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Author/s:

Pafka, E

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5. Streetlife Rhythms

Elek Pafka

This chapter explores the rhythms of streetlife in high density urban areas in relation to functional mix, urban morphology and density. The need to study urban rhythms was originally articulated in the 19th century by Baumeister (1876: 32-49), yet for the following century both empirical research and theory remained at an incipient stage. Holistic approaches to the study of time-space developed with chronotopic analysis in philology by Bakhtin in the 1930s, the time-geographic approach in human geography by Hägerstrand in the 1960s and rhythmanalysis as proposed by Lefebvre in the 1990s. However in urban design, sociology and planning there has been a lack of attention given to spatio-temporal aspects of urban life (Schaick 2011; Young and Schuller 1988).

An early writer of urban rhythm analysis, Jacobs (1961) described the link between streetlife, functional mix and morphology. What she referred to as urban vitality, since referred to as urban intensity or buzz, was linked to four preconditions: functional mix, grain size, permeability and density. In this framework a good functional mix between residents, workers and visitors assures a good time-spread of public activities throughout daily and weekly rhythms. She also argued that small grain size enables social and functional diversity, a high level of permeability increases walkability and thus opportunities for encounter, while high building density is a precondition for a critical population size for a diversity of social interactions. Remarkably, half a century after Jacobs' seminal work, there has been only very limited empirical research of these relations (Marshall 2012) and few tools developed to capture these four dimensions in a comprehensive and useful way.

A second theoretical starting point is Lefebvre's (2004) *Rhythmanalysis* in which he argued that space and time need to be thought together. However the limited empirical underpinning of his

work has been a recurring point of critique (Stanek 2011). Since the millennium rhythm analysis has had an increasing influence, and led to numerous empirical explorations. Most of these however have been focused on phenomenology (May and Thrift 2001; Edensor 2010), despite Lefebvre's (2004) indication that rhythm analysis cannot simply be 'phenomenology from the window'. As it has been shown that comprehensive empirical explorations of urban environments have to be based on multiple methods, including spatial analysis, discourse analysis and phenomenology (Dovey 2008), and considering the earlier emphasis given to the latter two, this chapter develops new methods of analysis focused on the connection between the spatial, social and temporal aspects of place. This approach is from the particular to the abstract, complementary to Lefebvre's progression from the abstract to the concrete.

A key method that has the capacity of capturing space and time together is mapping. While mapping is today commonly understood as a method of recording spatial attributes at a particular moment in time, throughout history often time was also an integral part of it. In particular, European medieval maps were often conceived as "histories", where time and space were represented together. This tradition was abandoned around the 14th century when geographic precision gradually excluded representations of time (Edson 1997). The attempts of time-geography (Thrift 1977) to re-introduce time into mapping via axonometric projections in which the third dimension is time did not find many followers, likely because of the lack of precision, as well as the confusion of representing time within the conventions of representing space. This chapter explores methods of mapping that link the spatial morphological attributes of cities with the temporal dimensions of urban life.

Three Urban Types

In order to develop refined methods of capturing, representing and analysing urban rhythms, a set of case studies has been selected. The aim was to explore a diversity of urban morphologies, while containing social variations. Thus case studies have been chosen from the cosmopolitan Anglosphere: London, New York and Melbourne. The nine case studies form a matrix of three distinct urban types in three cities (Figure 5.1), as follows:

(1) Central city areas characterised by the dominance of a mix of daytime activities (work, retail and entertainment) over residential activities. These are also characterised by heterogeneous grain size and high building density. This type of urban area has been in the focus of research by Gehl (2010), Pushkarev and Zupan (1975) and Whyte (1988). The selected sites are Covent Garden, Midtown NY and Melbourne CBD; they have been labelled Central Activities Districts (CADs).

(2) Inner-city areas characterised by relatively high residential densities and a fine-grain mix of uses. This type of urban area has been in the focus of research by Jacobs (1961) and Sennett (2007). The selected sites are Notting Hill, Greenwich Village and Fitzroy. As in all three neighbourhoods the presence of a creative class as well as processes of gentrification have been observed (O'Hanlon and Sharpe 2009; Martin 2005; Zukin and Braslow 2011); this type has been labelled Gentrifying Creative Clusters (GCCs).

