Article

Third-Generation Crime Prevention Through Environmental Design (CPTED)

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Abstract: This paper advances crime prevention through environmental design (CPTED) theory and practice by introducing a holistic and integrated crime prevention theory called Third-Generation CPTED. We use Third-Generation CPTED to expand both the situational focus of traditional CPTED and the social ecology/neighbourhood focus of Second-Generation CPTED, by creating a new theory that integrates human motivation and aspirations within a neighbourhood Liveability Hierarchy. Central to our theory is the planning concept of liveability and, because safety from crime, fear, and victimization is such an integral part of quality of life, we present two underlying themes on which liveability depends: public health and sustainability. We propose some theoretical assumptions and propositions that underpin the theory and suggest areas for future research. Our contention is that a holistic and integrative Third-Generation CPTED elevates liveability from the role of basic infrastructure and habitat to providing residents with opportunities to enhance their own personal aspirations and improve their quality of life.

Keywords: crime prevention through environmental design (CPTED); First-Generation CPTED; Second-Generation CPTED; safety; liveability; quality of life; public health; sustainability

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1. Introduction

Over the past half century, crime prevention theory has employed increasingly sophisticated and scientific approaches to understand and solve crime problems. Concurrently, there has been significant change in the way we design and think about our cities. In many cases, these developments have culminated in more holistic thinking about urbanisation and safety within ever-expanding 21st century cities (Grogan and Proscio 2000; Montgomery 2013). For example, many city governments now employ Safe City plans with safety strategies and liveability indices in which they recognise the synergy between urban form, crime, and social conditions. They acknowledge that all these elements together impact safety and quality of life. In this fashion, safety is seen as only one integrative element of liveability; reductionist approaches that isolate elements like urban design from personal growth or environmental health are insufficient and outdated.

Interestingly, there is considerable historical support for this integrative approach in the original writing of the crime prevention through environmental design (CPTED) founder, C. Ray Jeffery. In his early work, Jeffery coined the term 'crime prevention through environmental design', and called for the development of an interdisciplinary behavioural science of crime and prevention (Jeffery 1977). Jeffery was among the first to introduce the idea that the physical environment has an influence on the opportunity for crime and, consequently, the prevention of crime can be sought in the design of urban places. However, unlike the practitioners of Newman's defensible space theories (Newman 1972; Newman 1996), Jeffery did not think crime and its prevention are entirely based on

the physical environment. Jeffery's approach was to define the 'environment' using a much broader canvass and his suggestions were to merge a number of previously unconnected theoretical approaches into a behavioural science of crime prevention. His theoretical proposition included the organic sciences such as bio-social learning, psychological conditioning, genetics, and cognitive psychology (sciences that might help explain the motives of some crimes), along with physical sciences such as architecture, engineering, and urban planning (the sciences currently helping to explain the physical opportunities for crime). Jeffery was concerned that CPTED which only focused on the physical environment using Newman's principles of defensible space (termed First-Generation CPTED) did not consider any of the internal motives of crime, such as social psychology, social ecology, or the cognitive or health sciences. Jeffery's original vision for CPTED was never realised in the First-Generation CPTED practices (Jeffery 2000, p. 1):

> *We do not inherit behavior any more than we inherit height or intelligence. We do inherit a capacity for interaction with the environment . . . The brain contains a center for emotion and motivation, based on pleasure and pain, a center for reason and thought, and a center for the processing of information from the environment.* (Jeffery 1978, p. 162)

> *As planners for crime prevention we must reinforce desirable behavior rather than punishing undesirable behavior. We must create environments that are healthy for the development of the infant, that stimulate brain growth, that provide a healthy diet and not toxic poisoning or stress, and that provide opportunities for education, family support, and adequate medical care in places of high infant mortality and child abuse.* (Jeffery 2000, p. 2)

To some extent, a new form of CPTED termed 'Second-Generation CPTED' began to redress this imbalance in CPTED theory by reintroducing social ecology, neighbourhood planning and collective efficacy (Sampson and Groves 1989; Sampson et al. 1997; Cozens and Love 2015). Whilst First-Generation CPTED was limited to blocking crime opportunities, with a focus on territorial control of those areas through architecture and physical design (Crowe 1991; Atlas 2013) and prospects for the guardianship of vulnerable areas enabled by such design (Brown and Altman 1983; Reynald 2011; Uittenbogaard 2014), Second-Generation CPTED expanded prevention strategies into neighbourhood conditions and social relations within the neighbourhood (Saville and Cleveland 1998; Saville and Cleveland 2013; Saville 2018). Unlike First-Generation CPTED, where the primary goal was reducing crime opportunities by modifying the physical environment, in Second-Generation CPTED, social ecology and neighbourhood health were both considered causes of crime and the source of its prevention, an idea initially described by Jane Jacobs in her landmark publication *Death and Life of Great American Cities* (Jacobs[1971] 1961).

Some reviewers consider Second-Generation CPTED an extension of its earlier version, only intended to enhance the physical design to reduce crime opportunities by creating social cohesion (Atlas 2013). From this perspective, First-Generation modifications change the environment within a short timeframe, whereas Second-Generation social strategies aim to build a sense of community and social cohesion over a longer period of time. That is, in fact, precisely the point of Second-Generation CPTED and it represents a significant departure from how First-Generation CPTED theory, with its growing focus on target hardening and disregard for motive reinforcement (Miller et al. 2015), had evolved up to the late 1990s. Second-Generation CPTED reversed that tendency and reintroduced community-building back into CPTED theory (Saville 2009).

