrain modeling. There isn't space here to cover these and other approaches in detail, so we refer the reader to the Handbook by Groff and Haberman (2023).

We stated earlier in the book that risky places are not risky all the time, and alongside spatial methods, it is important to consider temporal patterns of crime in risky places, especially when identifying its 'beat.' Newton (2015) uses the 168-hour week to examine the tempo of crime offenses, which we argue can support an understanding of the rhythm and tempo of crime (Chapter 3). In Figure 8.3, we provide an example of a 168-hour week profile of a robbery committed by an anonymous UK police force.

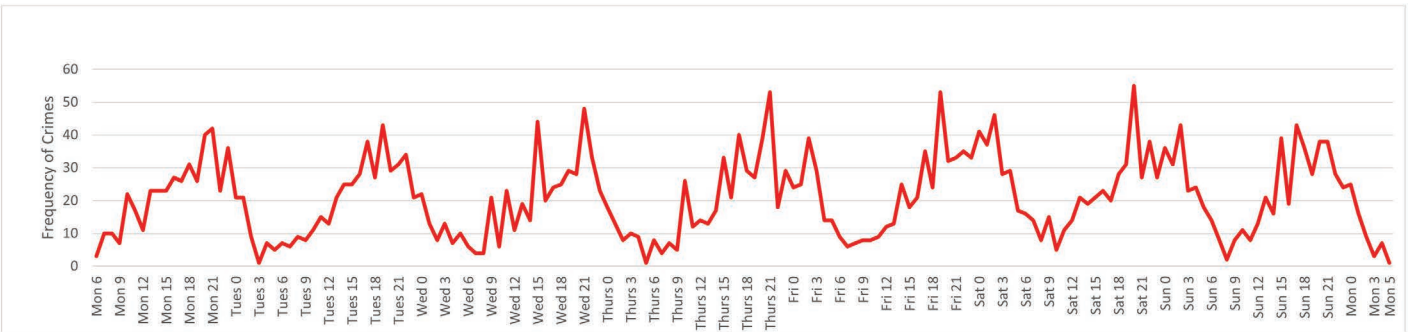

FIGURE 8.3 Temporal robbery patterns over the 168-hour week.

Source: Author.

Despite multiple methods for spatial and temporal analysis of crime patterns, we suggest there are insufficient methods for analyzing changes that occur in both place and time together. Two conventional methods are the Knox Mantel test and the space-time Kulldorff scan. The Kulldorff scan test creates space-time clusters based on an underlying denominator variable, such as population or number of households. It detects statistically significant clusters of crime in both place and time and avoids problems of repeat testing. An example of this is provided in Figure 8.4. The Knox Mantel test is used to identify repeat and near-repeat victimization in space and time (Chapter 3). It is more commonly used at the micro-scale and useful as it considers the influence of physical distance and time in hours between two or more crimes.

An alternative approach that could be used to better understand connections and hierarchies within systems is the space-time budget developed by Wikström in their longitudinal study of young people, known as the PADS study. The space-time budget (Chapter 6) is similar to a diary and provides detailed information about where a young person is, what activities they do there, how long they spend on this, and their emotional state at the time. When these are aggregated into patterns, we can better understand the behavior of young people as one element of a broader system. This approach offers much promise for supporting systems thinking approaches and individual interconnections of young people and their mobility patterns.

Creating Well-Informed Models of the Problem

Models can be used to provide a visual representation of interconnected elements that contribute to a crime problem. They help practitioners better understand the dynamics of a system and should include feedback loops and leverage points. Models help identify the structural causes of a problem rather than focusing solely on symptoms. They encourage long-term systemic solutions rather than short-term fixes (Meadows, 2008). Practitioners can use these approaches to rule out potential mechanisms that may seem intuitive but, after closer inspection, do not effectively address the identified causes. For instance, increased police presence may disrupt offending in the short term but is unlikely to reverse existing and reinforcing loops of poverty. Indeed, 'heavy-handed' police patrols could make the situation worse in areas with high levels of police mistrust.

If the saying 'not all knowledge is created equally' is true, then perhaps we can't use different forms of knowledge in the same way. Research knowledge provides solid theoretical foundations and understanding of processes within systems; organizational knowledge offers practical lessons

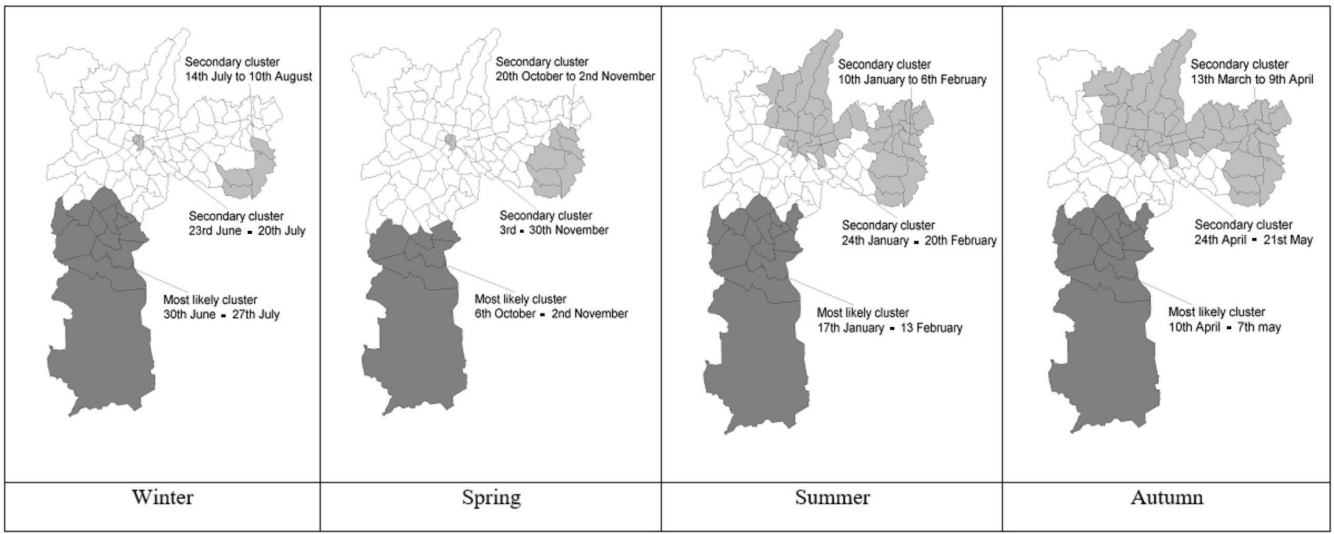

FIGURE 8.4 Homicides space-time clusters in São Paulo, Brazil, by season using Kulldorff's scan test (significant at 99%).
Source: Ceccato (2005, p. 318).

from past experiences about key elements and functions of a system; and insights from professionals contribute expertise to future planning. Integrating these forms of knowledge may be key to developing better partnership approaches. However, caution should be exercised as collaboration will not necessarily reduce overreliance on finding examples of 'what works.' The problem here is the lack of critical assessment of these.

One model that has grown in prominence more recently is to incorporate theories of change into crime prevention evaluations. Examples include theories of change, realist theories, and logic models. These break down crime prevention responses into inputs, outputs, and outcomes to identify if the outcome of a planned response has been realized. However, these types of models are generally linear and do not include feedback loops. They do not consider iterative change, nor that resilient systems may adapt or respond to new interventions. We suggest models that adopt theories of change should include feedback loops and leverage points.

Within the systems thinking literature, we identify two approaches that could support modeling. The first is quantitative or hard models, more akin to systems analysis (see Chapter 2). The second are 'softer' models derived from qualitative methodological approaches. Softer approaches to systems thinking are equally as valid as quantitative methods and should be incorporated into our thinking. Soft Systems Methodology (SSM) is an established methodology for this, which suggests that organizational and human factors should be intertwined with problem-solving approaches (Checkland & Scholes, 1990). Through qualitative methods, an in-depth understanding of problems can be developed through discussion with key communities and policymakers. The mnemonic CATWOE is used to frame this: Customers, Actors, Transformation process, Worldview, Owner, and Environmental constraints. This has been widely used in other disciplines and practice but has had limited uptake in crime prevention.

Promote Resilience, Self-Organization, and Hierarchy

Understanding and applying the principles of resilience, self-organization, and hierarchical structures may significantly enhance our ability to address long-term crime problems in risky places. Some urban spaces exhibit strong resilience to crime prevention, quickly 'recovering' from change and/or adapting to new circumstances. To address this, we need a resilient approach to foster strong community ties, social cohesion, and collective efficacy (Sampson, 2017). However, organizations may lose resilience if feedback mechanisms are delayed or distorted (Rudolph & Repenning, 2002). Practitioners should ensure feedback mechanisms for crime prevention are streamlined and avoid unnecessary layers of delay and distortion.

The promotion of self-organization in communities can enhance their ability to address emergencies or crises without centralized control (Nan & Lu, 2014). In certain major cities, administrative structures are configured for self-organizing functions, enhancing adaptability and robustness to address dynamic crime and safety challenges.

Meadows (2008) suggests that systems that establish hierarchical governance structures are more likely to promote 'order.' An effective 'chain of command' that balances central coordination and subsystem autonomy will likely yield optimal functionality for crime prevention. This structure allows for the efficient dissemination of safety protocols and ensures consistency and compliance across different administrative levels. Moreover, standardized safety guidelines that are adaptable to various scales, from national policies to localized implementations, promote a cohesive and comprehensive approach to ensuring public safety. This integration fosters a system that is not only well-organized but also capable of responding to safety challenges with agility and uniformity across different tiers of governance.

Focus on Leverage Points

There should be strategic efforts to identify leverage points, as small changes to these can yield significant and lasting change. A pertinent question to ask here is who should identify and define leverage points in a system. A conventional approach might be to ask practitioners and policymakers who are considered experts in their field. Alternatively, communities could be empowered to identify and bring about change at these leverage points. Moreover, a further question arises once we have identified what we think are the right leverage points. How do we know if these are the right ones?

A recent response to violence that has shown to be effective is the use of 'hot spot policing' in high-crime areas (Braga et al., 2019). Can we implement these at geographically identified leverage points to make them more sustainable? An alternative methodology to hot spot analysis of crime is to conduct safety walks with communities to identify places or conditions that contribute to safety concerns. A range of methods exist to engage local community members in safety initiatives, such as regular community policing sessions in neighborhoods where officers interact with residents and businesses. This could be through traditional surveys, interviews, focus groups, more innovative crowdsourced data collection, or through co-creation frameworks. We explore these further at the end of the chapter.

We know complex systems adapt and evolve, and a limitation of our conventional crime analysis is that we tend to run our analysis over a defined time window, for example, a rolling four-week period or over the past 12

months. Townsley (2008) proposed a hot spot plot to consider the stability of crime hot spots. This suggested several different types of hot spots where crime levels have been: consistently high for a substantial period of time; used to be high but are no longer increasing; and are episodic. Applying this enables us to consider how risky places for crime adapt and evolve within a system. It also reminds us that to achieve sustainable reduction, we may need to extend our typical post-evaluation over longer time periods to account for system adaptation and resilience.

An alternative approach that has been used in crime prevention is the use of crime scripts, which break down a crime event into a sequence of actions and actors (Chainey & Alonso Berbotto, 2022). These have been used, for example, for child sex trafficking, by deconstructing key steps in the process and using these to develop a set of outcomes-focused recommendations for practice and policy. It also is used to identify pinch points to target where interventions may be more fruitful. However, a limitation of this is that scripts are very linear and do not allow for feedback loops, resilient systems, or adaptive systems.

One of the limitations of traditional methods for detecting risky places is that leverage points might be far removed from the risky places we have identified. Therefore, the microanalysis of risky places discussed in Chapters 4–6 of this book may only identify the symptoms of a problem. What they are unable to identify are the intermediate causes, which could be considered as low leverage points, and, more importantly, the structural causes of crime, which are the high leverage points we need to identify.

Create Forms of Systems Interventions

There are perhaps two types of planning methods relevant to developing forms of systems interventions. 'Reactive planning' is designed to respond to existing issues and mitigate immediate concerns. For example, responding to street crime outside an establishment despite that has persisted for several years. Stroh (2015) states that people generally think 'doing more automatically leads to accomplishing more,' which is often not the case. This leads to tiredness and people disengaging when they do not achieve the desired result. Moreover, the large number of choices as to what to do and the limited resources available can be overwhelming. Achieving change requires focused and coordinated efforts, informed by a broad range of beneficiaries and emphasizing fewer key changes sustained over a longer time rather than a 'scattergun' of multiple interventions.

'Proactive planning' is an anticipatory approach to address potential issues before they arise by amplifying what is already working, reinforcing loops that lead to further success, or readdressing current shortcomings

that impede future goals (Stroh, 2015). An example is a team of architects creating a set of scenarios for a new housing development, a shared vision, and a set of priority goals aligned to sustainability. Applying systems thinking proactively helps to create paths of action that account for complexity and envision long-term goals. To plan for sustainable success or change, we need to be aware of what might go wrong and the possible risks and delays to implementation.

Knowledge building serves as a foundation in planning processes. Reactive planning relies on a deep understanding of current problems. Proactive planning requires foresight and awareness of potential issues to create safer and more secure environments with built-in flexibility. A multifaceted approach may be most effective here. When considering the 80/20 Pareto principle, coercive measures could be introduced for those who own and/or manage facilities with the most problems. Examples include publicity, sanctions, certification programs, voluntary codes of conduct, and performance standards. In risky places, safeguarding targets may involve landscape changes and physical barriers, potentially impacting certain groups or society at large. Major alterations might be costly and aesthetically undesirable, leading to conflicts with sustainability goals, such as the trade-off between safety and increased energy consumption.

One technique that might achieve sustainable change is 'placemaking and place activation.' This prioritizes citizens' ideas as the foundation of the planning process and emphasizes the inclusion of all groups. It seeks to enhance social life in existing outdoor spaces with the expectation that attracting the right type of people will positively impact safety. Risky places may benefit from targeted collaboration between local private and public site managers, such as Business Improvement Districts (BID). In Sweden, experiences with BID have shown potential benefits in preserving diversity among property owners. However, there are some concerns about creating monopoly situations. Evaluations in Malmö suggest BIDs have had a mixed impact on crime reduction. In Malmö, the BID emphasized the complexity of collaborative efforts and the varied impacts on crime and safety in different urban contexts (Ceccato & Petersson, 2022). Again, whilst placemaking embraces partnerships, they are often linear and do not consider interconnectedness and potential feedback loops.

Eck et al. (2024) have developed the General Problem-Solving Matrix (GPSM) to create an integrated tool for crime prevention. This builds on knowledge from public health by adopting the Haddon Matrix and combining it with the crime problem triangle (Chapter 3). It seeks to extend prevention solutions beyond the immediate crime event to include 'early warnings' and 'aftermath.' The matrix considers events before, during, and after a crime, aligning with systems thinking principles. Table 8.1 is

TABLE 8.1 General Problem-Solving Matrix (GPSM) applied to an off-campus burglary reduction project.