(3) High density developments of office and residential uses occurred in all three cities in waterfront locations since the early 1980s under conditions of global capital flows and a neoliberal economy. As a result of the accumulation and flows of capital specific to the period (Zukin 1995), these areas are characterised by a large-grain mix of uses. The selected sites are South Quay London, Battery Park City in New York and Southbank in Melbourne. Each of these urban renewal areas have been subject of in-depth analysis among others by Gordon (1997), Carmona (2009) and Dovey (2005), and have been labelled here Neo-Liberal Developments (NLDs).

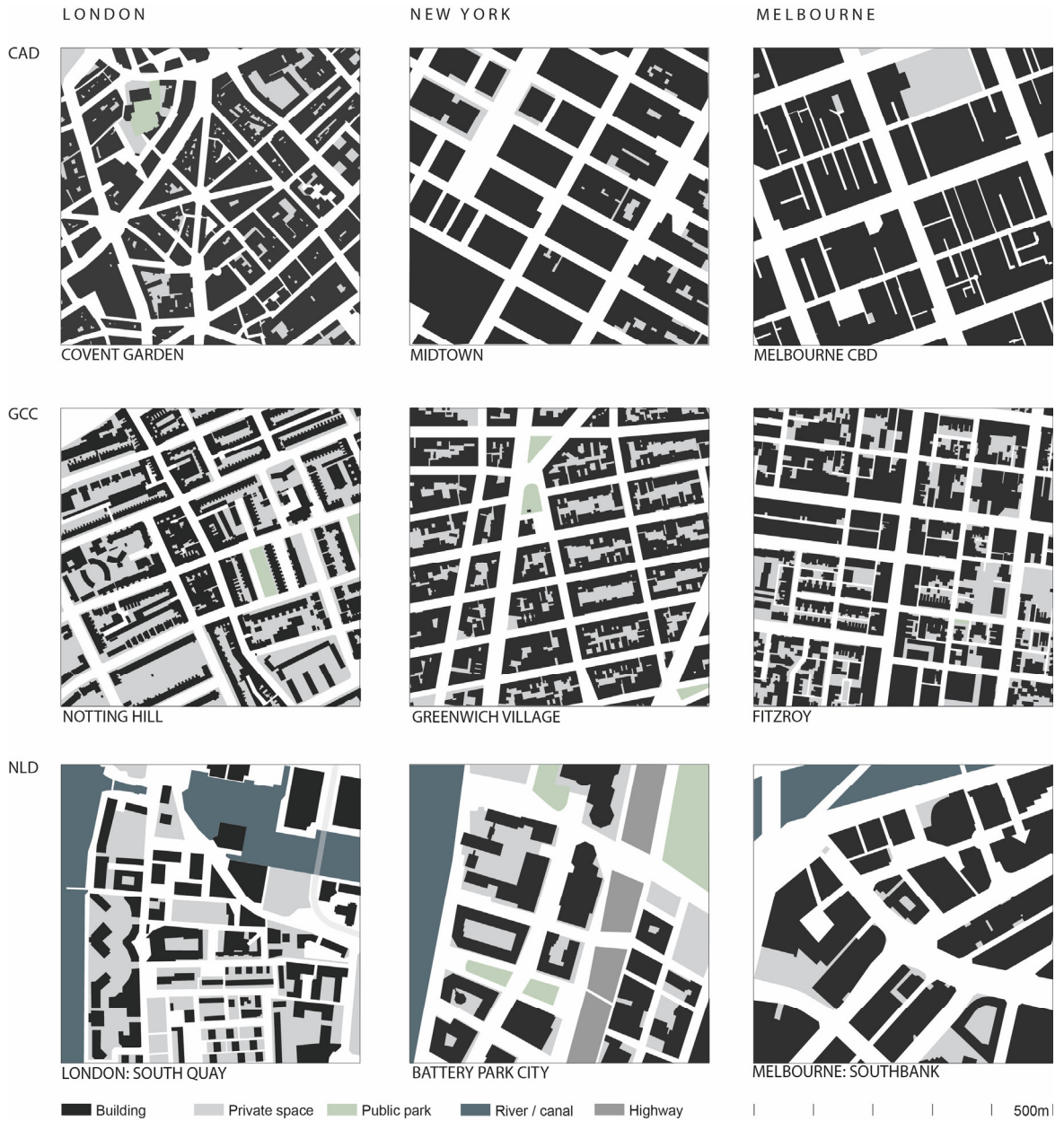


Figure 5.1: Nine case study areas: streets, lots and building footprints

These three urban types, representing a specific combination of functional mix and grain size correspond to distinct patterns of historic change: (1) the mixed-grain character of central city locations, is the result of multiple overlapping layers of change in the built and socio-economic environment; (2) the small grain creative clusters are characterised by much slower, gradual

change, and (3) recent large-grain developments, are characterised by the rapid and radical shift of industrial sites or reclaimed land to living and working precincts. This framework of case studies provides a matrix of commonality of linear historic time processes resulting in a shared history within each city on the one hand, and shared patterns of change within each urban type on the other hand.

Each of these nine case study areas has been centred around a representative intersection with a high level of pedestrian activity for that district. The selection of each intersection was based on preliminary observation within the broader neighbourhood. To avoid local rhythms being obscured by metropolitan rhythms, the highly localised impact of major public transport access points has been limited by selecting intersections at a minimum distance of 200 metres from railway or subway stations.

A Multi-method Approach

As no place can be understood without its links to other places (Massey 2007), the analysis requires a framework of multiple relevant scales. This research comprised three main spatial scales: intersection, neighbourhood and metropolis (Figure 5.2). Rhythms have been studied at three main temporal scales: micro-rhythms, daily rhythms and weekly rhythms. As different scales of analysis require different research methods, a multi-scalar analysis implies a multi-method approach: from statistical analysis at the macro-scale to mapping at mezo-scale and questionnaires, counting and video recording at micro-scale.