However, the broader model for CPTED as envisioned by Jeffery was not satisfied by the theoretical reimagining in Second-Generation CPTED. Part of the reason for this was political. The political unpopularity of psychological conditioning, bio-social engineering and bio-chemical or genetic research, especially in the criminological community, was at a peak in the 1960s and 1970s (Wright and Miller 1998). For example, the social policy of eugenics and mass sterilisation—programs continuing, in some countries, well into the 1990s (Stucchi-Portocarrero 2018)—had revealed both the embryonic stage of bio-social research and its inability to cut crime. By the time of Jeffery's writing, the socio-biological

approach and psychological conditioning theories had been thoroughly discredited as unethical (Laufer and Adler 1999, pp. 445–51). Therefore, CPTED turned exclusively to reducing crime opportunities in the physical environment, at least until the introduction of Second-Generation CPTED.

2. Attempts at Developing Third-Generation CPTED

Recent developments in the cognitive, behavioural and environmental sciences now offer a new perspective on how people gain quality and satisfaction from their environments, including how they respond to crime and safety (LeClerc and Wortley 2014; Gajos et al. 2016; Gilderbloom 2016). These developments represent an ideal bridge into some of the CPTED concepts developed by Jeffery. We call the evolution and synthesis of these concepts Third-Generation CPTED.

The efforts made to revisit CPTED theory and create Third-Generation CPTED, however, have seldom addressed the theoretical foundations described above. One attempt by Gibson (2016) to reformulate CPTED into Third-Generation CPTED was based on the rejection of Second-Generation CPTED on the unsupported assumption that "exploring social context through Second Generation CPTED were considered to be detached from First Generation CPTED, and environmental design" (p. 381). This was in spite of the fact that most Second-Generation CPTED research consistently references the same linkages between environmental design and social context that Jeffery identified in his 1970s research (Dickout 2006; Letch et al. 2011; Cozens and Love 2015; Brown 2016; Cozens 2016; Saville 2017). Cozens, in fact, links the history of First- and Second-Generation CPTED and devises the evolution of CPTED within one interconnected diagram (Cozens 2016, p. 84).

In the same work, Cozens also argues for a "broader consideration of *CPTED* within *planning* to integrate it with *public health* and *sustainability*", suggesting they have "similar and interrelated origins" (Cozens 2016, p. 134). While he does not specifically argue for the advancement of CPTED theory in the next generation, he calls for the integration of these overlapping themes by merging crime risk and crime impact assessments with other environmental assessments.

Thorpe and Gamman (2013) attempted to reframe CPTED as a participatory and community-led approach to neighbourhood regeneration, similar to the SafeGrowth planning method (Saville 2009; Saville 2018). While lacking a specific theoretical framework, they do allude to the possibility of Third-Generation CPTED based on social innovation and sustainability driven by local communities. There are some other references to Third-Generation CPTED and how a sustainable green environment is perceived as safe (Fennelly and Perry 2018); however, what exactly is meant by 'sustainable' is left undefined. Most early attempts at theoretical revision basically come down to the idea that safety is a by-product of an inclusive and collaborative problem-solving process between public and private agencies, and the local community.

The first notable effort to create Third-Generation CPTED is a United Nations Interregional Crime and Justice Research Institute (UNICRI) and Massachusetts Institute of Technology (MIT) (2011) report led by the architect and professor Carlos Ratti, who imagined a sustainable, green urban city based on green design strategies that were cybernetically enhanced, in order to foster a "perception of urban space as safe beyond mere concerns about crime" (p. 19). The report posited that

> . . . *while the focus of the first generation manifested in a fortified city mentality, and the second generation focused on a socio-economically balanced community and a well-maintained city for all [socio-economic and ethnic groups], the third generation of CPTED is more focused on reprogramming the urban space through digital means on one hand, and green technologies on the other. Yet, it also incorporates the principle of surveillance and control from the first generation, and effective physical design and socio-cultural diversity from the second generation.* (United Nations Interregional Crime and Justice Research Institute (UNICRI) and Massachusetts Institute of Technology (MIT) 2011, p. 23)

In that definition, there is nothing specifically related to crime prevention; rather, it is an attempt to introduce environmental sustainability and green technology to CPTED practice. Interestingly,

the definition in that report includes surveillance methods to eliminate terrain-vague places and ensure that all spaces experience some measure of supervision, maintenance, or defensible space. Of course, that brings his version of a sustainable and green CPTED directly back to a traditional focus on opportunity reduction and surveillance; in other words, First-Generation CPTED. This is obviously not the theoretical expansion that Jeffery had in mind.

It is clear that the attempts thus far to reformulate CPTED theory have not offered a coherent reformulation of a theoretical framework. Instead, they tinker at the edges of the notion of physical environments, crime opportunity reduction, and how those physical environments help us understand and prevent crime. Our position in this paper is that Third-Generation CPTED should build on Jeffery's original directions for CPTED and adopt a more holistic theoretical approach for expanding both First- and Second-Generation CPTED. It should embrace 21st century advances in cognitive, behavioural and environmental sciences, such as sustainability, social information processing, research on how people perceive their environment and their satisfaction of it, and advances in neurological and cognitive science.

Reviewing all the links between this new science and CPTED is beyond the scope of this paper; however, it is possible to see the evolution of Third-Generation CPTED within the urban planning principle called liveability.

3. The Liveability Principle

The concept of liveability and liveability indicators have been used by The Economist's Intelligence Unit (The Economist Intelligence Unit 2018) and Mercer's Quality of Living City Ranking (Mercer 2019) that annually rank world cities based on groups of objective statistical indicators. Recently, city governments have started developing their own liveability score tools to help citizens find their 'ideal' neighbourhood to satisfy their personal lifestyles, needs and demands. The indicators include elements such as stability, safety, the environment, social opportunities, culture, education, infrastructure, etc. Despite some contention concerning who decides about the content and measurement of these indicators (Okulicz-Kozaryn 2013; Rozek et al. 2018), the key strength of this approach is an integrated liveability metric that does not consider safety in isolation from other needs and quality of life elements.

