THE ROLE OF BUILDING ENTRANCES TOWARDS STREETS AND THE PERCEPTION OF SAFETY IN SIX NEIGHBOURHOODS IN BERGEN

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ABSTRACT

In a research project on space and crime, the urban micro scale method was developed. The method consists in to quantify various spatial relationships between private and public spaces. As the results show, the position of building entrances towards streets and roads plays a role on burglary risks (van Nes and López, 2010), and on street safety (van Nes and López 2013). In this inquiry, the micro scale method is applied on six different neighbourhoods surrounding Bergen centre in Norway. The results from the spatial analyses are correlated with the results from the local people’s perception of safety.

At present, Bergen city in Norway is growing fast. Due to a lack of available ground for urban expansion, the policy is to build compact cities with high density of the built mass. As implied, the use of urban streets will be intensified. This inquiry investigates various street profiles, the relationship between private and public space, the spatial configuration of the street network, and correlate these spatial parameters with the results from interviews from 200 locals from these six neighbourhoods: Møllendal, Solheimsviken, Marken, Engen, Sandviken, and Møhlenpris. These neighbourhoods’ ages are ranging from 200 years old till 5 years old. In addition, a review of the planning regulations regards the street plinth and requirements for new buildings are reviewed for each neighbourhood.

As turned out, the topological relationship between private and public space play a role in the perception of street safety. Segregated un-constituted streets with low inter-visibility and many topological steps between private and public space are perceived to be un-safe. Conversely, highly locally integrated streets with many entrances directly connected to the streets on both sides are perceived to be safe. The old neighbourhoods are perceived to be the safest ones, whereas some streets in the new urban areas are perceived to be unsafe. In the investigation of the current plans of every neighbourhood, planning regulations on the building-street interface is lacking. In order to ensure that new buildings will contribute to safe streets and to not have blind walls, a suggestion on how to formulate a standard legal regulation for each land use plan is proposed.

KEYWORDS

Urban micro scale tools, safety perception, public-private interface, building entrances, streets

1. INTRODUCTION

Bergen city in Norway is experiencing a large population growth. For facilitating this growth, several new apartment buildings haven been constructed. However, the spatial qualities of the ground floor spaces and their relationship to the street is often lacking. After half century of building new dwelling
areas in the suburbs in the countryside, the municipality is now enhancing to densify in exiting central urban areas. Project developers who implement high-rise buildings with high number of apartments in central areas get easily their building permissions in comparison with a decade ago, because it is in line with current planning policies for enhancing compact cities. However, these projects are implemented with a lack of an overall vision or plan of the neighbourhood. The results contribute to low coherence between the street pattern and building morphology, and places with a “messy” identity.

The debate on densification and quality of public space is intense in the city. Newspapers have daily articles on these issues. There are worries about how such a densification process will affect the quality of the public spaces and parks in central areas, and the living qualities in highly densified urban areas in general. The pressure to build in central areas are high. However, knowledge is lacking on what kind of spatial features contributes to a perception of a safe urban space.

In this respect, we investigated the spatial relationships between private and public spaces of six different neighbourhoods located in and on the edge of Bergen centre. These six neighbourhoods differ a lot to each other in terms of street pattern and building morphology. The oldest area is about 400 years old and the newest one is 5 years old. We also interviewed 200 people living inside or using these 6 neighbourhoods for identifying the streets that are perceived to be unsafe.

This inquiry is never done in Norway before. In comparison with other European towns, Norwegian towns has a low density of buildings. Norway has short urban history, due to the large available space and low population density. However, people are moving more into cities centres than before in Norway. But knowledge, spatial tools and planning regulations are lacking regards the building – street interface. Therefore, we wanted to reveal the private-public relationship in Bergen and compare the results with the locals’ perception of safety.

2. DATASETS AND METHODS

When revealing the literature on the relationship between space and crime, there exist some Norwegian reports on what the physical features are for criminals to operate. Examples on this are: Simple direct access and good escape routes for the criminal, possibilities to be not visible when operating, anonymity, empty places, deteriorated neighbourhoods, bad materials, space with unclear ownership, blurring boundaries of functions, lack of social meeting places and low degree of area awareness (Miljøverndepartementet 2000). None of these aspects mention the spatial relationship between private and public space.