At the scale of street intersections, this research relied on new uses of simple techniques: non-participant observation recording daily and weekly rhythms and time-lapse video recording micro-rhythms of social interaction. Both methods are constrained to a spatial scale within the limits of visual continuity. For counting a smart-phone app was used, which allowed operating multiple counters at the same time and minimising intrusion in the observed social space. While new technologies, such as GPS tracking, video-tracking and automated counters, are opening up

ways for capturing pedestrian rhythms many limitations remain (Spek et al. 2009; Johansson and Helbing 2008) making these less suitable for this research.



Figure 5.2: Multiple scales of analysis, exemplified for the Seven Dials intersection in Covent Garden, London. Streetlife in each intersection is linked to the scale of the neighbourhood (walking distance) and metropolitan area (commuting distance).

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Rhythms observed at the scale of the intersection also relate to the scale of the larger metropolitan area, where people travel to work, shopping, learning or entertainment, via public and private transport over large distances. The resulting daytime population fluctuations in central city areas have been the subject of empirical research in Melbourne's CBD (Melbourne City Research 2011), Notting Hill (Vector-Research 2010) and Manhattan (Moss and Qing 2012). These studies rely mostly on statistical analysis of census data that captures population flows between home and workplace, supplemented with additional surveys to determine non-work

related day-visitors to an area. In this study, census data has been used to determine residential and job density at neighbourhood level, as well as pedestrian flows through public transport stations. A simple questionnaire has been used to determine the proportion of day-visitors within each study area.

Pedestrian Flow Rhythms

Empirical research on pedestrian flows has focused on central cities. Early surveys have been conducted in the 1860s in Berlin and London (Baumeister 1876: 42-44) and in the 1920 in Tokyo where the ethnographer Kon recorded bi-directional pedestrian flow rhythms (Whyte 1979). Wide scale pedestrian counts capturing daily, weekly, monthly and yearly rhythms have been carried out in German city centres in the 1960s by retail associations (Monheim 1998). Better known in the Anglophone literature are the pedestrian surveys of Whyte (1988) and Gehl (1987; 2004a; 2004b; 2008; Gehl and Svarre 2013) conducted in urban centres and focused on midday peaks.