According to Gough, "community liveability is constructed by the sum of the physical and social characteristics experienced in places—including the natural environment and a walkable and mixed-use built environment, economic potential near diverse housing options, and access to a broad range of services, facilities, and amenities—that add up to a community's quality of life" (Gough 2015, p. 147). A similar definition is offered by the largest non-profit organization in the United States, the AARP (formerly the American Association for Retired Persons). It poses that "a livable community is one that has affordable and appropriate housing, supportive community features and services, and adequate mobility options, which together facilitate personal independence and the engagement of residents in civic and social life" (Kihl et al. 2005, p. 2). Clearly, the concept of liveability has great relevance to a high-quality neighbourhood life.

In this paper, we treat liveability and quality of life interchangeably since the principles and indices they measure frequently overlap in annual city rankings by various organizations (Conger 2015).

With the growth and modernisation of urban centres and increased quality of life, the expectations and needs of residents and visitors have expanded beyond the provision of basic services (Grogan and Proscio 2000; Montgomery 2013). Psychologist Abraham Maslow's hierarchy of needs posed that human needs are not static and that they transcend basic material needs, and suggests that opportunities to satisfy complex psychological needs will lead to improvements in the quality of urban life. In other words, to ensure higher levels of liveability—and the freedom from fear and victimisation that is implicit within liveability—cities must think beyond basic amenities and services like food and shelter. For example, to truly thrive as sustainable neighbourhoods, the liveability principle infers that cities need to consider that basic amenities are only the first step towards a liveable city and they must

also plan for higher-level Maslow-needs, such as opportunities to co-create social programs; recreate in pro-social places; and form emotional connections to people, places and their neighbourhoods. Planners and city officials might argue that this has always been the role of municipalities; however the resources and political focus have rarely followed those good intentions. This is also the case in CPTED; for most of the early life of CPTED theory, crime and its prevention was restricted to basic physical amenities such as architecture and urban design and the opportunities for crime they create.

From this standpoint, the goal for a theory of Third-Generation CPTED is to draw from research on liveability and develop a more holistic conceptualisation of CPTED. Third-Generation CPTED is not limited to the crime reduction proposed by the First-Generation CPTED, but rather operates as a motivation reinforcement strategy espoused by Second-Generation CPTED to reinforce pro-social behaviours and thus improve liveability. We later describe how public health and sustainability are central themes of liveability and how, in more advanced neighbourhood planning practices, Third-Generation CPTED can transcend its First-Generation crime prevention and social foci into a broader, integrated theory for planning 21st century cities. Seen in this light, preventing crime is only the first step in creating a liveable neighbourhood and a more integrated city; any holistic crime prevention theory must reflect that broader reality.

Ironically, when UNICRI and MIT's document describes liveability, it does so when it describes how Second-Generation CPTED creates "livable, civilized, balanced communities in well-maintained urban settings" (p. 54). However, the paper takes a much broader perspective when it recognises the interdependence of ecology, urban design and safety. The focus is clearly on ensuring the liveability of urban areas, including local participation in recycling urban waste and energy efficiency, using urban informatics to help residents better understand and respond to their city, enhancing residents' 'sense of belonging' in their neighbourhood, and capitalising online social networks to digitally enhance a local sense of place.

The UNICRI and MIT report also considers CPTED from a much wider global context than both First- and Second-Generation CPTED. Our view, based on years of project and research experience in neighbourhood planning and crime prevention, as well as long-established empirical work in social ecology (Sampson 2012), is that CPTED theory is best described at units of analysis ranging from street to neighbourhood levels. Our preference is to build on the Second-Generation CPTED's social ecological approach that takes the neighbourhood as the unit of analysis for a neighbourhood-tailored liveability plan. Urban planning fortifies the concept of 'neighbourhood' in planning practice, particularly the latest planning theory called Smart Growth. This was later reinforced following a series of collaborative summits (Saville 2018, pp. 65–90) in which dozens of planners, crime prevention experts and community development workers echoed the Smart Growth definition of neighbourhoods: "In that [Smart Growth] movement, neighbourhoods are generally described as compact places of less than 20 city blocks with a definable center, a diverse collection of land uses within walkable distances, and populations of between 1000 and 5000 residents" (Saville 2018, p. 22). Precise and boundaried definitions of neighbourhoods will obviously depend in great measure on the local context and geography of each city in consideration; however, that does not negate the empirical utility of the neighbourhood as the most ideal scale to apply Third-Generation CPTED.

By using a neighbourhood unit of analysis for describing the application of Third-Generation CPTED, the concept of liveability suggests that higher-level human motivational needs comprise a critical component for sustaining a safe neighbourhood. Since liveability is used in urban planning as a key indicator of quality of life, we propose that the next generation of CPTED should aim to increase the overall quality of life by specifically making neighbourhoods healthy; socially and personally fulfilling; and, ultimately, safe.

In addition to liveability and a neighbourhood unit of analysis, there is one concept we employ to devise Third-Generation CPTED and it emerges from Cozens (2016) exceptional review that links CPTED to non-traditional topics, such as public health and sustainability. He reviews this expanding literature by including citizens' well-being (Barton 2010, p. 95), fear of crime and public health

(Cozens 2015), and mental and physical health (Jackson and Stafford 2009). He reports on research related to sustainable development (Du Plessis 1999), walkability and environmental conditions (Rydin et al. 2012). While Cozens' review is not an attempt to specifically modify CPTED theory using public health and sustainability, we believe the burgeoning public health/sustainability research suggests a much more substantial expansion of CPTED theory. Further, his brief mention of Maslow's hierarchy of needs, and the powerful role of safety and security (Cozens 2016, p. 135) in human satisfaction, suggests to us a conceptual heuristic that connects public health and sustainability with crime prevention. In short, the hierarchy of needs is the theoretical bridge by which we conceptualise and operationalise Third-Generation CPTED.