	Offender	*Handler*	*Target/Victim*	*Guardian*	*Place*	*Manager*
Before	o Create watchlist of known burglary offenders o Focused deterrence messaging	o Talk to parents of juvenile offenders	+ **Knock & talk awareness** + **Social media awareness** o Distribution of alarm systems for high-risk properties	+ **Notifying parents** + **Consult with the university resource**	o Predict the highest risk places for police visits with residents	+ **Landlord Education**
During	o Monitor offenders during peak times		o Real-time reporting to social media platforms/hotlines	o Create student patrols of high-risk streets	+ **Directed patrols** + **Visibilityimprovements** o Place CCTV and license plate readers at hotspot thoroughfares	o Have landlords check building security at high-risk times
After	o Knock & talk with known offenders		o Community social media notifications of burglary incidents	o Create a cocoon neighborhood watch	o Post temporary signs about recent burglaries for residents	o Monitor social media sites for offenders selling stolen goods

Key:
o–possible interventions not used
+–interventions used

Source: Eck et al. (2024).

a retrospective demonstration of how the GPSM could have been used in a university campus burglary reduction project. Items with '**+**' in bold are solutions the team applied. During the selection of tactics, possible solutions discussed are marked with 'o.' This matrix offers a significant step towards a broader approach. However, to align with systems thinking, non-linear dynamics, feedback loops, and the interconnectedness of social, economic, and environmental factors across multiple scales need to be incorporated. It also needs to move beyond specific contexts or scales to consider broader system dynamics and cross-scale interactions central to systems thinking.

Include the Beneficiaries

In general, conventional situational prevention does not adequately involve the beneficiaries of interventions. Much of the emphasis is on the roles of place managers and capable guardians (Chapter 3) and, more recently, the potential for bystander intervention programs. However, there is also a need to integrate other users of places and consider those who may be more vulnerable.

Cultural and gendered sensitivity is paramount for tailoring crime prevention strategies with the varied norms and values of the community. An example of sensitivity is gender and LGBTQI+ community-related public safety measures in nighttime entertainment zones. For example, facial and other recognition technologies may cause concerns. Engaging with LGBTQI+ organizations and community groups can facilitate a better understanding of their specific concerns. This applies to other groups who may be vulnerable, including ethnic minorities, older adults, and those with disabilities. It is essential to consider accessibility and inclusivity when designing prevention measures so they may benefit all users.

Community engagement is a cornerstone for active participation from residents, businesses, and practitioners. Safety surveys are important tools for gaining nuanced insights from diverse users about safety concerns. This helps identify vulnerabilities across different groups and for tailored prevention that is appropriate for diverse groups within a community. An example is the audit carried out by the Stockholm City crime prevention program. Figure 8.5 shows how this information helped obtain a better understanding of safety conditions around transportation. Dots indicate the respondents' places of residence when they perceive the subway station as unsafe. Squares represent those who perceive the walk to/from the station to be unsafe.

Part of our understanding of risky places results from extensive studies into who are the victims of crime and how this victimization can manifest in

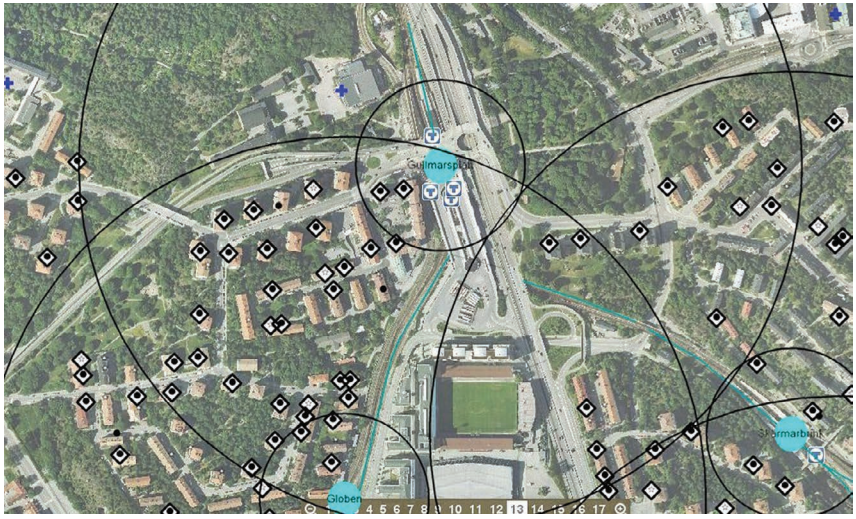

FIGURE 8.5 An example of the analysis using geodata from the perceived safety survey around a metro station in Stockholm, Sweden.

Source: Ceccato (2013, p. 100).

risky places, and two phenomena we identify in Chapter 3 were Repeat Victimization (RV) and 'Near Repeat Victimization' (NRV), which we found in the Global North and Global South (Chainey & da Silva, 2016). Whilst we have a good understanding of repeat victimization at risky places (Chapters 4–6), we rarely consider the specific set of circumstances that brought victims to that place. A systems thinking approach requires that we know more about the factors that led to the convergence of an offender and a victim and the broader system that the offender and victim are part of.

Expand the Boundaries

Meadows (2008) advocates for the breaking down of traditional 'silos' and encourages a collaborative approach to problem-solving. Instead of applying isolated, reductionist methods, we should seek to develop a comprehensive understanding of the range of factors contributing to crime at risky places and to identify system feedback loops and interactions across multiple scales. These levels of interaction may be local, regional, national, or even global. We need to include rural, suburban, and regional scales, or the rural-urban continuum. Applying systems thinking beyond urban areas also involves collaboration across various disciplines, bringing together insights from ecology, sociology, economics, environmental science, and more.

Given our previous discussions of crime concentrations, one important initial question might be what scale or resolution to examine these risky places. Indeed, most studies have used macro, meso, or micro geographies for this. Theoretically, we could consider at what scale the risky place functions or the most appropriate spatial representation of that place. Alternatively, our detection might be data-driven, restricted by the lowest resolution of data that can be captured about our indicators of risk, which we often translate into measurable variables. Macro scale considers bigger units, such as cities or even larger metropolitan areas. Meso-level geographies tend to be smaller units, such as neighborhoods. Micro-level geographies are the smallest units of analysis available and usually refer to street blocks, street intersections, or spatial clustering of crime. Theoretically, we could examine risky places for crime at any scale, for example, an international comparison between countries, a regional comparison within one country, or examining municipal boundaries. The question is perhaps, therefore, 'Which scale is best'?

Recently Hipp and Williams (2021) argued that risky places should be examined at the micro level, but individual households should also be considered within their meso-geography. He argues this reflects social and physical distances common to the characteristics of crime victimization. This also suggests that scale can be considered using a multilevel model. When seeking to employ a systems thinking approach, we can scale up our analysis of small-scale processes to bigger geographies, especially when considering how risky places fit within a wider system. The macro-environment can be highly influential on what happens locally—for example, comparing a vibrant, growing city with a suburban commuter belt or a declining industrial area. Therefore, whilst we urge the reader to reconsider the scales they use and the potential of expanding the boundaries of a system beyond the risky place under investigation.

Recent studies by Hammer (2011) and Herold and Herold (2017) have identified that violent crime events need to be examined beyond the immediate crime site. They identify additional nearby places that are prominent in violent networks, including convergent settings, which are places of routine meetings; comfort spaces where offenders meet privately for supply; stashing of equipment and planning; and corrupting spots that facilitate crime elsewhere, such as money laundering. When exploring organized crime networks at risky places, analysis focused on crime sites will only examine one of these four elements, and disruption at the crime site will not have a long-term impact on the network.

Geographical boundaries are not the only type of boundary we should consider for systems thinking. We also include interdisciplinary boundaries here, both from academia and practice. If we are to broaden our

understanding of risky places, we need to develop our knowledge of risky places from a wider range of relevant practices and policies. Without these, we will be unlikely to succeed at understanding structural causes and identifying the most important leverage points.

Assessing Consequences and Impact

By setting realistic goals, we can ensure that our objectives are attainable and align aspirations with practical outcomes. Clear definitions of key indicators and metrics provide measurable benchmarks, facilitating accurate evaluation and adjustment of strategies. By encouraging a shift in perspective toward short and long-term considerations, we promote more comprehensive planning and sustainable outcomes. By exploring possible consequences, we emphasize the importance of ripple effects, fostering foresight in decision-making, and embracing uncertainty. Promoting a commitment to continuous learning supports processes that consider adaptability and refinement, enabling organizations and communities to evolve as a response to changes in circumstances, which in turn can foster resilience and increase our effectiveness in addressing and responding to complex challenges such as risky places of crime.

When designing prevention responses, we need to consider both overall outcomes and how the chosen response impacts diverse groups within a system. Evaluating the same action across multiple locations provides insights into their effectiveness. Methods should include detailed documentation of environmental improvements for ease of replication and modification. Regardless of the chosen method, planning the evaluation before initiating measures is crucial. As an example, Table 8.2 illustrates the impact of measures in risky places against the 2030 sustainable goals.

Crime prevention measures in a city can have varied consequences across different areas and demographic groups. Several techniques create 'inventories' for safety and crime. One strategy is Security Certification, a quality control approach aimed at reducing crime exposure in residential properties. Verification is conducted through a tailored checklist that is adaptable for both existing buildings facing crime issues and planning new residential or public spaces. There is a range of schemes in operation that support this.

Neighborhood Watch Schemes promote activities that enhance residents' engagement and participation in crime control, fostering community cohesion efforts that can be crucial for effective crime prevention. Safety Walks such as Night Patrol, also known as Parental Walk or Adult Walk in Sweden, involve groups of adults actively moving through urban spaces to create a safer environment, particularly where young people gather during evenings and nights. Social Impact Assessment offers a comprehensive

TABLE 8.2 Impact of measures in risky places and risks against the 2030 sustainable goals.

Types	*Cause*	*Intervention*	*Impact/Risks of interventions*
Crime generators	Many unprotected crime targets	Increase protection—under what circumstances are the targets of crime exposed? How can this vulnerability be reduced?	Costs of various kinds for other individuals who do not commit crimes. Exclusionary design (grills in windows and facades, fences around parks and squares, barriers that limit movement).
Crime attractors	Attracts individuals who commit crimes	Deter individuals who commit crimes. What attracts them? How can it be changed?	Vulnerable groups may feel singled out. Actions (e.g. lighting) go against other 2030 SDG targets, such as energy consumption.
Crime enablers	Erosion of social control	Reintroduce surveillance, control of individual behavior or the management of a place—Who can control individual behavior?	Costs to increase surveillance. Less freedom due to monitoring during a certain time/place. Resistance of place managers against measures, for example, body worn cameras.

Source: adapted from Clarke and Eck (2003), p. 51.

package for analyzing, monitoring, and managing interventions' intended and unintended consequences. In Sweden, Social Consequence Analysis (SKA) facilitates the articulation of these consequences and the identification of social needs in the built environment. SKA sheds light on conflicts of interest and proposes measures. These techniques provide a multifaceted approach to addressing safety concerns, ensuring a broader proactive stance in promoting safety and crime prevention at various levels of urban planning and governance.

During times of austerity, there are increasing pressures to 'work smarter' and a desire to know 'what works.' For example, the UK now has 13 'What Works' centers, which have supported a drive to increase the use of randomized control trials or quasi-experimental designs in evaluations.

One limitation of these designs is that the post-intervention period is often short-term, for example, 12 months post-delivery. What is lacking is an understanding of the sustainability of these interventions. Evaluation studies have begun to include synthetic control method (Abadie et al., 2010) to estimate the impact of an intervention against one or multiple action interventions. They represent the counterfactual outcome of the treated unit, in other words, if the intervention was not carried out. These weighted controls could be thought of as similar to large-scale panel data, as they can include multiple relevant variables in their construction of the appropriate synthetic weights. Whilst these have been used for evaluations, we suggest that there is scope to use this approach within a systems thinking approach. Synthetic control method could be developed to model multiple variables within a system, and then their change could be tracked longitudinally and spatially over time.

8.3 Conventional and New Sources of Data and Methods

There are a range of conventional data sources and methods used to understand crime and risky places. Examples include large-scale surveys such as the Census of Populations and victimization surveys such as the Crime Survey for England and Wales. Crime concentrations are also detected using police-recorded crime and calls for service data. Alternative ways of understanding risky places are to use interviews and focus groups, ethnography, and observation. However, these approaches alone are not sufficient to advance systems thinking approaches to risky places. In the final section of the chapter, we outline some alternative methods that we could draw to support systems thinking approaches.

Co-Creative Participatory Schemes

Involving users/beneficiaries in systems thinking through a co-creation process can be a powerful approach to solving complex problems. Co-creation is a collaborative innovation process where those with vested interests work together to produce a mutually valued outcome, combining insights, skills, and contributions to develop new products, services, or solutions (Ramaswamy & Ozcan, 2018). Co-creation has supported urban planning (Leino & Puumala, 2021) and crime prevention (Degnegaard et al., 2015). To involve 'beneficiaries' through co-creation, it is necessary to identify the target groups. Co-creation workshops can be face-to-face or digital and can be used to include the beneficiaries in the design of appropriate solutions and the identification of leverage points. This iterative process creates collective knowledge, fostering sustainable outcomes through shared understanding. Beyond traditional participatory frameworks set up

by researchers researching sustainability transitions, Chilvers et al. (2021) developed a novel method known as distributed deliberative mapping by integrating case mapping of public engagement in energy systems with deliberative mapping that involves both citizens and experts in envisioning system futures.

Fieldwork Protocols

Fieldwork Protocols (FPs) can collect on-site data for three elements of risky places by collecting structured and systematic information about the nature of a place. Ceccato (2022, p. 168) defines FPs as "a predesigned form used to record information collected during an observation or interview." They vary from highly structured checklists to more flexible templates or itineraries employed in safety walks. FPs can help elucidate the links between crime and the environment in a more systematic way. Combining FPs with data mapped using CAD and GIS provides a solid toolkit for inspecting safety conditions in public spaces, as well as both the internal and external environments of facilities. They could support systems thinking approaches if they are broadened out beyond the immediate risky facility under inspection.

Space-Time Budget Methodology

Space-time budget is a tool used to track and analyze the movements and environments of individuals over time. This dates to the late 1960s, when Hägerstrand suggested the concept of space-time prisms (Chapter 3) to illustrate how an individual navigates through a city. In criminology, space-time budgets have been used to capture individual's exposure to various environments that could influence criminal behavior (Hardie & Wikström, 2021). The growth of 'big data' allows the continuous tracking of individual movement patterns through a relatively inexpensive collection of mobility data, for example, GPS signals on mobile phones (Ceccato & Wikström, 2012), to model spatial interactions in near real-time.

Ecological Momentary Assessment

Ecological Momentary Assessment (EMA) is a method of collecting data about subjects' behaviors and experiences in real time. It avoids the retrospective bias that can occur with traditional self-report measures where individuals are asked to recall behaviors and feelings. Irvin-Erickson et al. (2020) uses EMA techniques to collect context-specific data on individuals' fear of crime. Within systems thinking, EMA data can be used to analyze individual experiences and understand how they are shaped by and impact the surrounding systems.