In this study the daily rhythms of pedestrian flows have been recorded from 6am to midnight on weekdays (Figure 5.4) and Saturdays. The time sample was 15 minutes per hour for each flow, recorded every two hours. As the aim was to capture characteristic streetlife activity, peaks caused by singular events, annual rhythms or extreme climate were avoided. As the focus is on the level of social interaction, flows in each direction have been recorded separately and represented relative to footpath width in a chart graph as an overlay of northbound rhythms (blue) and southbound rhythm (orange). Two-directional flows corresponding to face-to-face contacts thus appear as a mix of the two (green).

Comparing the daily rhythms in the nine case study areas shows that there are much stronger similarities between urban types than between cities. The central activities districts (CADs) show the highest pedestrian flows corresponding to the high job and visitor density, and a clear pattern of three daily peaks, with a very sharp and one-directional morning peak, perfectly balanced two-directional midday peak and a more diluted evening peak. The midday peak in each CAD reaches a level of 10-12 people per minute per metre of footpath width; this is similar to the flow density

identified by Gehl as the threshold of congestion. Rhythms of nightlife are strong in London but weaker in the New York and Melbourne case studies. Rhythms of work, shopping and nightlife alternate and sometimes overlap.

The rhythms of gentrifying creative clusters (GCCs) follow smoothly rising and falling meanderings around a midday or afternoon peak during weekdays, followed by a slowly built-up climax during the weekend. The conventional rhythms of work times are subdued and only occasionally visible within the aggregate representation of pedestrian flows. Depending on the dominance of shopping (Notting Hill) or nightlife (Fitzroy weekend) the main peak is midday or in the evening. Visitors are both attracted to and sustain a retail concentration that could not be sustained by locals alone. They tend to fill in the midday-gap when local residents are not in the neighbourhood, leading to an overall pyramidal or trapezoidal profile of the daily flow graph. Thus local flows and rhythms mix with metropolitan and global flows of visitors. The pyramidal shape of the Notting Hill graph is due to the day market.

In the neoliberal developments (NLDs) flows are remarkably low relative to the building density, but still showing the three sharp and often one-directional peaks reflecting conventional work patterns. Between the peaks flow volumes are very low in South Quay and Southbank, and streets appear deserted. In Battery Park City however the volume of flows between the peaks is higher. This is explained in part by the higher proportion of visitors across the day, relating to its proximity to two public spaces that are significant visitor attractions: the Esplanade, one of few pedestrian friendly waterfronts in Manhattan, and the 9/11 Memorial.