4. Third-Generation CPTED—A Theory of Human Needs

In 1943, Abraham Maslow created a classification hierarchy to describe different levels of the emotions and motivations driving human behaviour. His classification placed basic physiological needs at the bottom of the hierarchy, the primal needs for safety and shelter, proceeding to higher psychological levels of love, self-esteem, and self-actualisation. By 1970, Maslow had added transcendence to the top of his system, a form of altruism when humans behave in ways that relate to others, their community, and other larger causes as an end unto themselves beyond their own self-driven needs (Maslow 1971; Garcia-Romeu 2010).

While Maslow's hierarchy is not without criticism, especially with regards to the ordering of needs at different levels (Wahba and Bridwell 1976), there is convincing research reinforcing Maslow's idea that fundamental internal needs drive human motivation, especially physiological/safety needs and psychological needs like self-actualization and love (Tang et al. 2002; Tang and West 1997).

The relevance of the Maslow system in Third-Generation CPTED pertains to the assumption that those living and working in any neighbourhood will first seek lower-level needs within the hierarchy, such as security and safe shelter, and then higher-level needs, such as connectedness, satisfaction from realising goals, and the capacity to contribute to something bigger than oneself. The assumption made by First-Generation CPTED aligns with the lower levels of Maslow's hierarchy, especially safety and security, whereas Second-Generation CPTED aligns with social belonging and collective efficacy depicted as mid-level psychological needs. Third-Generation CPTED extends to the highest levels of the hierarchy, in particular, self-actualization and transcendence. Note that in order to satisfy higher levels, it is necessary to satisfy basic physiological needs, which is why First-and Second-Generation CPTED are crucial components of Third-Generation CPTED. By the same token, neither First- nor Second-Generation CPTED provide opportunities for residents to realise and sustain the full potential of a liveable neighbourhood with shelter and cohesion alone.

Therefore, in theoretical terms, Third-Generation CPTED proposes some obvious hypotheses. The first—a central proposition of First- and Second-Generation CPTED—is that the quality of life in a neighbourhood (in this case framed as liveability), is directly impacted by the safety from crime and fear within that neighbourhood. The second is that, because liveability comprises a number of health, environmental, and cognitive properties, as well as safety from crime, sustainable improvements to quality of life result from effectively combining a holistic range of strategies, rather than a few based on modifications to the physical environment.

4.1. Human Needs, Liveability and Safety

Third-Generation CPTED makes the assumption that a prevention focus on safety and crime alone is insufficient as a way to create safe neighbourhoods, with a high quality of life, in the long term. Too often, crime prevention approaches reduce problems to the simplest crime opportunities and deal with one aspect of safety at a time. First-Generation CPTED in particular is guilty of such reductionism and is often seen as little more than a shopping list of strategies for addressing fear and safety.

Second-Generation CPTED suggested the need for revisiting the social ecology roots of prevention and social motivation in crime prevention. Since a discussion of liveability incorporates various

properties of city life, including public and personal health, the natural environment, urban mobility, or economic opportunities, it is obvious that safety represents only one property in a wide network of interconnected properties. This is a fundamental reality of contemporary urban life; cities are complex ecosystems of neighbourhoods comprising different social, economic, and environmental layers, all which interact and influence the quality of life.

Therefore, any crime prevention focus on city ecosystems should ultimately rest on the principle of liveability and a liveable neighbourhood should offer multiple opportunities for pro-social activities. In terms of Maslow's hierarchy of human needs, neighbourhoods should be safe, healthy and enjoyable. This is because residents want today's cities to satisfy their basic needs, like the necessities of life (adequate and affordable shelter and healthy and plentiful food). They also seek satisfaction of their higher needs, such as a sense of belonging to a group, the fulfilment of personal potential (self-actualisation), and the opportunity to contribute to a cause beyond the self (self-transcendence) (Maslow 1971; Koltko-Rivera 2006).

These various elements or layers of the needs that cities and neighbourhoods must satisfy, just as in Maslow's hierarchy of individual needs, are dynamic, not static (Maslow 1943; Maslow 1971). They interact with one another and influence each other.

Community safety and liveability are often considered complementing outcomes. In this paper we focus on public health and sustainability, with three complementary parts: economic, environmental and social. These are central themes of Third-Generation CPTED because they directly influence the quality of life and thus address human needs across all six levels of Maslow's revised hierarchy of needs. Additionally, opportunities for maintaining physical and social health are obvious influences on quality of life, while sustainability is a future-oriented dimension that allows people to consider the long-term impact of existing practices on future generations (National Research Council 2002). This means that these two dimensions extend from lower-level needs for personal well-being to a commitment to global well-being through public health and sustainability in the future, needs depicted at the very top of Maslow's hierarchy (Maslow 1971). Accordingly, public health and sustainability are central to determining the level of life quality for local communities and directly influence people's attitudes towards their physical and social environment. The next section outlines the link between public health, sustainability and safety.

4.2. Key Liveability Dimensions

4.2.1. Public Health

A public health focus encompasses features in the environment that promote people's use of public spaces for recreation and psychological wellbeing, infrastructure to grow or easily access nutritious foods (see Figure 1), and enjoy activities while being safe and not fearful of crime. The provision of safe public spaces and walkable communities has been studied in CPTED research and discussions (Cozens 2007a, 2007b; Lee et al. 2016). Public space research usually deals with activating spaces through physical and social means, and supporting infrastructure (for example, the activity generation strategy in First-Generation CPTED), and thus increasing safety prospects. For example, street furniture or food vendors, by themselves, may not always encourage people to use them if the neighbourhood experiences high fear, if residents are disconnected from their community or if the environment is visually unappealing (Branas et al. 2011).

Several studies have also found a positive correlation between population health and crime, where social disadvantage is part of neighbourhood life (Kawachi et al. 1999; Loh et al. 2018). This disadvantage includes disparity in nutritious food access, which is known as the 'food desert' problem (Cooksey-Stowers et al. 2017; Crowe et al. 2018).