Jane Jacobs (2000) and Jan Gehl (1971) state that entrances and windows oriented towards streets is a part of the natural policing mechanism. Jacobs mention already in the 1960’s three aspects important to ensure safe streets: Clear demarcation between private and public space, “eyes on the streets’ from buildings to ensure safety, and sufficient number of people in streets at different times of the day. The last point is reached by a mix of functions (Jacobs 2000).

However, until 2005 tools for measuring and analysing the private – public interface was lacking. In a research project on space and crime carried out in 2005, the urban micro scale tool was developed. At that time, the space syntax method was applied only inside buildings or on settlements. Three urban micro scale measurements were developed: entrance density, entrance and windows inter-visibility, and topological depth between private and public spaces (van Nes and López 2010). The street constitutedness was based on the work of Hillier and Hanson (1984). Figure 1 shows some principles of these four micro scale analyses.

The results from the application of these urban micro scale tools influence the distribution of burglary (van Nes and López, 2010) the locations where anti-social behaviour takes place (van Nes and López 2013), and the streets women tend to avoid (Aghabeick and van Nes 2015; de Rooij and van Nes 2015). The way streets are used and avoided are dependent on these micro scale spatial components as well as the macro scale spatial components. In particular, how neighbourhoods are connected to the main routes of a city or town, combined with the spatial relationship between private and public space, affect the degree of safety and liveliness of neighbourhoods (van Nes and López 2013).

These micro scale tools are applied in six different neighbourhoods in Bergen centre. The registrations were carried out though walking around in these neighbourhoods in May 2017. In addition, we did space syntax analyses of Bergen. The space syntax analyses show how these six neighbourhoods are connected to their vicinity as well as to the whole city. The angular choice analyses with metrical radii
indicate the main routes through the city (the through-movement potentials) and the segment integration analyses with metrical radii indicate the locations of the centres (the to-movement potentials) on various scale levels.

Figure 1 The spatial principles of the four urban micro scale tools used in this inquiry

For the registration of the perception of street safety, we interviewed in total 200 people at the local food shop in every neighbourhood. We had an aero photograph of the neighbourhood and asked the locals to point out streets they perceived to be unsafe. One of us registered the points from each respondent on a separate map, so that the respondents’ answers were not influenced by the others. We managed to get a large variation of respondents in terms of gender and age.
We choose six different neighbourhoods with very different spatial qualities and building morphologies. Figure 2 shows where these neighbourhoods are located.

Møhlenpris neighbourhood started to develop as an urban neighbourhood during the industrial period in Norway. Factories and dwellings were constructed after 1800. The orthogonal street grid was established and all transformations adjusted themselves to this street pattern. After the big city fire in 1916, several new dwellings were constructed in Møhlenpris for solving the dwelling shortages in Bergen. Today the area consists of four floors old apartments blocks, closed urban blocks with private courtyards for the dwellers. In the 1980’s several renewals and upgrading of the technical standards of the dwellings took place in Møhlenpris. The area has a large mixture of functions and services. Today, this old working-class area is very popular to live in, also for families with small children who want to live adjacent to the city centre. The area scores very good in the spatial analyses, except for some streets close to the fjord.

Originally, the Solheimsviken neighbourhood was used for locating the industry of Bergen. The factories were established along the fjord “Puddefjorden” around 1800. As an effect of the establishment of factories, housing for the employees were constructed further up the hillside. During the last decades, the factories has disappeared and recently transformed to a high-density dwelling area with services and facilities along the fjord. We have focused on the areas along the fjord, for using this case as an example on modern planning practice. As the results show, this area scores low in all the spatial analyses.

Møllendal is located opposite of Bergen centre at the lake “Store Lungegårdsvann.” In the past, the graveyard and some factories was located at Møllendal. During the last years, the area is transforming fast. Large building blocks with student dormitories and new apartment flats are built. Bergen School of Arts are under construction. This area is chosen, for putting modern planning practice under scrutiny regards how new buildings or rather how new planning practice contribute to the perception of street safety. As the results show, this area scores very low in all the spatial analyses.