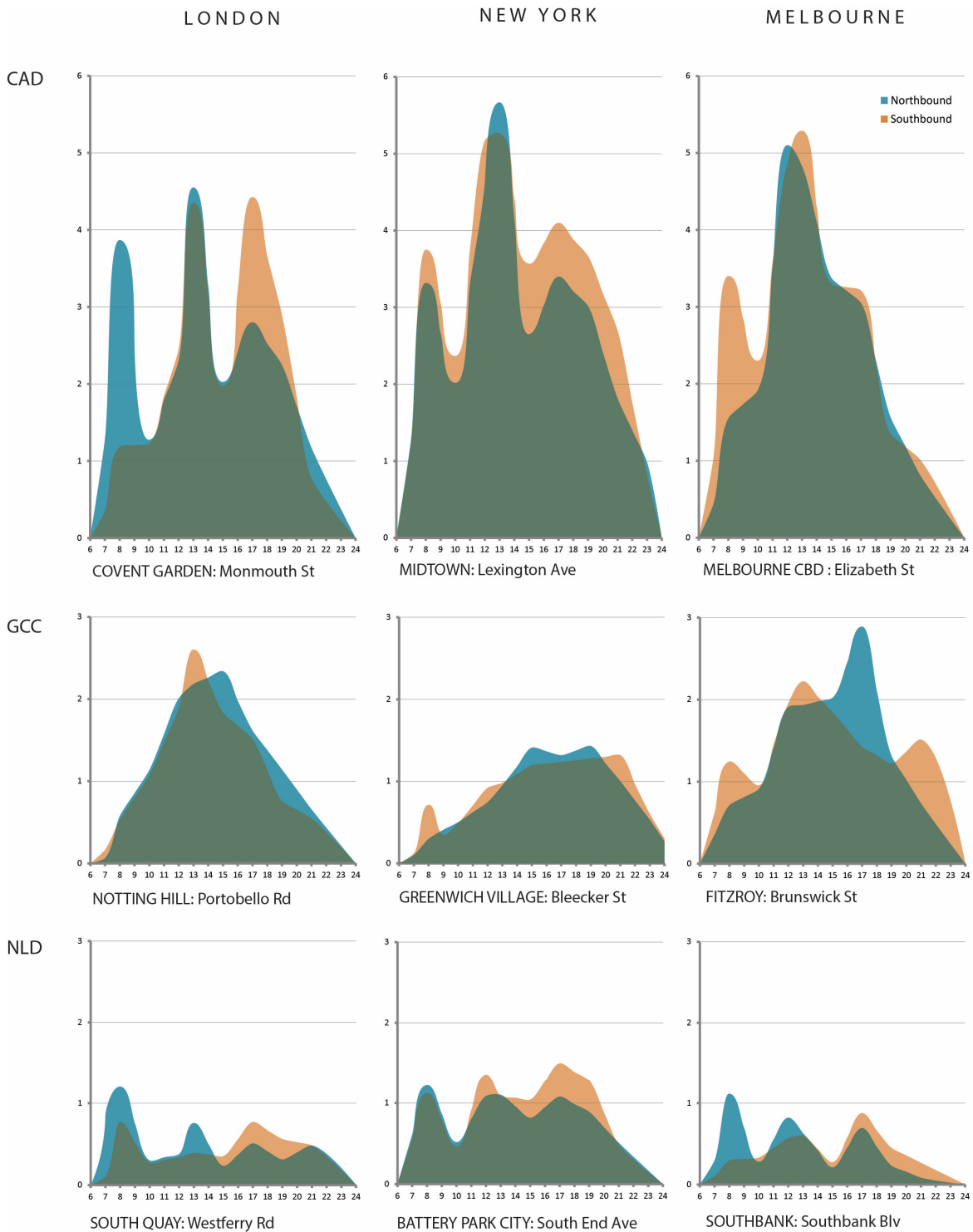


Figure 5.3: Daily rhythms of pedestrian flows (people per hour per metre of footpath width) between 6am and midnight adjusted to footpath width. One-directional flows appear as orange or blue, while two-directional flows corresponding to face-to-face contacts appear in green.

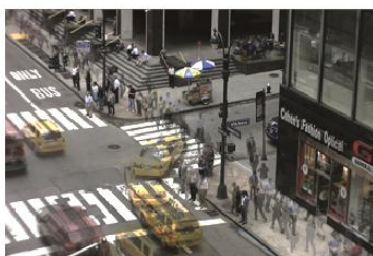
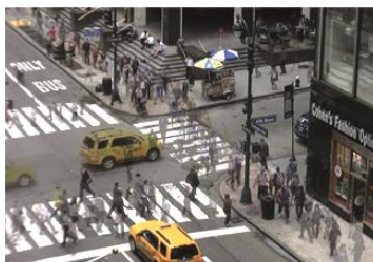
Micro-rhythms of Social Interaction

Studying social interaction in public space scale requires a focus on a spatial scale of less than 100 metres and a temporal scale that captures action that may last only seconds or few minutes, what I call micro-rhythms. Research of social interaction within pedestrian flows has shown that analysing the self-organizing behaviour of pedestrians is a complex task, which needs to take into account the dynamics at both individual and crowd scale. Certain characteristics such as banded flow patterns - people walking in the same direction aligning behind each other - has been shown to be an emergent phenomena, for which density and velocity are only a necessary condition, but not a determinant (Yamori 1998). The capacity of video recording to capture micro- rhythms of walking patterns is well exemplified by early cinematographic experiments such as *Berlin: Symphony of a Metropolis* (Ruttman 1927). Video recording has also been used as a research tool, notably by Whyte (1980) observing plazas and streets in Manhattan to capture multiple attributes of pedestrian flows, including social, spatial and temporal aspects of streetlife. Social aspects captured by video include groupings of people, gender mix, presence of small children and pets, diversity of dress styles and diversity of activities. Socio-spatial-temporal aspects include street portions of intense use, barriers to pedestrian movement, dominant directions of flow, ways in which street furniture and interface type influence behaviour, micro-rhythms of street crossing, situations of crowding and the visual interaction between people engaged in static and dynamic activities.