Lastly, public health includes increasingly popular research literature on the biophilia-liveability-safety linkage (Weinstein et al. 2015). It suggests perceptions of well-maintained green spaces as inviting and inclusive will help to lower crime anxiety (Kuo et al. 1998) and increase general wellbeing

([Grinde and Patil 2009](#)). These findings strongly suggest that there are powerful public health and natural environmental influences on people's attitudes towards the surrounding environment and their connection to places and people.

Figure 1. Affordable and healthy food options are critical for liveable neighbourhoods.

4.2.2. Sustainability

Sustainability includes three aspects: environmental, economic, and social ([National Research Council 2002](#)). Armitage and Gamman have edited a special journal issue entitled *Sustainability via security: A new look* ([Armitage and Gamman 2009](#)), showing how reconciling safety with sustainability improves liveability. The relationships are briefly explained below.

Economic sustainability refers to locally viable means of economic production for current and future generations. Economic sustainability is important for liveability and safety because it generates neighbourhoods that are resilient to decline. Research shows associations between violent and property crime, inequality and deficient social capital ([Kawachi et al. 1999](#)). Research also shows that these effects can be counteracted through local investment policies; they can reduce crime through neighbourhood redevelopment ([Grogan and Proscio 2000](#)) and reducing unemployment rates ([Montolio 2018](#)). The research suggests that positive social and economic benefits accrue when local investment is coupled with the local production of goods and services in neighbourhoods with mixed land uses. In addition, the [United Nations Global Compact](#) ([n.d.](#)) includes the role of local businesses and managing business impacts, in particular, how local businesses contribute to public life, make public investments, and partner with local organisations. Providing jobs and economic vitality in a neighbourhood is a key aspect of economic sustainability.

Environmental sustainability is concerned with greening environments in order to:

- make them friendlier for users;
- reduce pollution in cities and increase the quality of air;
- provide a green refuge in concrete cities (see Figure 2); and
- improve public health and safety.

Figure 2. Green walls help reintroduce nature to otherwise sterile public spaces.

Such places integrate the people-environment connection. One Philadelphia study on greening vacant lots found associations between vacant lot greening and a decrease in gun assaults across the city (Branas et al. 2011). Concurrently, residents reported less stress and increased levels of exercise. Another study reported people's positive attitudes towards walkable neighbourhoods and neighbourhoods rich in local activities, which are characteristics consistent with New Urbanism (Stanislav and Chin 2019). Such neighbourhood characteristics have beneficial effects on social relations, health, safety, and a reduced fear of crime (Talen and Koschinsky 2014).

Social sustainability deals with social and political dimensions. Second-Generation CPTED utilises social cohesion, a strategy drawn from the social ecology concept called collective efficacy (Sampson 2012), and this overlaps with the Third-Generation CPTED version of cohesion. The concept of achieving socially cohesive neighbourhoods is not new in social ecology; however, in Third-Generation CPTED, it expands beyond social cohesion into local decision-making and politics. Social sustainability includes local democracy and decision-making. A community-based governance system, with open and accountable rules, helps residents feel a sense of inclusion. Research documents many forms of neighbourhood governance already underway that might apply to this idea (Peterman 1999).

5. A Neighbourhood Liveability Hierarchy

The diagram below (see Figure 3) illustrates our proposition for the structure of Third-Generation CPTED—a Liveability Hierarchy. It not only describes a way to classify neighbourhood quality of life, but is also an orientation for future crime prevention research and a set of potential urban development strategies. Here, we describe the general features of neighbourhoods in each level of the hierarchy, and also some potential research directions to expand the model for future use.
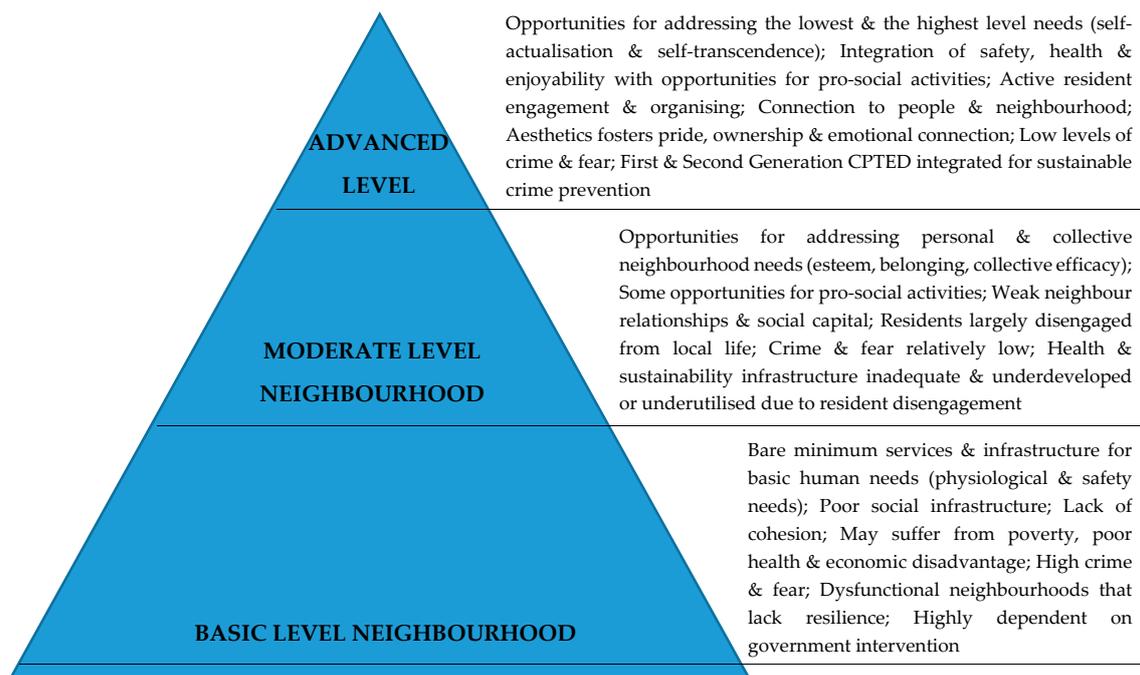
ADVANCED LEVEL — Opportunities for addressing the lowest & the highest level needs (self-actualisation & self-transcendence); Integration of safety, health & enjoyability with opportunities for pro-social activities; Active resident engagement & organising; Connection to people & neighbourhood; Aesthetics fosters pride, ownership & emotional connection; Low levels of crime & fear; First & Second Generation CPTED integrated for sustainable crime prevention