Virtual Reality

Instead of testing scenarios or interventions, one alternative is to test them using Virtual Reality (VR) (Figure 8.6). Virtual reality (VR) merges realistic virtual environments with user interaction, offering unique opportunities to study specific features like lighting conditions. By enabling the manipulation of certain aspects of an environment, VR helps create scenarios that reflect diverse user needs, which is crucial for sustainable urban planning. Diverging from a typical virtual tour, this technology can serve as a planning tool, facilitating shared experiences by navigating a virtual environment and discussing sensory perceptions. Virtual safety walks introduce a novel form of engagement, capitalizing on 'gaming' models for planning. Virtual safety walks have been used in Finland, with workshops using municipal actors, practitioners, and decision-makers. This facilitated innovative assessment, discussion, and development, enabling designers to test multiple planning and design variants.

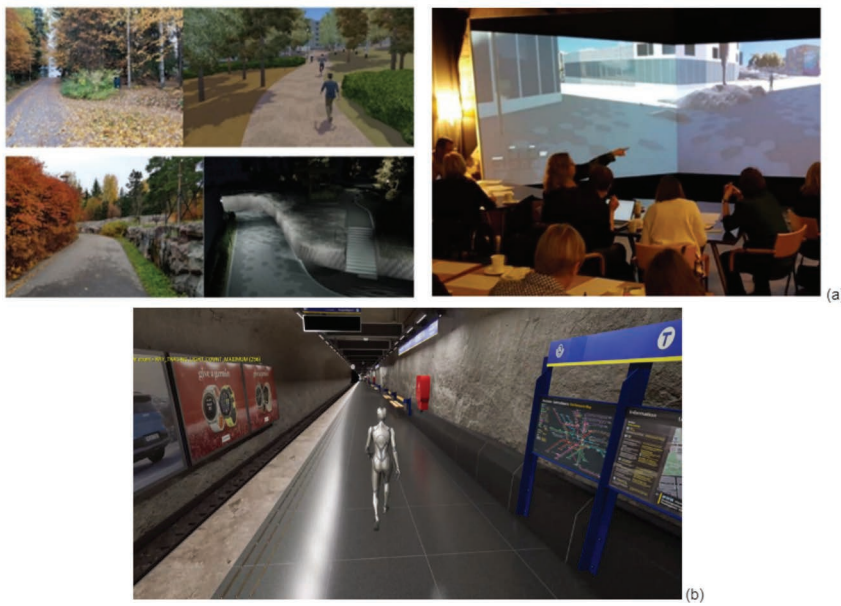

FIGURE 8.6 (a) Virtual safety walks to test security solutions in Finland. (b) Virtual reality in a subway station testing lighting conditions for visually impaired travelers.

Source: Ceccato (2024, p. 174) adapted of Mäkeläinen et al. (2019, n.p.)

Social Media and 'Platial' Analysis

Social media data provides a wealth of real-time, user-generated information, offering insights into public views, trends, and behaviors. Researchers and businesses leverage this data for market analysis, trend prediction, and understanding public opinion, fostering informed decision-making and strategic planning. It can also serve to support decisions to more accurately allocate resources to places and groups that have the greatest need (Ceccato et al., 2021). Unlike traditional spatial analysis, which focuses on precise geographical coordinates, boundaries, and spatial metrics, 'platial' analysis focuses on what makes places unique and significant to people, with a more relational perspective. 'Platial' analysis recognizes that each place has its own identity shaped by cultural, historical, social, and emotional factors. Platial analysis of social media is used to collectively make sense of and cope with a disastrous event through emotional support, emotional venting, and positive thinking. We suggest platial analysis could be incorporated into systems thinking, given its role in providing a comprehensive, qualitative view of places, to enhance policy-making and planning through deeper insights into human experiences and cultural dynamics.

Google Street View and Google Reviews

Instead of conducting expensive and time-consuming fieldwork, we can use Google Street View, Google Reviews, and other similar online tools to carry out 'mini-fieldwork' to inspect features of the environment and quickly identify problematic areas (Ceccato & Paz, 2017). Researchers can conduct virtual audits of urban environments and assess factors such as walkability and the presence of green spaces. Studies have explored the nature of micro places and individual facilities by examining user ratings of these places (Snaphaan et al., 2024). Whilst they are not explicitly related to risk, they do offer insights from the beneficiary into how well a place is managed and run. For restaurants and bars, this can also be used to get beneficiary perspectives on the ambiance of, or how a place feels, which may be indicative of crime risk. Moreover, computer vision has been used to support the analysis of the built environment to detect mismatches between where crime happens and where people feel unsafe (Kang et al., 2023). Image semantic segmentation has been used to calculate the proportion of elements of the landscape and associate them to measures of perceived safety using Google Street Views images and machine learning (Abraham et al., 2023) with insightful results that help to provide clues for better planning residential areas.

Remote Sensing Data

Utilizing photographs or satellite images provides a foundation to illustrate how various locations influence crime in their immediate vicinity. Remote sensing has been used in several criminological studies (Ceccato & Ioannidis, 2024). They can provide insight into our understanding of risky places by identifying features such as facade type, building height and density, window types, the presence of cameras or alarms, and vegetation. Measures of illumination from remote sensing data can provide us with information about unlit areas that might contribute to feelings of unsafety. Ioannidis et al. (2024) used remotely sensed data and spatial statistical modeling to examine how building density affects residential burglary and street theft in Stockholm, Sweden. By employing the Global Human Settlement Layer (GHSL) from Sentinel 2A imagery, researchers created indexes to analyze crime patterns at the neighborhood and planning area levels, incorporating socio-economic variables. Findings suggest significant links between urban density and crime rates, highlighting the need to consider neighborhood characteristics and variables like income and transport hubs in crime analysis.

Gaming and Simulation for Systems Thinking

'Serious gaming' and agent-based simulation have gained considerable traction recently, with increasing examples of their use in criminology and community safety. Gaming, often referred to as serious gaming, originated in the military in the 1950s. It is a technique that has been developed to support education and professional development. It has been applied to sustainability (Stanitsas et al., 2019), participatory planning (Koens et al., 2022), and policy thinking (Alfeton & Fleming, 2023). Games can be designed as complex systems with multiple elements that interact. They provide a simplified version of reality but are flexible as they allow interaction, where players can test different strategies, and those tasked with prevention can test out new ideas in a safe environment. They have been used in crime prevention for cyber security and adopted for problem-solving in policing and law enforcement. As an example, Zhang et al. (2014) demonstrate the use of a game theoretic framework to explore different types of police patrol strategies at metro stations. These were tested by a series of algorithms. We advocate for a broader consideration of using gaming theory that goes beyond conventional approaches and supports integrated systems thinking approaches to reduce crime at risky places. They have also been used to design safety audits that involve a diverse range of people. An example was a project carried out by the innovation lab in Botkyrka municipality, involving young women and girls who felt unsafe in

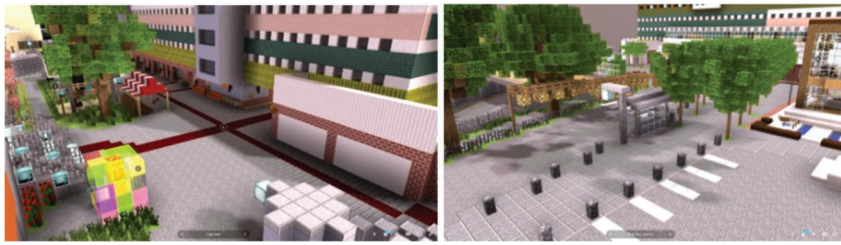

FIGURE 8.7 Making Fitja center safer in Minecraft, according to young girls who felt unsafe.

Source: Ceccato (2024, p. 175) adapted from Urban Girls Movement/Westerlund (2019, n.p.).

Fittja Centrum, a crime-focused area in Stockholm region, using scenario building in Minecraft (Figure 8.7).

Agent-based models (ABMs) are computer simulations that allow for controlled experimentation. A series of agents and variables are identified, and a set of rules are created for each. Once these have been defined, simulations are run multiple times (often in the hundreds or thousands) to test theories, simulate likely outcomes, and increase understanding of behaviors in the real world. They have been widely adopted in crime prevention, and Groff et al. (2019) identified 45 publications in their state-of-the-art review. These have been used to explore spatial patterns of crime and urban form and temporal patterns, to test theory, and to explore offender decision-making processes. Along with gaming theory, we suggest ABMs are a powerful tool that could be explored further to support systems thinking approaches to crime prevention at risky places. Like gaming, they have primarily been used for systems analysis rather than to support systems thinking, but we suggest they offer considerable potential for this.

Drones, the Meta Verse, and AI

There is not sufficient space in this chapter to cover in detail the rapidly evolving use of other technology for crime prevention and safety. However, it is pertinent to highlight some that we feel could be highly supportive of systems thinking. Studies have proposed the use of drones and unmanned automatic vehicles (UAVs) to detect crimes (Ranganathan et al., 2023). Whilst we remain unconvinced about the current potential to support active police monitoring, drone footage would enable large-scale data capture of risky places, which could be visual capture (photographs and video) and potential automatic recognition of features of the environment. AI offers a range of potential advantages for pattern recognition of crime datasets. When thinking of expanding boundaries outside of risky

places, the meta-verse is a further area of promise. Gómez-Quintero et al. (2024) identified 30 new potential cyber-crime threats. How we capture and understand the nature of this will continue to be difficult. However, we propose that we embrace a systems thinking perspective, including, for example, expanding the boundaries and hierarchies present and identifying potential feedback loops and leverage points.

8.4 Concluding Remarks

In this chapter, we build on previous ideas identified in this book and focus on how to detect risky places of crime from a systems-thinking perspective. We propose a series of steps that could offer a framework to do so. We acknowledge that the complexities present at risky places ensure we cannot ever understand the entirety of a system, but there are elements that we can begin to explore. We draw from some of our conventional approaches to detecting crime in risky places to show how they give us part of the information or picture. However, in doing so, we also review their limitations for systems thinking approaches. We recommend that future approaches should include the following. Firstly, we need multiple partners to come together to think about a shared vision and understanding of the system and what the place might look like in an ideal world. We then need to develop a deep understanding of the system, what has been termed its beat, and from this, develop well-informed models that help us understand the present complexities. These should go beyond simple linear theories of change approaches. We need to think about elements that might help promote resilience and self-organization of the system and understand the role of hierarchy in this.

When developing systems interventions, these should include the system's beneficiaries, think about the nature of boundaries present, and see to expand physical, digital, and people we consider as part of the solutions to reducing crime at risky places. Finally, our attempts to monitor and evaluate the consequences of changes we introduce should go beyond before and after models, consider how feedback loops may make change less linear, and state that our measures should account for the sustainability of systems change. We acknowledge that a shift towards long term thinking will take time. However, in the short term we do need to think more sustainability if we are to make a move towards this more likely.

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9

EXEMPLIFYING THE GOVERNANCE OF RISKY PLACES

9.1 Introduction

Persistent concentrations of crime in risky places can erode social cohesion, deter economic development, divert resources from crucial sectors like education and health (Taylor, 1995), and threaten community sustainability (UN-Habitat, 2019). High crime rates can lead to decreased investment and lower property values, impacting long-term growth and prosperity (Gibbons, 2004). Crime concentrations in urban places result from complex interactions of factors such as urban design, socio-economic conditions, and law enforcement strategies, meaning that the whole system's behavior cannot always be predicted by understanding its individual parts. Crime occurs at a disproportionately higher level in risky places than in other parts of the city. This may be because some areas impose more resistance to crime than others, for example, those with different levels of formal and informal social control. Alternatively, in some places, crime reflects where people spend time and converge (Brantingham, 1989), which creates multiple opportunities for offending.

Whether viewed as an economic or social concern, crime remains a critical issue for communities, deeply influencing and being influenced by the built environment's structure, design, and operation (MacDonald et al., 2019). Explanations for this are found in perspectives such as crime prevention through environmental design (CPTED), broken windows theory, situational crime prevention, and economic ideas about the supply and demand of criminal opportunities. However, suppose crime is significant as a community issue, especially when highly concentrated in

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risky places. Why do planners and designers often overlook crime in their decision-making processes?

There are several possibilities here. Paulsen (2013) points to a common belief that crime has multiple causes, and the built environment and urban planning play only a minor role. Planners and related professionals often lack education and training in crime prevention. Despite long-standing links to CPTED, crime prevention is seldom integrated into planning tools. There is a further misconception that crime prevention goals are incompatible with other planning objectives when, in fact, they often complement each other. Indeed, ignoring crime prevention can hinder their efforts to achieve broader planning goals. Planners often do not consider crime prevention part of their day-to-day role or even part of the planning process. Research demonstrates that planning decisions can have a significant impact on crime, and neglecting this can impact communities negatively in the long run. Conversely, effectively reducing crime is essential for fostering safe, stable, and sustainable communities.

Our current 'evidence base' for crime prevention highlights multiple challenges evident for the governance of sustainability in places that attract disproportionately high levels of crime. While some strategies prove effective, others do not, and the evidence base, whilst improving, is still limited. This raises a practical question: Is it possible to create a governance plan for crime-prone places, and what would such a plan look like in practice?

In this chapter, we highlight the role of 'shapers' (Brantingham, 1989) in defining elements of the urban system. These include the street design, housing layout, public transit locations, and land use patterns, which all play a part in shaping the built environment and, in turn, may increase or reduce crime. Although planners may not be the only actors, we show the role of planners and other key shapers of the built environment. We also illustrate the consequences of failing to include crime as a necessary component when planning and designing sustainable environments. Drawing on systems thinking principles, we look beyond immediate causes and examine the wider, interconnected factors contributing to crime. Following that, we critically present attempts to employ systems thinking in three real-life cases.

9.2 Framing Systems Thinking for Planning Risky Places

Cities exhibit intricate, complex, interconnected dynamics. Cities are complex systems; we cannot fully compress or simplify this using reductionist approaches. This complexity underpins why we need urban planning approaches that acknowledge and work within the inherent particulars of cities and can connect with a globally connected world. In this section, we

discuss alternatives for conceptualizing ways in which systems thinking can enhance a city's governance. Much of this is inspired by the systems thinking work of Meadows (2008) and Stroh (2015). Here, we apply this to the contexts of crime and safety and the study of risky places.

Systems thinking helps integrate safety as a core element of sustainability through the governance of risky places. For example, emergency services (the ambulance, the police, and fire brigades) are frequently called to attend places that concentrate on both crime and traffic incidents, especially when these are life-threatening. A challenge for planners and emergency services is that safety is not a standalone issue. It is deeply interwoven into various aspects of urban life. Potentially, it could be beneficial to address crime and car crashes together and allocate resources accordingly (Levine & Ceccato, 2021). In the United States, for example, the Bureau of Justice Assistance, the National Institute of Justice, and the National Highway Traffic Safety Administration have collaborated to target areas where these issues intersect (NHTSA, 2014). Such an integrated approach has yet to be adopted in other countries, potentially due to challenges of transferability, lack of knowledge, or lack of willingness and/or resources. In some remote areas in Sweden, despite not being formalized, such a collaboration between emergency services is a prerequisite for survival (Stenbacka, 2022; Stassen & Ceccato, 2021). In metropolitan areas, limited resources of police departments and emergency services may mean that this joint effort is feasible only in a few selected locations (Levine & Ceccato, 2021) or that this strategy is too challenging due to the distinct nature of crimes and crashes. Thus, decisions are dependent on an interlinked complex system.