LONDON, Covent Garden



NEW YORK, Midtown



MELBOURNE, CBD

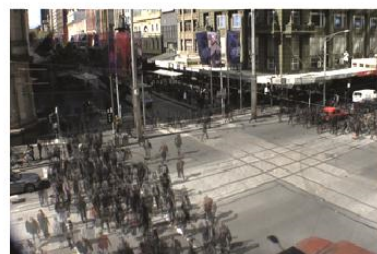
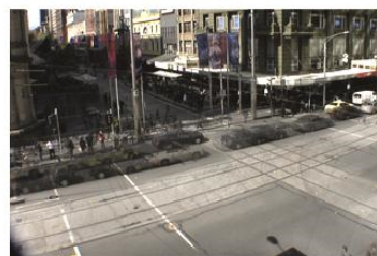


Figure 5.4: Time lapse video-recoding of weekday midday peak flows in CADs. Overlays of five frames at one second intervals.

In this study the video recordings illustrate the diversity of micro-rhythms and spatial patterns of pedestrian flows at midday, when in all study areas there is an even distribution of flows in both directions of each street (Figure 5.4). Switching the time scale from one hour to one minute, reveals patterns that seem to be mediated by traffic regulations and culturally specific walking habits. These are most evident in the CAD case studies where flows are most regulated. Pedestrian flows in Covent Garden are the least formal of such cases, with no strong patterns of choosing the left or right side of the footpath and high frequency of street crossings at almost any point. The patterns of pedestrian flows in New York's Midtown are more constrained, with a limited level of informal crossing. In Melbourne's CBD, pedestrian flows follow highly formalized patterns, with a strong tendency for people to walk on the left side of the footpath and crossings strongly structured by the mechanic rhythms of traffic lights. The time-lapse video also reveals the interaction between static and dynamic activities, wherever the public space design allows or

encourages sitting or standing as in Covent Garden. While the study of such interaction was not within the scope of this study, it is an important aspect of urban life (Whyte 1988) and there are promising empirical explorations of this dimension (Wunderlich 2013).

Entry Constellations

To capture the key urban morphological dimensions that mediate rhythms, the case studies have been mapped with a focus on the capacities of functional mix to attract pedestrian flows. To capture the specific functional mix of each study area, a new mapping form has been developed, representing entries to various functions with a dot proportional in size with the level of attraction for that entry. The functional categories have been defined based on the specific time period and frequency an entry is used: residential (red), retail (yellow), work (green), spectacle (blue) and transport (white). Residential entries are used continuously during daytime, retail entries continuously during opening hours for ca. 8 hours, work entries are mostly used at 4 hour intervals considering the lunch break, spectacle related entries such as theatre or cinema at ca. 2 hour intervals and public transport entries at frequencies between a few minutes to half an hour.

To represent the level of attraction, three size categories have been defined for each functional type. For residential uses the dot size increases as the number of units passes the thresholds of 10 and 100 dwellings respectively. For retail and office uses dots increase with the gross floor area (500m², 5,000m²), for spectacle with the capacity of the venue (500 seats, 1000 seats) and for transport with the capacity of the system (bus, subway). Through this index of dot size and frequency, the map also provides an indication of building density and grain size. Thus these entry constellations maps (ECMs) illustrate the morphological conditions mediating pedestrian rhythms, visualising key forces embodied in the morphology of each place (Corner 1999). They reveal much stronger similarities between the urban types, than between the different cases studies within any of the three cities (Figure 5.5).

each CAD. The functional mix is dominated by retail and office space, with only 20-25% residential floor area. They are also at the centre of an extensive public transport network, and attract a large number of daytime visitors. The entry constellation maps illustrate these similarities, but also the key differences: Covent Garden has a more irregular street network and highly mixed grain size; Midtown New York has larger grain size and clustering of offices along Park Avenue on the western side of the study area; while Melbourne's CBD has a less heterogeneous mix of uses. The large green dots (office space) and white dots (subway entries) relate to the one-directional morning and evening pedestrian flow peaks, while the large number of yellow dots (retail) relates to the two-directional midday peak.