MODERATE LEVEL NEIGHBOURHOOD — Opportunities for addressing personal & collective neighbourhood needs (esteem, belonging, collective efficacy); Some opportunities for pro-social activities; Weak neighbour relationships & social capital; Residents largely disengaged from local life; Crime & fear relatively low; Health & sustainability infrastructure inadequate & underdeveloped or underutilised due to resident disengagement

BASIC LEVEL NEIGHBOURHOOD — Bare minimum services & infrastructure for basic human needs (physiological & safety needs); Poor social infrastructure; Lack of cohesion; May suffer from poverty, poor health & economic disadvantage; High crime & fear; Dysfunctional neighbourhoods that lack resilience; Highly dependent on government intervention

Figure 3. The neighbourhood Liveability Hierarchy.

5.1. Basic Level Neighbourhoods

The Basic Level of liveability will include a bare minimum of services and infrastructures. The amenities that exist are not inviting (see Figure 4), may not provide physical and social infrastructure to encourage relationship-building, and people generally have no input or engagement in the planning and execution of services/infrastructure. There are no attachments of residents to their own community and some Basic Level neighbourhoods suffer from a highly transient population with people moving in and out too frequently to form social bonds.

Figure 4. Blank walls next to apartment towers create hostile walking routes.

In such places, residents are unwilling to participate in local events (if there are any local events), people do not know their neighbours, and residents have neither respect for others nor a sense of belonging in the neighbourhood. There will be few, if any, activities or facilities for public health, such as walking, cycling, or parks (see Figure 5), and people are not inspired to engage in such activities.

Figure 5. Poor environmental conditions reflect neighbourhoods with a poor quality of life.

At the lowest regions of this Basic Level, neighbourhoods suffer from concentrations of poverty in which few opportunities exist for pro-social activities and they experience poor personal health and economic disadvantage. Such places may barely reach the basic requirements of liveability. Neighbourhoods at this level will suffer from high crime and fear and, as such, they are dysfunctional neighbourhoods incapable of responding to crime and disorder. These are not difficult to identify since they are typical dysfunctional neighbourhoods that host disproportionately high levels of crime where residents suffer from a poor quality of life.

The Liveability Hierarchy diagram suggests that, at a basic level, some neighbourhoods may survive but not flourish because they rely on the services that satisfy only basic needs to keep residents alive. In that case, they occupy lower regions of the hierarchy scale, but they may not be the worst. Crime may not predominate in such places (at least not reported crime); however, opportunities for personal fulfilment are scarce and, because social cohesion is poor, residents are vulnerable to crime outbreaks or crime displacement form other areas. Crime increases will go unchecked and Basic Level neighbourhoods are rarely capable of responding to even modest social problems without considerable government intervention.

Ironically, neighbourhoods that satisfy a few elements of liveability will not extend beyond the Basic Level. For example, a healthy neighbourhood with ample, affordable and nutritional food options and positive physical health among residents, perhaps with fitness facilities, a variety of grocery stores, and walkable streets, may not necessarily provide a flourishing liveable environment. Health and food options are basic level needs on the hierarchy, and without more community involvement, a sense of neighbourliness and contributions to the greater good, it is still difficult for residents to muster the collective efficacy to do much more than call the police for assistance. There is little sustainability of safety initiatives in such places since there is no collective consciousness that anyone has a role bigger than themselves, so even neighbourhoods with some amenities still may not transcend the Basic Level hierarchy. Unlike neighbourhoods at the lowest regions of this Basic Level, there may be some public

art or other aesthetic features in the public realm, but they represent neither a significant portion of the area nor a significant feature of public life recognised by residents.

The defining characteristic of Basic Level neighbourhoods is that they focus on satisfying basic human needs through service provision and infrastructure. Therefore, once basic needs like safety are satisfied, it is necessary to expand the neighbourhood capacity to improve social aspects of human interaction, health and environmental sustainability, and opportunities to satisfy deeper human needs.

5.2. Moderate Level Neighbourhoods

The Moderate Level of liveability includes all the Basic Level services and also provides opportunities for addressing personal and collective neighbourhood needs through pro-social behaviours, preferably with the input of residents themselves, thereby providing residents with an opportunity to control factors for improving their own liveability (a key element of self-actualization). However, the majority of the resident population does not, as yet, avail themselves of those opportunities due to disengagement, lifestyle conflicts, or problems of inaccessibility (too expensive, schedule conflicts).

In such places, there is a willingness to participate in some local events and some familiarity between neighbours, but that does not yet translate into a shared sense of values about pro-social behaviours or collective problem-solving of community problems. Should the neighbourhood experience an increase in crime, there are few active local groups or associations willing to help organise prevention activities; however, opportunities do exist to launch, or expand, such groups or associations (such as funding grants or underutilised common facilities like common houses).

Neighbourhoods at moderate liveability levels do experience occasional positive social events or cultural festivities and fear of crime is low, but other quality of life indicators, such as health or the environment, may be deficient. Public health activities and facilities may, or may not, exist, but they are not well-known and they are, as yet, underutilised.