By applying systems thinking, planners, policymakers, and other involved actors can better understand their local needs, identify leverage points, and better manage dynamic relationships. However, this is not without risk (see Chapter 3). Uncertainty complicates planning because it introduces unpredictable elements and is, therefore, challenging to manage. Planners must embrace uncertainty by specifying potential risks or by developing flexible, iterative approaches to navigate it. A critical first step is the recognition and acknowledgment of uncertainty by the planner. In the next section, we discuss the risks and opportunities when planning for new and existing residential areas.

9.3 The Shapers of the Environment

Over 30 years ago, Patricia Brantingham highlighted the critical connection between a city's physical layout and the experiences of its residents. She emphasized how the city's structure affects what people observe, their routes of travel, and their likelihood of becoming victims of crime.

Therefore, it is crucial for urban planners, developers, and architects, referred to collectively in this book as 'the shapers,' to carefully consider the interaction between individuals and their environments. This approach is essential not only for creating functional and visually appealing urban spaces but also for enhancing safety, well-being, and overall health, all of which are vital components of sustainability. Brantingham explained that 'the shapers' influence where people go, how they reach their destinations, and their impressions of the places they visit. They also affect the 'awareness space' of everyone, including criminals, who often select targets within these familiar locales (Brantingham, 1989, p. 35). In this section, we explore who the shapers of the environment are.

Some actors involved in urban development have more visible roles than others. Although planners and architects may not prioritize crime reduction in their scope, their design decisions inevitably impact crime opportunities in urban settings, whether international or not. We described these here as 'shapers,' which encompass a broad group of actors, professionals, and practitioners that play a part in the creation and modification of urban spaces. These shapers have a significant influence on the governance, as well as the social, economic, and environmental frameworks of cities, some of which will pertain to crime and safety. There are primarily two moments when these shapers can intervene in a place: (a) during the planning phase of a new residential area, which offers an opportunity to design buildings, streets, and public spaces from scratch, and (b) in the post-construction phase of an existing area, where experts are tasked with pinpointing and addressing specific safety challenges through targeted interventions. The influence of these actors or 'shapers' can vary, with some only having influence in specific time windows while others exert change more or less continuously.

Prior to the Construction of an Area

In a local government, actors are engaged with different issues, each one holding a certain degree of influence and control over problems. The best approach to map out problems is first to identify every actor involved in the system. Batty (2013, p. 378) suggests that the importance of actors is reflected in the power they have: "Two patterns of interactions can be derived between actors in a system as the ones described—one through problems, the other through policies, and these patterns determine the relationship between policies and problems." These interactions may also follow the type of planning strategies that are in place, such as proactive, reactive, and interactive strategies. Depending on the interpretation, they may be directly associated with one of two windows of action. For instance,

reactive planning is often associated with prediction and preparation to help anticipate potential risks, essentially in an uncontrollable future. This differs from responsive modes of working, where targeted interventions are put in place in response to a problem. Ackoff's interactive planning is relevant (Ackoff, 2001) because of the need for a shared vision to solve problems. In the discussion that follows, we select only actors who are actively engaged in the process.

Architects, civil engineers, and urban planners are responsible for the overall layout and design of urban spaces, including zoning, land use, and the integration of infrastructure. Their decisions can impact social interaction, traffic patterns, and the accessibility of different areas, all of which can affect crime rates and perceptions of safety. Civil Engineers define the physical infrastructure of a city, including roads, bridges, and public transportation systems. Their designs can affect traffic flow, pedestrian safety, and the ease with which police and emergency services can respond to incidents. Architects shape the city by designing buildings and public spaces, influencing features such as visibility, lighting, and access control, all of which may deter or facilitate offenders. Their work on public spaces affects us directly through the design of parks and green areas. Experts in Crime Prevention Through Environmental Design (CPTED) focus on adopting strategies to design environments that naturally deter offenders. For example, well-designed green spaces can promote community interaction and guardianship (Iqbal & Ceccato, 2016). Poorly designed spaces may become hotspots for crime. In practice, these experts often operate under constraints such as limited resources, stringent building and planning regulations, and the demands of diverse special interest groups. These groups may prioritize objectives other than security and safety, like energy savings or economic efficiency, adding complexity to the task of urban development while striving to balance these diverse and sometimes competing sustainable development goals.

Control over urban development also extends from financial and government organizations that finance and regulate property ownership (Rothstein, 2017). According to Linning and Eck (2021), these entities play a significant role in shaping urban spaces. In the development of new residential areas, local governments and policymakers are instrumental in setting the policies and regulations that guide land use and urban development. These policies create the framework within which architects, civil engineers, and urban planners operate. For example, focusing on public transportation from the start increases the chances of creating an area with less pollution from cars and more space for green areas and parks. The decision of real estate developers on where and what to build can shape the demographics and economic conditions of neighborhoods for a long time,

influencing factors that may relate to crime and safety. There are also bad examples in which governments have historically played a role in creating segregated areas through practices like zoning and redlining (Rothstein, 2017). While zoning refers to the process where specific areas of a city are designated for particular uses, such as residential, commercial, or industrial, and can be found anywhere in the globe, 'redlining' is a more discriminatory practice, historically used in the United States, where certain neighborhoods, often those predominantly inhabited by racial minorities, were marked as high-risk for lending, leading to disinvestment and decline and in some cases poorer living environments.

In *The Death and Life of Great American Cities*, Jane Jacobs provides a critical examination of urban power dynamics. She highlights the influential role of affluent individuals in determining the course of neighborhood developments and activities. According to Jacobs (1961), this control largely originates from their ability to own properties. By acquiring real estate in different neighborhoods, these wealthy individuals secure significant influence and decision-making power over what happens in those areas. This observation by Jacobs illuminates the complex interplay between financial wealth, property ownership, and the control of urban environments: "The forms in which money is used for city building—or withheld from use—are powerful instruments of city decline today" (Jacobs, 1961, p. 137).

Businesses and property developers make decisions about where to locate and what kind of developments can shape the economic health of an area, which indirectly affects crime (Jacobs, 1961). Their decisions can influence accessibility to services and crime through economic revitalization and employment opportunities; investments in mixed-use developments that combine residential, commercial, and recreational spaces may also create unexpected consequences, such as gentrification (Hubbard, 2017).

Insurance companies may also contribute to housing segregation through practices that affect the accessibility and affordability of house insurance for different populations in different places. In the specific case of North American cities, Rothstein (2017) asserts that insurance companies: "have large reserves of funds to invest, and because they are heavily regulated, state policymakers are frequently involved in plans for any housing projects that insurers propose" (Rothstein, 2017, p. 106). Insurance companies, as major financial players with substantial investment capabilities, have the resources to fund large-scale housing projects globally. Their involvement shapes the housing market, influencing the social and economic landscape of neighborhoods and cities.

Other less noticeable shapers have played a crucial role in the development of cities. Roads and automobile companies, especially in North America but also in other parts of the world, have significantly influenced

the design, layout, and character of cities, a trend observed to a lesser extent in Europe. In many cases, commercial and residential developments have become centered around major roadways. These shapers have significantly influenced the design, layout, and character of cities, a trend observed to a lesser extent in Europe (Montgomery, 2013).

There are additional people, institutions, and organizations that create incentives for controllers to prevent or facilitate crime. They do not have direct control to prevent crime but influence them indirectly through handlers, guardians, and managers (Sampson et al., 2010). As previously mentioned in this book, 'handlers' have a direct relationship with potential offenders and can influence their behavior. Examples include family members, teachers, and employers. 'Guardians' are those who can directly protect potential crime targets, including security personnel and community watch groups. 'Managers' are those who oversee places and can make environmental changes to prevent crime, for example, property managers and local authorities (Eck & Madensen-Herold, 2018). The integration of such policy decisions with urban planning and design illustrates the complex interplay between governance, financial systems, and the physical shaping of urban environments. These shapers are in control not only before the area is planned but also once it exists.

Residential, commercial, and industrial property buyers play an important role in shaping the housing market, influencing patterns of segregation, and indirectly affecting long-term crime patterns. If an area is suffering from high crime or the residents are complaining about lack of security and fear, they tend to move out if they can. In turn, this might reduce local tax contributions, further weakening a place and contributing to further decay (Ceccato & Wilhelmsson, 2011; Ceccato, 2020). There is a vast international literature on how individual buyers, through their preferences, purchasing power, willingness to pay, resources, and behaviors, significantly impact the housing market. This may even perpetuate or change segregation patterns in neighborhoods and cities (Gibbons, 2004). Surveys and market trends across the world often show that safety is a top priority for many people when choosing where to live, and this happens internationally, including in the Global South (Yoade & Olatunji, 2018).

Ownership of a property can impact crime rates locally through a range of actions. These include the extent to which a property is maintained, levels of visible security, engagement with local communities such as neighborhood watch schemes, collaborating with local authorities, managing tenants responsibly, and supporting community development initiatives to create a safer and more secure environment (Eck et al., 2007; Eck, 2019). Owning multiple properties and the extent to which they are managed appropriately can have more of a direct impact on the area's safety. Poor

place management can contribute to a decline in the quality of life for residents and visitors, discourage legitimate use of space, and lead to an increase in crime and fear of crime (Clarke & Bichler-Robertson, 1998). Finally, in the era of smart cities and smart homes, companies responsible for designing and managing surveillance systems, social media platforms, and various digital realms serve as supercontrollers. By shaping the digital landscape, they can influence online behavior and potentially mitigate cybercrime, which often encompasses both online and offline interactions (Chavez & Bichler, 2019). We now discuss the shapers of the environment when the city 'is already in place,' the so-called post-construction phase.

The Post-Construction Phase of an Area

As explained in previous chapters, systems thinking emphasizes the importance of constantly considering the effect of feedback loops in the system. For example, increased crime in an area may lead to more police presence, which might temporarily reduce crime but could also alter social dynamics, potentially leading to more crime in the long term. The same applies to the impact of crime and fear on people and neighborhoods. One way to assess this partial cost is to observe the impact of crime and fear on housing markets. Although insecurity affects housing values, these relationships might be complex and can be influenced by various other factors, for example, local policies, law enforcement practices, and broader economic conditions; international evidence shows that the overall effect of crime on the housing market is non-negligible. Ceccato and Wilhelmsson (2011) found that moving a house one kilometer away from a crime hot spot would increase its value. Wilhelmsson et al. (2022) found that firearm violence affected the housing prices of the surrounding area of the shootings even 100–200 days later after the shooting and that the reduction of prices varied across the city; namely, buyers had their property prices discounted closer to the city center. The role of land use, such as schools and poor socio-economic conditions, plays a significant role in the housing market and proliferation of violence (for a review, see Ceccato & Westman, 2024).

The role of security experts in teamwork, namely with police, site managers, and the local team engaging different groups in the community, may become more important than the role of planners or architects at this stage. More specifically, a deep understanding of the nature of the problem is required when facilities and their surroundings disproportionately concentrate on crime. As individual factors play an important role in defining perceptions of risk of crime and insecurity, it is necessary to think about the goal of the planning and to whom we are planning. In every part of the community-building process, it is important to reflect on how the chosen

measure affects the safety and security of certain groups of individuals and weigh it against other wishes and requirements (Ceccato, 2024). Local communities and residents also shape their environment through activism, community projects, and neighborhood watch programs. Their involvement can enhance safety and reduce crime through collective effort and social cohesion. As previously suggested, this process aligns with the need for effective management of sustainability transitions involving a broad range of actors to define common visions and viable strategies to achieve them. Systemic, large-scale changes come with trade-offs; they benefit some while negatively impacting others and can result in unexpected outcomes that disproportionately affect vulnerable communities and social groups (European Environment Agency, 2024).

Recognizing the ongoing significance of these shapers in the post-construction phase is crucial, as their actions are shaped by the policies and political environments they exist within. To illustrate this point, we will first provide a descriptive discussion using examples from Sweden and the UK. Before doing so, however, we acknowledge that their operations are also influenced by wider international planning and supranational policy frameworks.

9.4 The Policy Backcloth and Governance in National and Supra-National Contexts

Ensuring safety in cities and smaller settlements is a crucial aspect of Goal 11 in the 2030 Agenda for Sustainable Development. While the EU and UN seek to connect crime prevention with planning, their policies are voluntary and lack legal mandates, serving only as recommendations. The EU adopts a standardized system, proposing guidelines that underscore the built environment's significance in crime prevention and security. The initial model presents several propositions and strategies for planning, urban design, and management, clarifying that these are not design directives but rather planning guidelines. Ongoing revisions involve collaboration among European academics, practitioners, and experts from the International CPTED Association's standardization committee.

Beyond 'official circles,' numerous additional documents have emerged, advocating for the incorporation of crime prevention into planning due to continued collaboration at the EU level. (see, for example, EU, 2021, 2019). Efus—European Forum for Urban Security, a network comprising around 250 members from 16 countries, plays a vital role in uniting cities and local governments committed to European-level crime prevention and urban security policies. Linked to the UN-Habitat Global Network on Safer Cities (GNSC), Efus represents Europe, sharing global best practices.

Meanwhile, the UN-Habitat's Program for Safer Cities, established in 1996, prioritizes capacity building in the Global South, focusing on Africa and Latin America. Unlike the EU program, the UN emphasizes multi-party crime prevention, urban network collaboration, and fundamental capacity-building programs. This diversification reflects a distinct approach to integrating crime prevention into planning, emphasizing global partnerships, and sharing experiences across regions. This approach, which has gained prominence in recent decades, helps bridge gaps among public actors in the planning process (Ceccato et al., 2019). The Netherlands and England have been pioneers in integrating crime prevention into planning. Notably, the UK initiated formal guidance in the mid-1980s through local partnerships, while England introduced 'Secure by Design' in the late 1980s to certify new residential areas adhering to safety guidelines. A similar certification model was later adopted in the Netherlands based on similar principles.

In the UK, many police officers felt that they were not brought into planning early enough to have a significant impact or that their perspective was given proper weight when involved in the process. Planners felt that the training provided was not sufficient to support them in making design suggestions (Paulsen, 2013). The Dutch model, at least in its first period from the mid-1990s to the mid-2000s, used Christopher Alexander's pattern language as a reference. According to Jongejan and Woldendorp (2013), the Dutch police certification has reduced crime by applying CPTED principles and by ensuring that the physical security of the residence can prevent crime.