The three gentrified creative clusters (GCCs) (Figure 5.5 middle row) are inner-city neighbourhoods with high residential densities. The building density is significantly lower than in CADs, with gross FAR ranging between 1 and 2. All three areas have a significant number of mostly retail jobs, with a rate of jobs to residents of 1:2. Retail is strongly clustered along distinct streets, sustained by a residential hinterland but also linked to the rest of the city by public transport. This linear pattern of retail distribution takes a slightly different configuration in each case study area: in Notting Hill it is a main north-west running street, doubled by a parallel street over a short section; in Greenwich Village it is a network of streets comprising two north-south running streets and several short east-west running streets connecting these, while in Fitzroy the retail distribution follows a cross pattern along two intersecting streets. Permeability is high in all three neighbourhoods. All three study areas are characterised by a fine-grain pattern of small lot subdivisions, with medium sized lots occupied by larger apartment buildings or public housing. The entries constellation maps illustrate this fine grain and highly structured functional distribution. The large number of small dots (yellow and red) relates to the multi-directional flows across the day.

The three neo-liberal developments (NLDs) (Figure 5.5 bottom row) are characterised by high building densities, despite the significant extent of water and land under development or vacant. Gross FAR ranges from 2 to 4 and all three case studies are characterised by large grain size and

low permeability. The functional mix is predominantly residential and office, with limited retail. The small number of dots relates to a predominance of monofunctional commercial or residential towers, hence limited number of visitor related rhythms. As a result the street network becomes illegible on these maps, even in Battery Park City, which was ostensibly based on Jacobs' ideas. This is also true of the neoliberal developments within the CADs, such as the commercial parts of Midtown New York.

The Entry Constellation Maps presented here capture some of the interconnection between urban morphologies and pedestrian flows. As argued in the earlier chapters, the synergies between Jacobs' four preconditions of diversity -or the urban DMA- establish the basic fingerprint of the city. Yet this constellation of density, mix and access is a highly complex assemblage that is very difficult to represent in a single map. The ECMs presented here seek to move a step forward in revealing this complex assemblage, as they represents density (the frequency and size of entries), mix (the colour of entries) and access (the shape of the constellation) in a single map.

Morphologies and Rhythms

With an integrative approach that aims to avoid the common reductionism of urban environments to phenomenology or social construct alone, this chapter uses a broad, open and dynamic conception of place, as "integration of space and time", as "spatio-temporal event" (Massey 2005). Drawing on Deleuzian philosophy, place is seen as a territorialised assemblage, constituted of temporal connections of spatial and social elements, at and in-between various scales (DeLanda 2006; Dovey 2010). A good starting point for a comprehensive analysis of place as temporal socio-spatial phenomena is provided by Lefebvre's (2004) proposed rhythmanalysis, an approach aimed at investigating time and space together, as "localised time" or "temporalised space".

The three neighbourhood types defined above represent tendencies of assemblages of particular morphologies, functional mix and density; however they also show significant overlaps. While CADs are central within the metropolitan transport system, GCCs and NLDs are often in their immediate vicinity and also benefit from good public transport access. While GCCs are most

diverse in terms of functional mix and grain size, various mixes exist in CADs and NLDs as well. While NLDs are dominated by large grain developments, large grain also appears in all CADs and some GCCs. While each case study site is characterised by particular polyrhythms, there are common tendencies between neighbourhoods that have morphological similarities. These tendencies can be linked to the forces that shape cities, such as the clustering of businesses in city centres, the clustering of creative milieus in small-grained neighbourhoods, and social exclusion in neo-liberal developments with large-grain control over land and access. While rhythms of CADs have been studied in the past, the common pattern of rhythms in GCCs and NLDs is a key finding of this study.

To conclude this study I now represent these case studies on the live/work/visit diagram introduced in chapter 2 (Nes et al. 2012). In this case live, work and visit related floor areas have been weighted by an estimated relative trip generating ratio of 1:3:10 (Figure 5.6). Thus the centre of the diagram will indicate not an even distribution of residential, office and amenities related floor areas but an even distribution of residential, work and visitor trips. The GCCs appear in the middle of the diagram as having nearly even live-work-visit mix, the CADs appear as a work dominated mix with significant visit related functions while the NLDs as work dominated with significant living related functions. The proportions of visitors in each case study area implied from the floor area mix is close to the results of the pedestrian surveys (Figure 5.6 right), although the latter figures are about 10% higher. This can be in part due to the impact of visitor attractors that are not floor area related (parks, memorials, building facades). The only large discrepancy appears in the case of Battery Park City where the esplanade and the nearby 9/11 memorial are major visitor attractors. The relatively high pedestrian flows in the GCCs where building density is lower, is related to the high proportion of visitors, that again can be linked to the morphological diversity of these places.