5.3. Advanced Level Neighbourhoods

The highest level of liveability offers neighbourhood residents and visitors ample opportunities for pro-social behaviour by integrating the safety, health and enjoyability of public space (see Figure 6). This Advanced Level of liveability includes high-quality public health activities and facilities; programs (and accomplishments) in environmental sustainability; a significant portion of residents (possibly up to 25% or higher) actively engaged in organising formal/informal associations geared to helping this neighbourhood; and ample examples of pro-social activities that generate emotional attachments between people, places and their neighbourhood (also known as lovability). In planning terms, the lovability factor can now be measured as a Lovability Index (Deakin University 2016; Novacevski et al. 2017) and that may well be utilised by researchers examining Third-Generation CPTED.

Such neighbourhoods experience neighbours with extensive local friendship networks; low fear and a high quality of life; a strong sense of belonging; an emotional connection to the neighbourhood, its residents and its local culture; and shared commitment to local values. In sociological terms, such neighbourhoods experience high levels of collective efficacy since neighbours participate in inclusive events and organise responses to community problems.

There may be a tendency to equate homogenous, secure and apparently, low crime communities as occupying an Advanced Level on the liveability scale. The gated community is one example due to rigid access controls (fences, gates and security), and homogenous, upper income residents (Manzi and Smith-Bowers 2005). However, gated communities do not necessarily produce high liveability on the Liveability Hierarchy. First, in Blakely and Snyder's study on American gated communities, they discovered "exclusion is not the same as protection, and fenced borders do not automatically create a community that will defend them" (Blakely and Snyder 1997, p. 163). Second, Atlas studied gated communities and crime and discovered that "gates do not make a significant difference in the increase or decrease of crime or deterrence to criminals" (Atlas 2013, p. 406).

As liveability metrics are developed and applied to different neighbourhoods, we contend that Third-Generation CPTED concepts will greatly enhance the capacity of First- and Second-Generation CPTED to implement crime reduction efforts and sustain those efforts in the long term. After all, quality of life and liveability are the ultimate goals of all urban and environmental design and, as Jeffery described in his earliest work, we must be more holistic in how we theorise and prevent crime. Third-Generation CPTED will facilitate that research process.
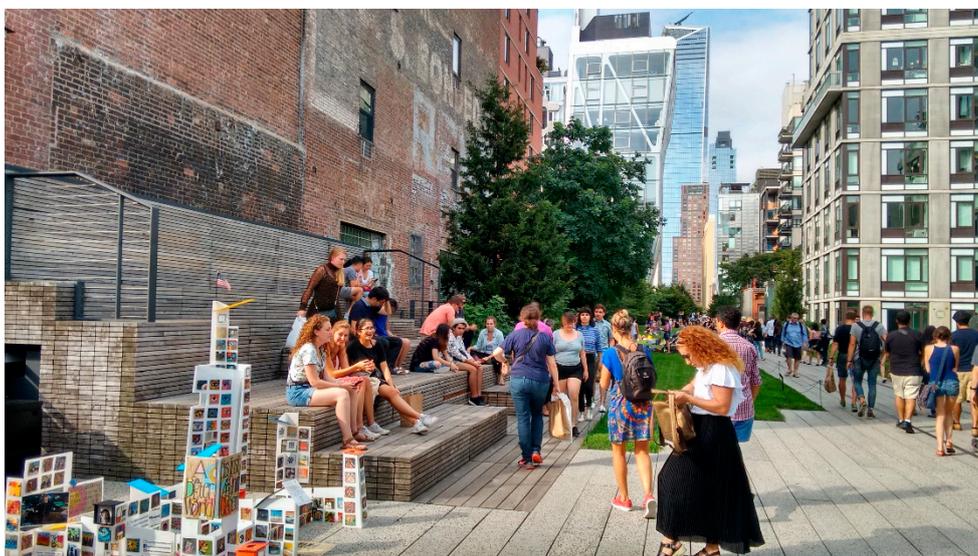
Figure 6. Liveable neighbourhoods combine art displays, grass areas for relaxing, sitting spaces and walking trails near apartments.

In Advanced Level neighbourhoods, aesthetics and urban form play a large role (see Figure 7). Such neighbourhoods contain beautiful features of the public realm such as art, music, and a sense of history through the historical preservation of notable places. Aesthetics also mean that local design features are honoured by residents and reflect a sense of pride and collective ownership. The importance of aesthetics and human quality of urban space are central to liveability (Bailey et al. 2015). The diagram below summarises how at the Advanced Level of Liveability Hierarchy personal safety transcends the sole focus on crime prevention and integrates it with other quality of life dimensions to achieve the highest liveability potential.

6. Future Research Opportunities

As an embryonic theory of crime prevention, Third-Generation CPTED creates many opportunities for research and development. Clearly, the hypotheses we described earlier are only the beginning stages of this theory. Our theoretical assumptions arise from the situational and opportunity-reduction assumptions of First-Generation CPTED and the social ecology, neighbourhood-based assumptions of Second-Generation CPTED. However, Third-Generation CPTED goes further by adopting a hierarchy of human needs and a typology of neighbourhood needs based on that hierarchy.