During the 1990s, discussions were rife across Europe about a significant shift in planning approaches towards what was termed a communicative or argumentative turn. The underlying principle was the need for planning to move from being overly technocratic to becoming more interactive. However, in the 2000s, a contrasting trend started to appear towards 'evidence-based planning.' Since the new millennium, there's been a growing focus on research in spatial development, emphasizing the renewed importance of data in planning (Faludi & Waterhout, 2006). Despite this shift, evidence-based planning continues to depend on interactive and communicative processes, where the interpretation and relevance of evidence must be collectively established through discussion and debate.

Two paradigms can be observed here: the 'instrumental' and the 'enlightenment' models. The instrumental view assumes that the relationship between evidence and policy is unproblematic, linear, and direct. It is assumed that either research steers policy and hence policy is evidence-driven; or research follows policy and hence research is policy-driven. The second paradigm assumes that facts are not self-evident in planning processes. This means

that in practice, although research does and should play an important role in policymaking, that role is less problem-solving and more clarifying the context and informing the wider public debate, meaning that evidence is never self-evident; it needs to be established in an 'argumentative' fashion (Faludi & Waterhout, 2006).

According to Davoudi (2006), the evolution of planning ideas, particularly from the early 2000s, emphasized enhancing the knowledge base of planning approaches by fostering critical thinking about spatial interventions. This advancement necessitates a shift towards a model that informs policy through enlightening discussions rather than merely providing 'ready-made' solutions that 'spoon-feed' policymakers.

Central to this approach has been the creation of links between policy and research. This paradigm moved away from a narrow, instrumental view, which limited creativity and rests on precarious assumptions about the research-policy dynamic. Instead, there has been a call for a society that is 'informed by' rather than solely 'based on' evidence. This should promote a broader use of available data to enrich planning and decision-making processes. These trends have also happened in parallel with the decentralization process of crime prevention in Sweden in the mid-1990s.

In the next section, we provide a description of the governance of crime prevention in more detail for both Sweden and the UK. Once we have described both, we then return to consider how this impacts the potential for including systems thinking in our governance approaches.

The Swedish Case

In Sweden, efforts to integrate crime prevention into planning involve a unique approach, distinct from the models in the UK and the Netherlands. Rather than adopting a certification system, the focus is on skill development and information dissemination to influencers within existing organizational structures. Despite BRÅ The Crime Prevention Council—BRÅ and the Swedish National Board of Housing, Building and Planning—Boverket being deemed appropriate authorities, no specific mandate was assigned. Unlike the UK and Dutch models, deemed unfit for direct application in Sweden, the approach aligns with a shared Nordic tradition and emphasizes collaboration at the municipal level. The local crime prevention council plays a central role in this process (Ceccato et al., 2019). In the 1990s, Sweden initiated the 'Everyone's Responsibility' national crime prevention program (Ds, 1996, p. 59) amid a decentralized police organization and a shift towards market-oriented neoliberalism. Facilitated by the Problem-Oriented Policing (POP) model, local crime prevention councils were encouraged across municipalities with support from BRÅ. Over three decades, BRÅ has supported municipalities and enhanced

national security knowledge through initiatives like the National Crime Victim and Safety Survey since 2007. The 2016 'Together against Crime' program prioritizes cooperation, local issues, and knowledge-based approaches. Concurrently, the Housing Authority addressed crime prevention and safety in urban environments from 2000 to 2010. The BoTryggt initiative, initiated by the police in 2000 and evolved into BoTryggt2030, disseminates knowledge on crime prevention and safety in residential areas through physical space design.

BoTryggt2030 evolved as a national concept supporting crime prevention in planning, and 20 years later, the growing societal challenges demand immediate police action and a sustained societal commitment. The planning of crime prevention should consider the vulnerabilities of marginalized populations outside major cities. The Swedish Standardization Institute (SIS) has taken charge of disseminating European standards and providing guidelines for urban planning and building design. Studies on standardization's integration into situation-based crime prevention within municipal planning reveal positive perceptions among respondents, especially police officers and security coordinators. While increased standardization is viewed positively, risks include inflexible measures and counterproductive strategies. Coordination between national, regional, and local planning levels is crucial, given the diverse civil engineering sector. Although standardization is not the sole solution, clear national guidelines can enhance local efforts, prevent the loss of knowledge, and ensure a unified approach within crime prevention work.

National guidelines should allow flexibility for local adaptation, ensuring communities tailor approaches to their unique circumstances. Coordinated efforts by interdisciplinary teams, comprising architects, planners, security experts, police, policymakers, and civil society, are vital for fostering safe, secure, and sustainable urban environments. Capacity building is essential to enhance understanding of challenges and opportunities. Establishing a stable foundation involves incorporating situation-based crime prevention into planning within the Planning and Building Act (PBL) at all levels. Future legislation on municipalities' responsibility for crime prevention should align with the implementation of national guidelines.

Moreover, in 2023, according to new rules in the Planning and Building Act, municipalities should have up-to-date comprehensive master plans. The comprehensive master plan is the municipality's declaration of intent regarding how the physical environment should be used, developed, and preserved. It is thus an important political document and has a central role in the municipalities' work to formulate strategies for long-term sustainable development. Among other things, the comprehensive plan should also

show how the municipality intends to meet the long-term need for housing and the development of the housing stock following the guidelines around Agenda 2030 for a more sustainable society.

At the same time, since the year 2000, Sweden has seen a 20% increase in its police force numbers, but this growth has not been uniformly distributed across the country. This surge primarily benefited larger municipalities, leaving some areas with fewer officers than before. Remarkably, around 25% of Swedish municipalities lacked a permanent police presence (Lindström, 2015). The Swedish police organization has undergone a significant restructuring in the last decade, combining previously independent regional bodies into a single national authority.

In 2023, the government in Sweden put in force a new law requiring the municipalities to be responsible for crime prevention, which means that there must be an organization with an appointed coordinator (SOU, 2021: 49 s, p. 242). In practice, the legal requirement means that several things will be affected at all planning levels, but especially at the local level, where both problems and a partial solution exist. We suggest a special forum/council could be created in cooperation with other local actors to monitor and work continuously with crime prevention issues. There are expectations that this framework will create a better knowledge base of different urban environments that concentrate a disproportionate amount of crime, but also how these environments are connected to the rest of the municipality, both in the city and in the countryside.

The UK Case

In England and Wales, there was a more centralized top-down approach to planning for crime prevention than in other countries, particularly during the 1990s. There were perhaps four key trends at this time that could be identified and underpinned several policy decisions. These were offender-centered strategies, victim-centered approaches, situational or place-based approaches, and community or neighborhood-focused policies. In what follows, we consider the key impacts of policy and legislation on both policing and local governance.

A key central government driver was linked to new legislation, the Crime and Disorder Act of 1998, which placed an emphasis on local authorities developing partnership approaches to reduce problems of crime and disorder. This placed a statutory duty on police, local government, and other key agencies to come together and develop partnership approaches to reduce crime based on local consultation exercises with residents to identify their priority concerns.

The police were also engaged in environmental design improvements to reduce crime, and indeed, most police forces employed Architectural Liaison Officers (ALOs) to promote situational approaches to crime prevention, liaise with local developers, and award 'secure by design' status on new and existing developments; and, to respond to local planning applications. It is important to note that at the time, the UK population was approximately 50 million, with 43 police forces and an average of 1 million persons per force (in larger forces, this was much greater). By contrast, there are over 400 planning departments. Thus, whilst it was considered good practice that ALOs commented on new planning developments, this was not compulsory, and forces did not have sufficient resources to do so.

Within planning, in 1994, the Department of the Environment issued a Planning Out Crime circular 5/94, which argued for a more formal role for ALOs and greater cohesion between planning departments and police in developing crime prevention and the growth of mixed-land use models—which do not always achieve reductions in crime. In 1997, a Labour-elected government sought to bring regeneration and social inclusion into the previously established partnership approach and, in 2007, released a White Paper that sought to re-invest in towns and cities, to support new homes, for people to remain and move back into urban areas, to address issues of low quality of life in some areas and make urban living more sustainable and attractive. It also sought to reduce crime levels as part of these quality-of-life issues. Large, funded programs included a reducing burglary initiative, a large expansion of CCTV, programs to stop children becoming involved in crime linked to school exclusion and truancy, neighborhood warden schemes, and drug-arrest referral programs.

In 2004, the Home Office released a Safer Places guide entitled 'The planning system and crime prevention,' which continued in a similar mold, with structure (design), movement and access, surveillance, ownership, physical protection, activity, and management and maintenance all considered key components of planning safe places.

In 2010, a change of government led to a Conservative-Liberal Democrat coalition until 2015, followed by a solely Conservative government at the next election. Here, the rhetoric and narrative moved towards one of fighting crime and proposed a shift of power from the central government to local communities. To achieve this, in 2012, they brought in locally elected police and crime commissioners who were responsible for holding police forces accountable. However, it can be questioned to what extent this supported the empowerment of local communities and to what extent it was an extension of central government where Conservative PCCs were elected.

The Anti-Social Behaviour, Crime and Policing Act of 2014 also strengthened police powers to address disorder and a range of other crimes. In 2012,

the Department for Levelling Up, Housing and Communities produced a new National Planning Framework, including a section on promoting healthy and safer communities, moving away from the previous regeneration approach to crime prevention. This maintained some elements of place design, quality of life, and social cohesion but with less of a focus than previous planning guidelines and the police-planning partnership. Indeed, much of the change has been on strengthening police powers such as the Police, Crime, Sentencing and Courts Act 2022 (PCSC) rather than supporting changes through planning. There have, however, been some efforts to rekindle partnership approaches to crime prevention. These include the funding of 18 violence reduction units in England and Wales (2019–2024) to support public health and partnership approaches to reduce serious violence, the Safer Streets funding program, and, more recently, the rollout of the Serious Violence Duty. Whilst these have demonstrated some early successes that are generally police driven, it is unclear to what extent a partnership working model exists.

9.5 Crime and Crime Prevention in Risky Places

One way to promote safety is to reduce crime or prevent it from happening in the first place. Situational approaches support the adoption of strategies that reduce the opportunity for crime by altering the immediate physical and organizational environment in which potential offenders operate. From a situational perspective, crime can be of two types. One involves offenses related to new products and services, such as cloning mobile phones. The other is a result of failure to prevent this crime despite known and practical solutions.

Several explanations can be found for why people and organizations fail to prevent crime. Some explanations include a lack of awareness regarding existing solutions, insufficient resources, reluctance to allocate resources, and the potential profitability of allowing crime rather than preventing it (Sampson et al., 2010). Addressing these issues requires understanding, developing, implementing, and testing crime prevention interventions. Before we initiate the discussion by drawing distinctions between traditional situational crime prevention and systems thinking, we start by reminding the reader about the principles of systems thinking.

Systems thinking is an overarching approach to problem-solving that emphasizes viewing the system in its entirety, understanding the interdependencies, and recognizing the relationships between parts. It encourages looking beyond individual components and considering the dynamic interactions and feedback loops within a system. Systems thinking is not confined to a specific set of tools or methods but focuses on understanding

how different elements within a system influence each other (Meadows, 2008; Stroh, 2015). In situational crime prevention, a systems thinking approach might involve considering not only the immediate physical environment but also the social and economic factors influencing crime. For instance, instead of solely focusing on improving lighting in a high-crime area (a situational measure), the approach prompts a broader consideration of how community engagement, economic opportunities, and social support systems could collectively contribute to crime reduction.

We explore ten distinctions to guide this process, recognizing interconnections between parts, anticipating long-term outcomes with unintended consequences, and navigating multiple interdependent scales, which may also include emphasizing hierarchical boundaries, leverage points, shared values, and unequal impacts of these interventions. We start by contrasting traditional situational crime prevention and systems thinking to guide future refinements and foster a more nuanced understanding of the theory's applicability (Table 9.1).

TABLE 9.1 Approaches in situational crime prevention.

Conventional situational crime prevention	*Systems thinking in situational crime prevention*
Address crime-specific, location, time specific	Beyond individual parts, the interconnections between parts
Before-after-analysis, control, a policy designed to achieve short-term success will also assure long-term success	Long-term outcome, no control, most quick fixes have unintended consequences: they make no difference or make matters worse in the long run
Local disregard regional, national, and global	The multiple interdependent scales, 'glocal,' system of networks
Target area, control area	Hierarchical boundaries, nested boundaries, systems within systems
Aggressively address independent initiatives simultaneously	Leverage points, only a few key coordinated changes sustained over time will produce large systems change
Disparity between actor goal and systems goal	Shared values, clear vision
Linear impact to optimize the whole, we must optimize the parts	Unequal impact to optimize the whole, we must improve *the relationships* among the parts
Urban centric	Rural-urban continuum
Disciplinary specialization	Interdisciplinary
Focus on the situation (physical and social environment patchwork, temporal dimension)	The interaction individual-environment, structural features (demographic, socio-economic, cultural, cohesion)

Conventional situational crime prevention methods are often focused on specific crimes within localized contexts, and they seek immediate success through strategies designed for quick resolution. However, while effective in the short run, these efforts sometimes overlook the broader, interconnected dynamics that contribute to crime. We find several examples that demonstrate a blend of conventional and systems thinking strategies. Systems thinking focuses on the interdependencies across various scales, from local to global, or 'glocal.' We recognize also that solutions need to account for the complex web of social, economic, technological, and environmental factors present. This perspective is relevant when considering the role of shapers in the post-construction phase of urban development, as we discussed previously, as their actions within specific policy contexts can have significant implications for crime prevention and environmental design.

In Sweden, crime prevention interventions have increasingly involved initiatives that integrate social welfare policies with traditional situational measures (e.g., Sarnecki & Estrada, 2004). Efforts to reduce youth crime could include youth associations, schools, and employment initiatives alongside urban design improvements involving young people and artwork. Another example from Sweden exemplifies the decrease in safety incidents because of systemic changes, including staff training, emphasizing the importance of collaborative approaches with practitioners (Ceccato et al., 2023). The program did not adopt a systems thinking approach from the start, but it does contain elements that align with it.

Systems thinking in the UK context can also be exemplified by the role of evidence-based strategies in adapting urban environments to reduce crime opportunities, as the UK has pioneered the use of CCTV and data-driven policing to focus on risky places (Farrington et al., 2003). Through approaches that are perhaps unintentionally based on systems thinking principles, initiatives make use of crime data analysis and pattern detection to strategically allocate resources, aiming to disrupt offending and improve city users' safety. Elsewhere, there have been examples of more integrated approaches, such as the 'Community Policing Through Environmental Design' initiative in Colombia in the Global South, bridging urban and rural crime prevention strategies. This initiative applies environmental design principles, such as improved lighting and community spaces, to urban neighborhoods and rural villages to reduce crime. For example, Salazar (2011) reports on using this approach in Medellin.

Broadening situational crime prevention to systems thinking demands coordinated actions rather than isolated initiatives, aiming for long-term outcomes by identifying leverage points within the system. The case of initiatives against violence (the Violence Reduction Unit, VRU) in Scotland is an example of a more integrated approach that treats violence as a

public health issue (Graham & Robertson, 2022). By coordinating efforts across education, healthcare, and law enforcement, the VRU identifies systemic leverage points, such as early intervention and community engagement, aiming for long-term reductions in violence. As discussed earlier in this chapter, there have been attempts to reproduce this approach in England and Wales with the establishment of 19 further violence reduction partnerships.