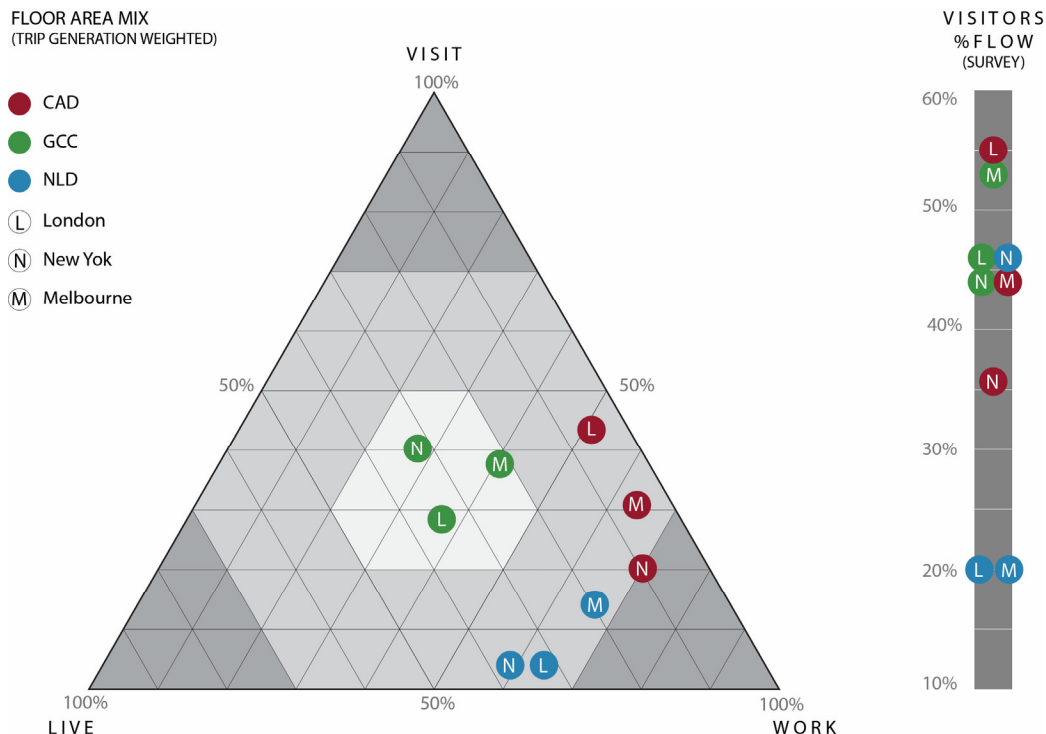


Figure 5.6: Relating visitor flows to functional mix

This chapter shows that Jacobs' work concerning the relationship between streetlife intensity, functional mix and morphology can be further developed towards a more detailed and nuanced understanding of these connections. One area of research in this direction can build upon Lefebvre's rhythmanalysis, examining the relationship between the experiences of everyday rhythms of intensity and the materiality of the city. It is shown that the overlay of regular patterns of everyday habits and routines, rhythms of social interactions and mechanical micro-rhythms of transportation systems, all mediated by urban form, lead to place specific polyrhythms. Each place is thus revealed as emerging from the intersection of rhythmic flows, mediated by functional mix and urban morphology. Further, the capacity of mapping is explored as a means of revealing the forces underlying each place. It is also shown how a place can be mapped in a way that reveals its potential rhythms. The Entry Constellation Maps (ECMs) presented in Figure 5.5 illustrate the spatial distribution of attractors relating to different functional categories. In a very simple way, these maps open a window onto the highly complex synergies between density, functional mix and access.

Acknowledgement

All figures in this chapter are by the author.

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