Research opportunities arise from those assumptions. For example:

- It is possible to formally operationalise various features of different neighbourhoods to categorise them according to our typology. While our own field practice in CPTED over the past few decades has uncovered only a few examples of neighbourhoods approaching an Advanced Level, there are certainly many examples of other neighbourhoods at Moderate and Basic levels;
- Since Third-Generation CPTED is an integrated theory of crime prevention, with multiple interrelated factors influencing liveability and crime, it will remain a challenge to parse out the individual

interactions between those factors in how they increase, or decrease, liveability. However, that is an empirical task that lends itself to multiple forms of analysis and experimental design;

- Measuring and testing Third-Generation neighbourhood characteristics will involve creative research design and innovative methods. There is already an abundant literature of simple statistical tests having been applied to reported crime data at the neighbourhood level, including some emerging innovations in crime mapping analysis, such as crime displacement tracking (Hodgkinson et al. forthcoming). These quantitative datasets have long been applied to examine crime patterns for First-Generation CPTED studies (Cozens et al. 2005);

- In addition, quality of life and perception surveys are also well-established in urban research and they have been successfully applied to Second-Generation CPTED research projects (DeKeseredy et al. 2003; Rigakos 2007). However, these prior research methods in First- and Second-Generation CPTED need expansion with broader datasets that capture some key Third-Generation variables, such as liveability and environmental sustainability. Fortunately, there are existing tools that crime researchers might use to develop new evaluative metrics;

- One possible way to use evaluative metrics would be to modify the Mercer Quality of Life City Ranking (Hasan 2008) for the neighbourhood level. Obviously, researchers will need to control for a similar neighbourhood size and scale; however, such considerations are no different for any measurements in social ecology research. Such an approach might provide neighbourhood typologies illustrating how different neighbourhoods align with the Livability Hierarchy;

- Another possible measurement technique is the Perceived Residential Environmental Quality (PREQ) survey instruments (Walton et al. 2008). Similar to other quality of life surveys, the PREQ instrument combines a number of urban characteristics that align with Third-Generation CPTED theory (neighbourliness, green areas, recreational services, environmental health, and safety). Using the research design suggested above (control for neighbourhood size and scale), PREQ measurements may also generate neighbourhood typologies for the Neighbourhood Livability Hierarchy;

- Crime and safety are integral parts of Third-Generation CPTED; however, they are linked to other quality of life factors, especially as they satisfy different needs on the Liveability Hierarchy. Future research can examine the multivariate influence of different factors as they impact crime and safety or, perhaps, vice versa. It is unclear whether it is possible to satisfy higher-level needs and thereby positively impact lower-level needs, which is a sort of chicken-and-egg research dilemma rife with experimental opportunities;

- The public health and sustainability assumptions of the theory suggest there is a need to better operationalise the linkage between those elements. Not only are the links between them important, but the psychological and social mechanisms triggered within those elements help satisfy higher levels on the Liveability Hierarchy. If those mechanisms can be more clearly parsed from the data, it may be possible to determine the role of bio-social and psychological factors in creating a neighbourhood high or low on the Liveability Hierarchy.

Figure 7. Third-Generation CPTED infers that future cities need a quality of life found at the highest level of the neighbourhood Liveability Hierarchy.

7. Conclusions

It might be reasonably suggested that the Maslow needs are satisfied by all forms of CPTED. For example, consider First-Generation CPTED strategies. Improved lighting to enhance natural surveillance in dark areas might result in aesthetic improvements to dark areas like parks or walkways. However, in First-Generation CPTED, the intention of the improved lighting is to increase guardianship through the implied natural surveillance of a high-risk area. Beautification, if it occurs, is a by-product of the lighting. Another example is a strategy that generates positive activities in dangerous places, such as food vendors in high-risk parking lots. The food vendors may create a pleasant experience, and a satisfying activity, for users of the parking lot; however, the intention of activity generation is to place eyes on a risky location, thereby reducing the ability of offenders to offend with impunity. The user satisfaction is a by-product of the strategy.

Similarly, in Second-Generation CPTED, various cohesion or culture-creating strategies may include festivals and other pro-social activities in which residents can get to know each other better and take a more active interest in crime prevention programming. The cultural events may provide opportunities for personal recreation and positive personal socialising; however, the primary intention of Second-Generation strategies is to encourage high levels of social cohesion so that neighbourhood

residents can devise, and take ownership of, their own prevention planning. The satisfaction engendered by the cohesion and cultural strategies is a welcome by-product of the strategy.

This is not the case in Third-Generation CPTED, where the intention is to provide opportunities for residents to enhance higher-level Maslowian needs. Those may include self-esteem (perhaps by helping others in a neighbourhood organisation), self-actualization (perhaps through self-expression in art or music or by becoming a local leader and helping others), or transcendence, (perhaps by contributing to the neighbourhood through environmental protection and sustainability). Satisfying each, or perhaps any, of those higher level needs will no doubt have a significant impact on neighbourhood liveability. At some future point, it may be possible to assess the impact on liveability of strategies that address each of the levels.

Ultimately, liveability is not only a way for people to experience pro-social activities that result in a safer environment, but a way to help residents realise higher personal satisfaction through the places and relationships where they live and work. Jane Jacobs suggested that eyes on the street were an important way in which territory can be reinforced and crime reduced. Second-Generation CPTED suggests that, due to the phenomenon of offensible space (where offenders and gangs members utilise their own eyes on the street to control their criminal territory), it is not just eyes on the street that matter, but whether the owners of those eyes actually care about the street.

Third-Generation CPTED makes another claim that builds on Second-Generation CPTED: that a willingness to take part in street life and pro-social activities does not depend on simply preventing crime (though that may be the result). It can also represent a joyful way for residents to seek out positive social activities in which they are able to express themselves through their neighbourhood activities and thereby satisfy deeper needs for themselves. The contention in Third-Generation CPTED is that neighbourhood-based, pro-social activities that produce caring eyes on the street are, if designed accordingly, a form of self-fulfilment and a goal within themselves.

This is a very different theoretical orientation compared to First- or Second-Generation CPTED. As Jeffery suggested a half century ago, motives for all sorts of behaviour are rooted in a multitude of environmental, social, biological, and genetic causes. It stands to reason that crime and its prevention are no different. Accordingly, Third-Generation CPTED permits a more holistic exploration of the neighbourhood dynamics in which liveability, safety and, ultimately, a higher quality of life, truly emerge.

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