Traditional methods are often urban-centric, focusing primarily on urban environments. At the same time, systems thinking acknowledges the continuum between rural and urban areas, suggesting strategies that bridge the gap between these environments. The 'Safe Schools' initiative in South Africa illustrates the shift from an urban-centric to a rural-urban continuum approach in crime prevention. Recognizing that school violence affects both urban and rural areas differently, the initiative adapts its strategies to address the specific needs and contexts of each environment. In urban areas, it might focus on gang-related violence prevention, while in rural settings, the emphasis might be on improving infrastructure and access to education. This approach ensures that interventions are effective and relevant across different settings, acknowledging the unique challenges and resources of both urban and rural communities (Meyer & Chetty, 2017).

Compared with conventional approaches, adopting systems thinking as guidance means also critically considering the scale and boundaries of a system. Approaches should transcend urban-centric views, integrate rural-urban continuums, and champion interdisciplinary collaboration over disciplinary specialization. For instance, the 'Vision Zero' road safety strategy can be considered as an ongoing example of 'systems thinking on paths' as its goal is zero fatalities or serious injuries on the roads. It adopts an interdisciplinary collaborative approach involving urban planning, technology, and public health across rural-urban continuums (Hughes et al., 2015; Kristianssen, 2022). This road safety program indicates that an ongoing paradigm shift is taking place, highlighting the significance of enhancing the connections between system components, positively affecting the whole system. This represents a shift away from the traditional linear approach of conventional crime prevention strategies. In the next section, we explore further examples of systems thinking being put into action.

9.6 From Words to Action: Towards Sustainable Interventions

Here is a hypothetical problem. Consider a city official's request to redesign pedestrian paths in response to teenagers illegally using scooters on them. Instead of addressing the issue in a conventional, specific, and localized manner, urban planners prompt a broader exploration, revealing that

the real problem extends beyond the misuse of pedestrian paths, possibly originating from a lack of suitable spaces for young people to socialize and engage in activities after school. In applying systems thinking, various interconnected long-term solutions should be considered, what is termed the multiple interdependent scale. This could involve creating designated areas for scooter use, developing youth engagement programs, or redesigning public spaces to accommodate diverse activities. The key is to recognize that the issue of scooter misuse on pedestrian paths is possibly a symptom of a larger issue related to urban planning, youth recreation, and community engagement. We start by identifying all potential actors involved over the time of interest (Table 9.2).

Rutherford (2018) suggests several steps to address the issue. First, actors should collaborate to establish a unified agenda. This involves forming a collective vision for change, developing a mutual understanding of the problem, and a broader consideration of the possible causes and effects. According to Meadows (1994), this involves developing models and gathering detailed information about the challenges we wish to address, as well as how previous 'missteps' may have made the problems evident. It is also important to develop well-defined goals and a shared vision, which is collaboratively discussed and widely embraced across the community. Then, it is necessary to determine whether and how individuals within an organization might have inadvertently contributed to or exacerbated the problem. Finally, it is crucial to create a strategic plan of action that considers

TABLE 9.2 Actor responses: A Systems Thinking analysis of urban scooter (mis)use.

Agents/actors	*Events*
Youth	Use scooters on pedestrian paths
Residents	Complain about the risk of teenagers illegally using scooters in pedestrian paths, noise, risk of accidents
Police	Deal with complaints of illegal use of scooters, investigate reported cases and identify individuals who use scooters in pedestrian lanes
Planners	Call to redesign pedestrian paths
Local government	Consider redesigning paths to assess city regulations balancing user needs, investigate further local community needs for recreational spaces, and consider other possible motivations for lanes being misused
Pressure groups/ community leaders	Investigate the value added of a new path and for whom, discuss potential causes of illegal use of scooters in these

potential system changes over time and knowledge about the problem. Storytelling can be a helpful tool for telling systems stories that can make people think differently.

Instead of just targeting the problem place to address teenagers' illegal use of scooters, a systems thinking approach starts by considering multiple levels of a problem. First is the micro level. What motivates their behavior? Are they seeking recreation, commuting, or just congregating with friends? Then, we should investigate the local community's need for recreational spaces. Are there enough recreational spaces for teenagers? Finally, we should consider the importance of addressing city-wide policies on scooter use. The leverage points range from educational programs and redesigned paths with scooter lanes to city regulations balancing user needs and national discussions on inclusive urban spaces and shared values.

Once a solution is implemented, it is important to conduct a comprehensive review to ensure that the response aligns with the broader needs of the system and addresses structural causes. To improve the relationships among the parts, this approach recognizes that different parts of the system, for example, pedestrians, scooter users, and the urban infrastructure, are affected differently by changes. Improvements should aim to balance these impacts to benefit the entire system. Stroh (2015) recalls that this is the point in time where actors who previously blamed others for the problem might reflect on this, acknowledge their own or their organization's role in this, and commit to changing their behavior to improve the system. Rather than seeking immediate solutions, they focus on understanding the underlying systemic structures responsible for the problem.

Systems thinkers often use analogies or mental models to understand better and characterize the problem, as well as to identify potential solutions. An example is the 'iceberg model,' where only the tip is visible above the water, suggesting that solutions are unlikely to be found at the surface level. This model helps differentiate between symptoms and possible causes of problems that may lie in the underlying structures. In these deeper layers, elements such as policies, control mechanisms, and perceptions can be found. Another example is the 'bathtub analogy' that illustrates dynamic systems through the concept of stock and flow, where the bathtub signifies the system's 'stock' and taps, and the drain symbolizes the 'flows.' In the case of the illegal use of pedestrian lanes by scooters, the goal is to prevent this behavior. The bathtub analogy can be applied, focusing on deterrent and enforcement strategies to reduce the inflow to virtually zero. Urban planners may put a few solutions into practice and monitor their impact on all parts of the system, adjusting based on feedback and observed outcomes to ensure that the solution benefits the whole system.

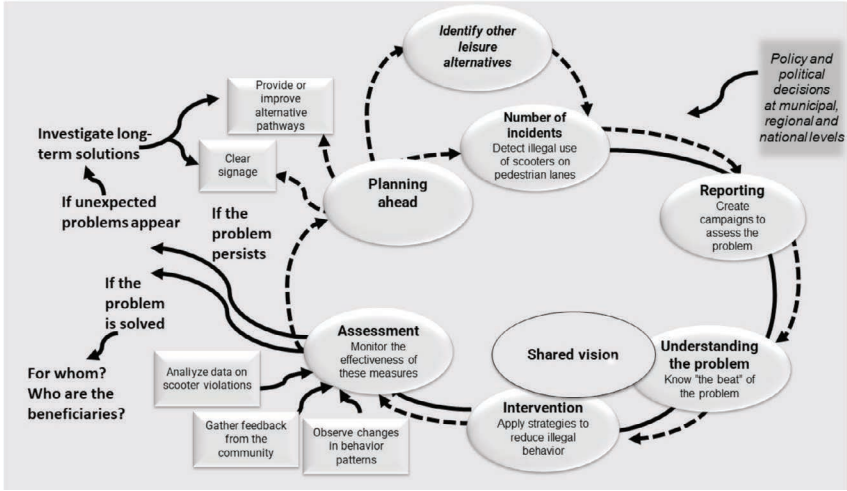

FIGURE 9.1 The iterative process helps in refining solutions and adapting to changing circumstances of the system: The scooter in pedestrian lanes.

Source: Authors.

Furthermore, systems thinking emphasizes the importance of cyclic and repetitive problem-solving approaches (Williams, 1970). This iterative process helps refine solutions and adapt to changing circumstances, ensuring that the strategies implemented are sustainable over time and responsive to the community's evolving needs and system adaptation. This requires approaches that monitor the effectiveness of these measures across multiple groups and a flexible strategy that can adapt to change. This could involve analyzing data on scooter violations, gathering feedback from the community, and observing changes in behavior patterns. A long-term solution for this problem, regardless of whether this is in a large city or rural area, is a combination of awareness, infrastructure adjustment, consistent enforcement, and community engagement tailored to the specific needs and resources of the location. Through these strategies, the final goal is to significantly decrease the entry of scooters into pedestrian lanes to address the problem in a sustainable fashion.

In this hypothetical case study, a systems thinking approach revealed that the underlying problem was not the paths but the lack of adequate spaces for young people. This insight shifts the focus towards a broader exploration of the local community's needs for recreational areas and less on the causes of pedestrian lane misuse. By understanding these connections, interventions can be designed not just to alter the physical environment but also to meet the recreational needs of these groups in the community. Who

benefits from the current design and use of urban spaces? Are young people and their families adequately served, or are their needs in conflict with other users? Understanding who the current beneficiaries are can inform efforts in a way that better serves the whole community, especially those who have not been well 'served' by the existing system.

Political and policy decisions at local and regional levels may help address the real problem, which is the lack of recreational spaces for children. Understanding and navigating these levels of influence requires a systems thinking approach that considers the complex interactions and feedback loops between policy decisions and community needs.

9.7 Conclusions

A sustainable environment prioritizes all its residents' well-being, equity, and quality of life. By emphasizing the nature of sustainability as a goal, we detailed assess how various facets of the planning process and practitioner involvement intersected and exerted mutual influence. In this chapter, we evaluated the changing roles of diverse actors, particularly those instrumental in shaping urban environments, before and after an area is built and functioning. We then differentiated between conventional situational crime prevention and the application of systems thinking in managing areas that concentrate crime. Employing the principles of systems thinking, we moved past surface-level causes to analyze the broader, interconnected factors that drive offending. Finally, we presented a critical review of attempts to employ systems thinking in three real-life cases. Though these examples may not derive from systems thinking from the start, they establish a foundation for illustrating the challenges linked to place management in a risky place.

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10

ACTIVATING SYSTEMS THINKING FOR SUSTAINABLE CRIME PREVENTION

10.1 Reflecting Back and Looking Forwards

We set out with two key aspirations. First, we sought to disentangle the intricacy of locations that have disproportionately high levels of crime, which we consider risky places. Second, we questioned conventional methodologies for analyzing crime at risky places and advocated for a systems thinking approach to foster more integrated and sustainable crime prevention.

In respect to the first goal, we considered three elements of risky places, namely facilities, nodes, and paths, and examined these as individual systems. We also recognized these risky places are embedded in other broader systems, such as neighborhoods, cities, and regions. We identified that for risky facilities (Chapter 4), a small proportion of one facility type would experience most of the crime for that facility type; for example, 20% of all bars might experience 80% of all violence at bars. We explored risky nodes (Chapter 5), characterized as places of convergence, sometimes with multiple facilities such as shopping centers or nighttime entertainment zones, or locations with a high convergence of people, such as large train stations or stadiums. Additionally, the exploration of risky paths and journeys (Chapter 6) focused on how the underlying street network shapes individuals' daily routines, norms, behaviors, and roles within the city. These paths, as described by Lynch (1976), represent channels guiding peoples' movements. These risky places are linked by 'networks' in both physical places and in 'cyberspace.' Throughout the book, these definitions served as foundational elements, showing the dynamics of crime concentration in diverse urban environments.

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Considering our second objective, the book questioned the way we methodologically analyze risky places for crime. The book identified challenges in conventional crime prevention and showed how practices can be improved through a systems thinking lens. The adoption of systems thinking provides an analytical framework, facilitating a comprehensive examination of these environments, leading to more effective crime prevention strategies for risky places. We demonstrated several reasons why 'well-intentioned' interventions do not always realize their intended crime reduction outcomes. Informed by examples of the 'systems traps' (Meadows, 2008), we showed certain system behaviors undermine collective desired goals. These traps provide opportunities for us to address the problems we are trying to solve. Rather than merely responding to issues as they emerge, systems thinking seeks to pre-emptively address challenges by comprehensively understanding how risk factors change over time. What may work today may not continue to reduce crime in the long term. Conversely, an intervention that seems not to work now may prove more fruitful in the longer term.

The concept of risky places is central in this book, denoting different types of locations with markedly elevated crime levels. To apply systems thinking at risky places, we need to understand the nuances of these places, including crime and associated fear. This necessitates understanding the rhythm and dynamics of risky places, creating comprehensive models of the problem, and promoting resilience, self-organization, and hierarchy within the system. This demands a deep insight into these locales to gain insights into offending patterns. The challenge is how to apply this in practice.

We cannot understand a system as a whole. Nor can we design interventions to address crime across the entirety of a complex system. Therefore, it is crucial to identify leverage points for effective interventions and to 'craft' systematic interventions through collaboration and active participation with practitioners and users. Through a series of interactions with key groups and individuals, we can integrate their insights to develop a collective and shared understanding of the problems faced, as well as a shared vision of sustainable crime prevention. These leverage points might include changes in the environment, community engagement initiatives, or policy interventions that impact the crime dynamics of these places (Masson et al., 2014).

An important consideration is how places adapt and evolve through a series of feedback loops. For example, as crime manifests in a place, systems adapt and evolve by changing policies, reallocating resources, and implementing community interventions. However, this process is rarely linear, and there are critical thresholds or tipping points that, once crossed, result in significant systemic changes (see Chapter 2). We need to consider

how to apply or adapt situational crime prevention perspectives to systems thinking. We believe this approach can potentially encourage a long-term understanding of urban dynamics, fostering innovative and more sustainable interventions for crime prevention.

We appreciate that a major hurdle here is whether systems thinking is too complicated for practitioners to use. Here, we favor the notion of 'appropriate complexity' (Ekblom, 2011). Given the complexities of crime at risky places outlined in the book and the limitations of conventional approaches for situational crime prevention (Chapter 7), we need to find a compromise between simplicity and complexity. We suggest the 'old toolkit' is overly simplistic and inadequate for addressing crime at risky places, and we have to find ways to do this in a more integrated and long-term manner. If systems thinking appears too complex, it may discourage engagement, but we recommend strategies that strike an appropriate balance between simplicity and complexity.

Researchers should start exploring their own problems through systems thinking to gain insights. Practitioners should adapt the principles to their specific needs, modifying them based on the local conditions and available resources. This process needs to be accompanied by a refurbished delivery system for systems thinking. This needs a more supportive organizational structure and working culture (Knutsson, 2003). At present, the career structure of practitioners does not support sustainable transitions. Policymakers are taught to be generalists, with short-lived rotations in community safety and other policy areas. Moreover, they do not receive the necessary training, knowledge, skills, and techniques to achieve this. The UK Government Office for Science (January 2023) published 'introductory systems thinking toolkit for civil servants,' suggesting UK central government support for systems thinking. Sweden boasts a robust heritage of systems thinking across environmental sciences, engineering, and urban and regional planning. More recently, there has been a renewed emphasis on this approach in practice, driven by the aim to provide policymakers and decision-makers with the essential tools to expedite the journey towards a more sustainable society (Rosvall et al., 2023).

Risky places in themselves and the environments they connect with are complex systems that continually change. It is no longer sufficient to know 'what works' and 'what does not work.' Given the nature of the currently available 'evidence base,' we contend it is more appropriate to phrase this as 'what worked' and 'what did not work.' We need to know more about when interventions work, for how long, where, in what contexts, and for whom. As discussed in Chapter 3, the EMMIE framework does begin to address some of this. However, it does not consider how systems adapt or evolve over time and generally does not explicitly consider the sustainability

of a program, at least not beyond 12 months. We want to encourage readers to use systems thinking here. Start by setting long-term goals for interventions and/or expanding the boundaries of analysis beyond a risky place. Try to ensure users and practitioners are involved in the design of the intervention, its implementation, and or the evaluation. We should make efforts to extend the deadlines for evaluations from one year to five or ten years, taking distance from the short-term before-after analysis and considering the primary and secondary impacts of those interventions.

This would require a steep change in the funding culture to support these interventions. Funding organizations could designate and protect a proportion of resources for long-term integrated systems thinking that aligns with the 2030s Sustainable Development Goals (SDGs) discussed in Chapter 1. National guidelines could support recommendations for long-term evaluations of safety interventions following standardized processes that allow for multiple and iterative trial and error approaches to evaluation to capture learning of successes and failures along the way. With greater flexibility but a clear framework for comparison between initiatives, we would have a better chance to address our current problem of fragmented evidence.

We suggest it isn't sufficient to wait for major structural change. Indeed, we urge readers to experiment or 'have a go' at using a systems thinking approach and to share their outcomes. They should seek ways to facilitate change from the ground up, expanding horizons and building evidence. They should endeavor to incorporate long-term perspectives that embrace uncertainty and support a culture where 'failure,' in other words, an intervention not realizing a favorable outcome, is considered a positive learning experience. This process is crucial if we are to reframe our approach as part of a broader 'sustainability transition.' This is a process that represents the systemic changes necessary in our societies to address ongoing crises (Köhler et al., 2019). Systems thinking can be thought of as part of our 'new toolkit' to help us identify ways to facilitate change towards more sustainable societies. As Geels and Schot (2007) recommend, we need to create new practices and mainstream them. The development, testing, and normalization of these new practices require the sustained participation of diverse societal actors (Huttunen et al., 2022).

In the next sections, we discuss the suitability of systems thinking for addressing crime in risky places. We discuss the rationale behind this approach, the diverse actors involved, and the strategic application of systems thinking in crime prevention efforts. While acknowledging certain limitations of the book, we present a research agenda aimed at advancing the implementation and development of systems thinking to foster safer environments in high-risk places.

10.2 Why is Systems Thinking Suitable for Preventing Crime at Risky Places?

There are several reasons why systems thinking is particularly appropriate for addressing crime and fear of crime at risky places. Risky places are complex environments, and crime manifests from a series of interconnected factors, including socio-economics and the built environment. There are also distinct temporal patterns, as these places are not risky all the time, and risk changes as places adapt and evolve. Systems thinking enables a comprehensive analysis of the relationships between these multiple factors contributing to crime. By understanding these interdependencies, we can design crime prevention measures that address the drivers of crime in a long-term and systematic way. By identifying leverage points, we can focus on the places within the system where we can gain the most traction rather than seeking to address the whole complexity of a system. This approach allows for more effective, sustainable, and nuanced strategies to reduce crime and alleviate fear in risky places, considering the broader context in which these issues manifest.

An advantage of systems thinking is that it can address the safety needs of diverse users. It enables the development of targeted interventions that consider the specific needs and vulnerabilities of each group, including women, older adults, LGBQTI+, people with disabilities, and other vulnerable populations in a variety of environmental contexts. Although research in sustainability transitions indicates the importance of people's local knowledge as experts in their everyday lives and daily practices, individuals need to be aware of the co-production process and develop an understanding of how to intentionally generate more sustainable societies (Huttunen et al., 2022). There is a chance that poorly conducted co-production can reinforce existing unequal power relations and can even backfire. This calls for more attention to the conflicting interests and power disparities involved in co-production (Miller & Wyborn, 2020).

A systems thinking approach supports an understanding of the relationship between physical and cyber spaces by integrating technology infrastructure, legal frameworks, human behavior, and educational systems (Kashef et al., 2021). For example, transportation systems such as the metro could be susceptible to cyber-attacks whereby offenders gain control of computerized systems and can manipulate vehicle operations. This could cause delays, accidents, or unauthorized route changes (Huq et al., 2018). One strategy is to identify how these elements interact and to develop strategies that focus beyond enhanced cybersecurity measures, for example, software and network security, but also promote digital literacy

among users to reduce vulnerability to cyber-attacks. Simultaneously, collaboration with legal entities can ensure robust legal frameworks that deter cybercrime.

Systems thinking can help address problems of fear of crime. Let's consider a neighborhood experiencing an increased fear of crime due to poor street lighting and limited community engagement. Applying systems thinking, planners might recognize that these issues are associated with factors such as social isolation, insufficient infrastructure, and a lack of community programs. This might include improving street lighting for better visibility, initiating community watch programs to enhance social connections, and collaborating with local authorities to address underlying social and economic factors contributing to fear of crime.

Systems thinking is effective for addressing challenges in both rural and urban areas. Addressing the safety needs of individuals in rural areas requires a nuanced approach, and systems thinking can be instrumental in this. In rural settings, safety concerns may encompass issues such as limited emergency services, lack of adequate lighting, and the challenges of large open spaces. In urban areas, systems thinking can focus on the interaction between complex issues, such as social inequality, inadequate lighting, and ineffective law enforcement. Systems thinking can support a better understanding of perceptions of crime risk. This can be influenced by economic exclusion, discrimination, and macro-level changes in urban and or rural places. By examining the factors in these settings, interventions can be tailored to address the unique challenges of remoteness. Access to the internet and social media further heightens concerns, illustrating that victimization and fear of crime are no longer solely dependent on location, bridging the gap between urban and remote areas in the face of emerging challenges. Systems thinking acknowledges the inadequacy of urban-centric crime prevention models. Researchers can explore context-specific dynamics, empowering local agencies and resisting the notion of a universal 'silver bullet.' This shift promotes nuanced, effective strategies that respect the unique qualities of rural safety concerns, fostering genuine local empowerment.

Systems thinking is also applicable in the context of the rural-urban continuum, especially in developing regions of Africa, Asia, and Latin America. This approach enables analysis of a broad set of factors for crime, such as chronic poverty, famine, social exclusion, violence, and the challenges posed by risky places. By understanding the complex relationships within these hybrid settings, where rural and urban elements intersect, researchers can develop comprehensive strategies to address safety needs and contribute to sustainable development. This approach allows for a more inclusive understanding of the complexities of crime in globalized

areas, acknowledging the diversity of dynamics worldwide, particularly in countries of the global south.

Systems thinking considers the environmental, social, and economic dimensions, ensuring comprehensive solutions that promote long-term sustainability. Integrating systems thinking enhances the effectiveness of crime prevention strategies in fostering safer and more resilient communities (Chapter 1). Applying systems thinking to studying climate change and social conflict enables a broader examination of interconnected factors like resource competition, extreme weather events, and migration. This approach reveals how climate-induced stress may lead to criminal behavior as a coping mechanism, affecting routine activities and altering social dynamics (Agnew, 2012). By comprehensively understanding these multifaceted impacts, researchers gain insights into the complex relationships between environmental changes, economic hardships, and crime. This perspective offers a foundation for developing policies and intervention strategies in response to the evolving challenges posed by climate change.

10.3 Who Should Be Using Systems Thinking to Prevent Crime in Risky Places?

There are a range of key people, or 'actors,' who could use systems thinking, including researchers, policymakers, practitioners, civic societies, and other interested organizations who play a pivotal role in crime prevention. For instance, practitioners, planners, safety experts, law enforcement officers, community safety personnel, health workers, educators, and others directly involved in crime prevention should be the frontline implementers of systems thinking. Their day-to-day experiences provide insights into the practical challenges and opportunities of applying systems thinking in real-world contexts.

'Practitioners' can experiment with innovative approaches to collaboration, feeding lessons learned back into the broader system for continuous improvement. Researchers could also contribute by developing evidence-based models that map out the complex interactions and feedback loops between communities and offending or address specific problems in risky facilities. By having a strong grasp of the 'beat of the system' and 'well-informed models of the problems evident' (Chapter 8), they may be able to identify leverage points where interventions could have the most significant impact and monitor its development over time.

'Policymakers' have the authority to allocate resources, set agendas, and formulate policies encouraging cross-sector collaboration. Policymakers can foster an ecosystem where statutory, voluntary, and commercial organizations are incentivized to work together in a systematic fashion,

aligning their efforts toward shared goals. Thus, policymakers are fundamental in creating the right environment for systems thinking to be effectively implemented. However, they are subject to multiple pressures and constraints imposed by political, social, and economic change.

'Civic society organizations,' often those directly affected by crime in risky places, can be involved in creating solutions. By participating in workshops, forums, and community meetings, they can share their first-hand experiences and insights, contributing valuable perspectives that might not be visible to policymakers or practitioners from the outside. Note that we are not advocating here for new partnership models of governance developed from scratch. What we are proposing is for partnerships to revisit their current ways of working and to embrace systems thinking and longer-term strategies. The questions should be asked not about the problems but about what an 'idealized' system should look like. We acknowledge there are recognized challenges within existing partnership models for preventing crime in risky places. We suggest a way forward, which is to find shared goals and identify and work with the key beneficiaries.

By employing a systems approach, practitioners can provide insights and enhance real-world applications, but this is not enough. Civic involvement fosters solutions driven by community needs, aligning with broader sustainability goals. However, it is essential to critically assess how we can improve the integration of these key actors who are crucial in utilizing systems thinking to enhance crime prevention efforts that support sustainability transitions effectively.

10.4 Should Systems Thinking Be Used for Crime Prevention in Risky Places?

This book posits that a paradigm shift is necessary to move from conventional methods of situational crime prevention to systems thinking. While conventional methods are highly valuable, they focus on immediate rather than long-term solutions and can miss interconnected factors contributing to crime in risky places. The essence of systems thinking lies in understanding the complex web of factors that influence crime rates in high-risk areas. Figure 10.1 suggests the main principles of systems thinking compared to conventional thinking, both in the process of investigating the nature of the problem and evaluating the interventions themselves. These have been discussed in detail throughout the book.

It would be beneficial for future practice to go beyond linear conceptions of cause and effect when addressing and assessing crime prevention. The 'silo' mentality is still prevalent in many organizations, where different departments or groups work independently of each other. Instead, what

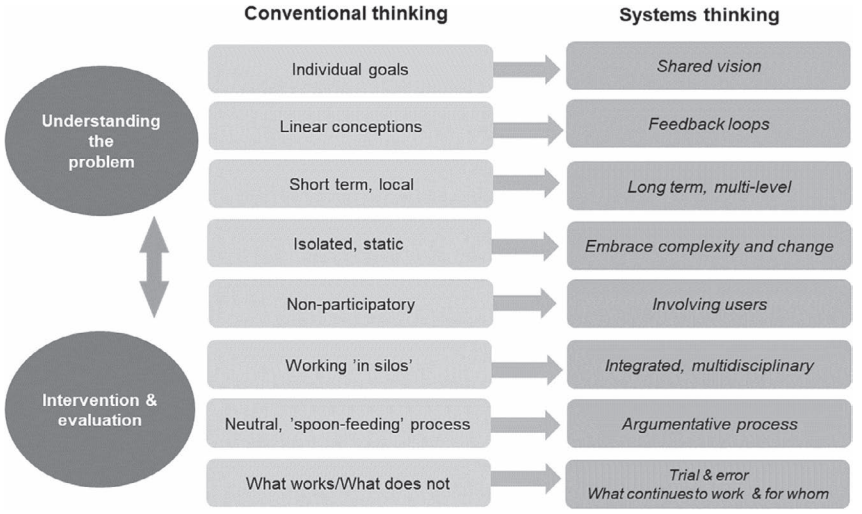

FIGURE 10.1 Systems thinking for sustainable crime prevention of risky places: Main principles.

Source: Authors.

is needed is an integrated perspective. The next step is to define interventions, making efforts to consider the feedback loops. The process requires acknowledging 'failures,' embracing complexity, and accepting that a complete understanding of the system may be unattainable. Instead, we could identify 'handles' or methods to monitor changes spatially and temporally. Instead of 'spoon-feeding' other partners, we need to foster a 'questioning process' to encourage discussion, pushing participants to defend their viewpoints, challenge others, and refine their ideas.

Moreover, by using systems thinking, we can identify leverage points within these systems that offer the greatest potential for impactful change. This approach requires a shift towards longer-term planning and investment, recognizing that sustainable crime reduction is a gradual process that unfolds over time and is, therefore, likely to require continual adaptation. As discussed previously, these are requirements for sustainability transitions. Moreover, the lack of discussion about policy implications and the often taken-for-granted 'neutrality' in crime prevention can sometimes overlook the reality of conflicting interests inherent in many situations. Acknowledging these conflicts can lead to more transparent and fair decision-making processes, which can be particularly important in private and public cooperation. As mentioned in this chapter, it is equally important to include users in the creation and refinement of solutions.

Systems thinking can be used to achieve greater inclusivity in crime prevention and urban planning. Women's safety is a priority. The 67th session of the United Nations Commission on the Status of Women reached a consensus on ways to achieve gender equality. However, despite these efforts, these documents neglect some basic conditions that are essential for women's economic and social autonomy (see, e.g., Commission on the Status of Women Sixty-Seventh Session, 2023). By integrating gender perspectives into urban planning, we can ensure that crime prevention strategies can resonate for whole communities. Beyond gender, it is also important to consider intersectionality, as well as the needs of different age groups, abilities, and socio-economic backgrounds in urban planning and safety measures. This is in line with the Sustainable Development Goals, in particular SDG 11 (of promoting safe, inclusive, and resilient cities), much of which is also reflected in the policy and programmatic work of UN-Habitat and partners such as UNODC and UN Women (UNODC, 2020).

10.5 What Are the Limitations of This Book?

We recognize and accept that there are several limitations in this book. One issue is that the book proposes a generic framework for applying systems thinking to crime prevention. Researchers, practitioners, and policymakers are encouraged to adapt these approaches to their specific local contexts, which might require significant modification from their current ways of working. While framed within a systems thinking approach, the perspectives we advocate reinforce some of the perspectives that have already been put forward by several eminent scholars and practitioners who question the localized nature of situational crime prevention and problem-solving approaches for crime reduction. Our contribution here is to advocate for a broader, more interconnected, and long-term perspective in crime prevention, recognizing previous calls on this matter.

The book only briefly touches upon complex adaptive systems, considering how places evolve over time and that change tends to happen over a gradual period. However, there can also be sudden events that have a significant impact on a system. An example of this was the Covid-19 pandemic. Alternatively, the pressure might build on a place gradually, for example, some short-term conflict between residents or a dispute between place owners. There may be gentrification of an area as new residents move in over several years. This might eventually result in a tipping point, which causes a shock to the system and significantly changes the nature of the system.

Another limitation is that we have not used a strict criterion to compare crime prevention for risky places across various international contexts. In

the future, comparative studies of risky places should be systematically designed at the outset. These could then inform the practical application of systems thinking in situational crime prevention across a broad spectrum of environments, ranging from urban to rural and from the Global North to the Global South. By examining how different regions and cultures design and implement crime prevention strategies, researchers and practitioners could gain valuable insights into the multifaceted nature of crime systems and the complex interplay of socio-economic, cultural, and environmental factors that influence these systems.

We have not explored the perceptions of those who consider committing crimes in risky places in relation to the place's criminal opportunity structure. With the growth of Information Communication Technology (ICT), some of the traditional crime opportunity structures described in this book will adapt and evolve over time and may even become more complex. As discussed in previous chapters, some 'local crimes' are often not isolated but are one node within an intertwined set of networks, with links far from that place (e.g., Hodges, 2021). Future research could greatly enhance our theoretical understanding and practical application if conducted within a broader examination of how individuals acquire knowledge about new criminal opportunities and methods to exploit them effectively.

A further constraint is that while we touch upon the connectedness of physical spaces and cyberspace, especially in relation to hyper-locations (See Chapters 4 to 6 on facilities, nodes, and paths), we have not explored links to cyberspace in great depth. As digital and physical realms become increasingly intertwined, exploring this nexus could reveal innovative approaches to situational crime prevention. The lack of in-depth analysis of these cyber-physical interactions restricts our capacity to fully understand the potential of systems thinking in addressing the complex nature of crime in both the digital and physical worlds. Transnational, interdisciplinary collaboration efforts can accelerate the development of comprehensive strategies that encompass the evolving dynamics of crime in both the digital and physical realms.

In this book we have only touched on the notion of crime harm (Chapter 3). We consider risky places for crime and facilities, nodes, and pathways. We also discuss some of the differences in terms of crime type by time of day and season, for example, 'pickpocketing' and 'sexual groping' during peak travel times and sexual assault during quieter times or on journeys home (Chapters 4–6). There is scope for systems thinking approaches to consider crime harm from the user's perspective, as well as the severity of a crime and its impact. This may extend beyond the immediate vicinity of the risky place, over longer time periods,

and link to other forms of harm such as well-being and health. For example, a shooting and a series of retaliatory shootings across the city will impact communities in multiple ways and for several months or even years.

In Chapter 7, we identified multiple barriers that hinder the application of systems thinking to risky places. One of the challenges in writing this book is that it was not possible to identify successful examples of systems thinking being fully applied to crime prevention at risky places. We included cases that adopt partial aspects of systems thinking, some more successful than others, and identified key lessons for future learning from this. Efforts to reduce crime through public health approaches are one example. Within engineering and associated disciplines such as chemistry and physics, there is an extensive body of research to understand flows and feedback loops within complex systems. These are more focused on hard sciences rather than the social sciences. Systems analysis employs tools like data modeling, simulation, and optimization to analyze and enhance the performance of a specific system. It may be possible to adopt these models to support systems thinking for crime prevention. Perhaps if we wrote a future edition of the book in five years' time, as more interdisciplinary approaches develop, there may be more examples for us to learn from.

10.6 What Are the Components of the Research Agenda Focused on Applying Systems Thinking at Risky Places?

Creating a research agenda to integrate the principles of systems thinking into the analysis and creation of intervention strategies that address the multifaceted nature of crime in various environments is a demanding task. In what follows, we discuss examples of research ideas that could form part of a future research agenda devoted to systems thinking for sustainable crime prevention in risky places. While this research agenda presents a comprehensive set of examples across diverse settings, it is important to recognize that crime and society are constantly evolving, thus, this agenda should not be viewed as an exhaustive list of topics but rather as a starting point.

A key requirement is to define systems boundaries and identify leverage points. Globalization affects the dynamics of crime and imposes challenges for the conceptualization of systems boundaries. What criteria should be used to define the boundaries of a crime system in a globalized world with both local and global influences? One suggestion is to focus on gaining a better understanding of how local communities are influenced by the dynamics of crime systems. Another is to explore how situational crime prevention can be adapted to account for the different scales at which crime is impacted. This could take different shapes, comparing the dynamics of

crime across the rural-urban continuum or evaluating the unique challenges and opportunities at each scale. It could also explore how systems can be adapted in the diverse socio-economic contexts of the Global North and Global South and how the supply and demand of products in one part of the globe affect crime levels in another. For instance, the demand for beef and materials for fashion and textiles impact deforestation in the Amazon rainforest.

We propose a debate on how we should apply systems thinking to crime and harm prevention, focusing on how crime systems operate across different environments and cultures. Examples of questions could include: Can we transfer successful local interventions to wider contexts, considering cultural, economic, and political differences, and how can systems thinking address the challenges and boundaries in coordinating a global response to situational crime prevention? Can systems thinking be utilized to dynamically adjust the boundaries and scales of situational crime prevention strategies in response to evolving threats in risky places? We should develop more collaborative projects with other researchers or institutions to address these queries specifically. For example, workshops and seminars that focus on these limitations could be promoted by networks of scholars and practitioners to discuss both the current barriers and potentialities of systems thinking in situational crime prevention and urban planning.

There is also a need to explore other methods, including the use and development of technology, such as virtual reality to visualize scenarios and artificial intelligence for prioritization policing. We identify several of these ideas in Chapter 8. These should be incorporated within an interdisciplinary framework involving criminology, policing, urban planning, engineering, and psychology, for example, to foster a broader understanding of crime systems. Future research could explore participatory action research to engage communities directly in identifying problems and co-creating solutions, ensuring the inclusion of diverse voices, and considering the ethics in research and practice. Similarly, there is a need to test methodologies for assessing the long-term impact of systems thinking-based interventions on crime prevention, community well-being, and environmental sustainability. Moreover, evaluations will need to 'design in' appropriate sensitivities to measure resilience and adaptive capacities of interventions and incorporate potential shocks and changes in the wider system.

As we pointed out in Chapter 1, there is a growing emphasis on finding synergies between climate change adaptation and crime prevention (Chamard, 2024). The author shows that by integrating nature-based solutions such as tree planting and community gardens, cities can potentially mitigate heat and reduce crime simultaneously. The article discusses the need for research linking climate resilience with crime deterrence, urging

collaboration between criminologists and urban planners. This subject area has not been part of the scope of this book, but it is linked to SDG 13, which is dedicated to climate action. It opens up a broader spectrum of related issues to investigate in the future, including the links between environmental and organized crime across global locations (see, e.g., Wyatt, 2021), which are of great importance for both research and practice.

As discussed in previous chapters, institutional barriers limit the implementation of systems thinking. We propose policy frameworks that support the adoption of systems thinking in situational crime prevention 'at source,' fostering interagency collaboration, avoiding silos, and promoting long-term perspectives. Capacity building can be developed by training policymakers, practitioners, and community leaders in systems thinking and its application to crime prevention. This would be the first step in aligning research objectives with societal sustainability goals.

10.7 What Are the Takeaway Messages for Systems Thinking for Sustainable Crime Prevention?

The use of systems thinking for crime prevention at risky places requires a critical systematic understanding of the challenges faced. This should recognize that complex problems cannot be solved through short-term, linear approaches that fail to consider the interconnectedness of a range of factors that characterize the problems experienced. Using systems thinking, practitioners can define strategies that address the main causes rather than just symptoms, leading hopefully to more effective and enduring solutions. Systems thinking connects key actors across different sectors to address complex challenges, combine perspectives and resources through partnerships, and bring in the perspectives of beneficiaries. Continuous monitoring of outcomes and adaptation of strategies are crucial, but how do we go from words to action?

Firstly, we must create a vision and foster a sense of shared ownership of a particular problem, in other words, a common understanding of the evident challenges, before developing prevention strategies. Challenges of addressing problems in cities through fragmented policy silos highlight the need for a systems approach. Government decisions are often made sector by sector and, therefore, fail to recognize the whole picture. A systems thinking approach refers to a set of processes, methods, and practices that aim to affect systems change. For governments, this approach has several implications. Together with the relevant groups in society, they need to develop and put in place a vision of strategies to transform the current system and achieve the shared desired goals. This rarely happens. As highlighted previously, even where individual policymakers are adept at

systems thinking, the policies they create may not inherently be systemic, as they demand institutional support to achieve genuine systems-oriented policymaking (OECD, 2020a).

Secondly, it is essential to ask what issues need to be addressed. Why is a particular factor problematic, and why and how does that challenge impact people and communities? The next step is to have a general understanding of the broader context influencing the problem and the system in which the problem(s) occurs(s), delineating the key factors and dynamics at play.

Thirdly, it is critical to identify the main actors within the system, recognizing their perspectives on the system's function, outcomes, and the roles they each play. Inside the organization, further key elements include change champions, courageous early adopters, and a willingness to experiment, accept failures, and learn from mistakes. It is also essential to engage practitioners and policymakers inside and outside government, backed by resources, to avoid the 'business-as-usual' traps (OECD, 2020b). One of the points made by Woodhill and Millican (2023) is that organizations must adapt to shift towards systems thinking. Not all key actors will be willing to participate, which is a barrier. The literature in systems thinking suggests the importance of carefully selecting key actors instead of focusing on quantity. There are some critical relationships to analyze for effective interventions. These include understanding the connections within the system, the problems, possible causes, and how they affect each other, as well as context, in other words, their relationship with the external environment.

Fourthly, it is necessary to support those involved so they have appropriate tools to carry out systems thinking. At the minimum, this should include basic training in systems thinking. Given that practitioners have limited time to learn about systems analysis, short courses, and professional training sessions would support those interested in learning about the principles of systems thinking and getting the basics. Webpages, videos, and audiobooks are examples of reference materials that can easily be accessed, and many are readily available. Recent publications provide guidelines on how to start. One example was proposed by Woodhill and Millican (2023) from the Institute of Development Studies in the UK, which offers links to additional resources and tools on systems thinking. Another example is from the International Institute of Applied Systems Analysis—IIASA and OECD by Dieckmann et al. (2020), which provides a macro perspective for policymakers. It is necessary to develop practical learning and training environments that mimic real-life challenges, allowing participants to explore actions and strategies and ponder their effects in a secure setting. Simulation games have proven effective for instilling systems thinking and enhancing

systems competence, equipping individuals with the skills to navigate uncertainty, process incomplete information, collaborate, and make collective decisions. For instance, IIASA's 'The World's Future—A Sustainable Development Goals Game' merges systems analysis and simulation with collaborative scenario creation and imaginative role-play, showcasing the advantages of this approach. Woodhill and Millican (2023) list 14 different tools that have proved to be particularly useful in helping teams and practitioners analyze a situation and make decisions using a systems mindset.

Changes in the way people work are crucial for a more systemic approach. One of the shifts is changing the process from 'plans' to 'learning,' being conscious that situations change and new solutions may be needed. Additionally, it is important to develop a clear direction and purpose, although we need to remember that achieving these goals is frequently nonlinear, which requires experimentation and constant learning. From this, we must encourage collective responsibility among actors by creating a shared understanding and establishing incentives. A centralized model may become ineffective, so there needs to be a shift from 'centralized models' to 'collective responsibility.'

Classic planning tends to assume the wider context is static or only changes in predictably linear ways. Adopting a systems thinking approach in the real world relies on trying different approaches, monitoring outcomes, and a fundamental shift from rigid planning to learning systems. This change requires a move from 'rigid targets' to 'adaptable directions,' especially as not all impact can be measured. This challenges the conventional approach in that only measurable change matters. Woodhill and Millican (2023) suggest that the alternative is to explore the future in terms of multiple possible scenarios, given critical uncertainties, and examine desired futures in terms of practitioner values and interests to identify broad directions for positive change. This process requires a search for realistic opportunities to 'nudge' change within existing contexts. In this, we need to identify realistic ambitions for change and constantly monitor and assess the changing context to adjust directions and interventions and design interventions that align with how the systems evolve.

When applying this at risky places for crime, key questions are: What factors are related to the problem, how can we get the relevant practitioners to take part, and how can we include all necessary actors to identify the problem and develop a common goal? To initiate systems thinking in crime prevention in risky places, the first step is defining the system's boundaries, for example, if it is a risky place in the context of a neighborhood in a particular city. This involves understanding the specific issues or problems of interest, the interconnectedness within the system, and its relationship with the external environment. By determining where the system's limits

lie and conceptualizing the system itself, we can begin to consider a systems thinking approach.

We also need to consider the key trends and uncertainties that could impact the system and envision possible future scenarios. This requires answering fundamental questions about the desired change: why it's needed, what should change, how to implement the change, who will be involved, and when it should occur. Determining which changes in the system's outcomes are desirable and for whom helps clarify the goals of the intervention. Putting in practice the changes in the system to improve the safety conditions is important, but it is equally important to plan beforehand how we monitor whether our actions are changing the situation. Having a system of long-term monitoring is desirable but rarely possible given short-term projects and funding, for instance.

Planning the cities of tomorrow with safety and sustainability in mind in the face of contemporary urban challenges requires a multidisciplinary approach. This broadens the scope beyond the realms of planners, architects, and engineers to include experts in digital technology, artificial intelligence, big data, finance, and climate science and experts with a variety of expertise, from policing and criminal justice to emergency services, those who can deal with moments of crisis but also long-term everyday safety problems. Current competencies must be relevant to the future, while new professionals must be accommodated to satisfy the demands of an ever-changing world.

In summary, a systems thinking approach needs to involve the right users and practitioners to succeed in crime prevention strategies in risky areas. This collaborative stance positively impacts through interventions but also aligns with the broader objectives of the Sustainable Development Goals, as outlined by the United Nations in 2018. Whilst this alignment presents a way ahead to sustainable development and crime prevention, it must be inclusive to all types of city users and other beneficiaries. The success of such initiatives hinges on their ability to address the causes of crime and safety problems, ensure equitable participation of all, and adapt to the dynamic nature of social systems. Finally, when striving for systemic change in crime prevention, it is essential to remain critical of our approaches, continuously evaluate outcomes, and be willing to adapt strategies in response to emerging insights and evolving societal needs.

10.8 Concluding Remarks

In this book, we highlight the nature of risky places and suggest using systems thinking as a theoretical framework to deepen our understanding of crime in a globalized world. We have explored how traditional situational

crime prevention methods, 'the old toolkit,' could be adapted and innovatively applied to address the challenges of urban dynamics and global disparities, fostering long-term sustainable crime prevention strategies. This involves identifying key intervention points within complex systems and embracing the role of users and practitioners to develop interventions aligned to a sustainable future.

We believe systems thinking offers an effective strategy for addressing the crime dynamics of risky places across the rural-urban continuum. We aspire that this book ignites the curiosity of researchers and experts towards adopting a contextual, interconnected, and long-term perspective in addressing risky places. The journey towards integrating systems thinking for crime and safety is already underway. We recognize several reasons we have neglected systems thinking for crime prevention at risky places, but the first step is to move beyond the barriers and look for opportunities. To do this, we need to start sharing a common vision for safer and more sustainable places.

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