Marken is a very old neighbourhood adjacent to the main city centre in Bergen. The area consists of low rise old wooden buildings that survived all the 33 city fires through Bergen’s history. A
pedestrianised shopping street with individual shops is located in the middle of the neighbourhood. The area is developed around an old hospital established around 1400. The area is well used by people, and the old wooden buildings have a large mixture of functions such as dwellings, offices and shops. In all analyses, Marken scores very well, except for some dodgy side-streets that lacks entrances.

Engen is located adjacent to Bergen centre. The area is well used during day and night time. The area has a high diversity of functions such as dwellings, offices, cultural activities such as the cinema and the theatre. Through history, the area has changed a lot. The first traces of settlements can be found back to 1100. The first hospital in Bergen was established in Engen. During the 1800 century, the area urbanised fast, with a mixture of old wooden dwellings, 4 floors concrete buildings from the 1900 and 1930’s and some modern buildings from the 1960’s and 1990’s. The area has an orthogonal street pattern, has high density of the built mass, and consists of old 2 floors and 4 floors buildings shaped by the orthogonal street pattern. Engen is used as an example of a high-density old urban area. Engen scores well in most of the analyses, but has also some dodgy areas at nigh-time.

Sandviken is a very attractive neighbourhood located on the sunny side of the city. The area is between the city centre, the nature and the fjord. The area has the highest property prices, and consists of low rise, but dense wooden traditional buildings. Most of the buildings are between 100-200 years old. However, some city fires have contributed to the constructions of some newer buildings in the area, such as apartment blocks and single-family houses. Therefore, Sandviken has a large variation of buildings. Sandviken scores best in all the spatial analyses, and the results comply with people’s perception of this neighbourhood.

Finally, we revealed all the current planning documents for each neighbourhood. We investigated the rules and regulations related to the ground floor of buildings and their relationship to public space. As it turned out, planning regulations with precisions regards the building-street interface are lacking in each document. Therefore, we propose a suggestion for a paragraph that could fit into any planning regulation in the conclusion chapter.

3. RESULTS

The application of the various spatial tools offers detailed descriptions for making precise spatial diagnosis for each neighbourhood. The various spatial micro scale tools offer detailed spatial descriptions on the relationship between buildings and streets, whereas the space syntax analyses on macro level shows the degree of street vitality and the degree of connectivity of the street network on various scale levels.

3.1 Entrance density

The registrations of entrance density show the concentration of entrances and windows on ground floor level. Here the number of entrances that are actively used per street segment on each side of a street segment. When there are free standing buildings, only the street segment in front of the building are registered. When there are more than 6 entrances with windows per street segment, the entrance density is high. Segments with 3-5 entrances (with windows) have a middle level of entrance density and streets with 0-2 entrances (with windows) have low entrance density. The higher density of entrances, the higher the probability is that someone can come out from the buildings.
As figure 3 shows, the older the neighbourhood, the higher entrance density. The newest areas, Solheimsviken and Møllendal have low entrance density, whereas Sandviken has the highest entrance density.

3.2 Street constitutedness

A street constitutedness analyses show which streets have entrances to the streets and which one has not. The analysis is very simple. Ever street segment that has entrances connected directly to the streets are coloured in green and every street with no entrances directly connected to the street are coloured in red. Constituted streets indicate that someone can come out from the buildings located along streets, whereas un-constituted streets lack this probability.
As the street constitutedness analyses show, Solheimsviken and Møllendal has the highest number of unconstituted streets, whereas Sandviken has the highest number of constituted streets.

3.3 Street inter-visibility

The street inter-visibility analysis shows to what extend buildings are inter-visible to one another in relation to the street. A highly inter-visible street is that buildings have doors and windows on the ground floor level on both sides of the street. A poorly inter-visible street has only buildings with windows and streets on ground floor level on only one side of the street. This analysis gives indication of the degree of the natural surveillance mechanism between buildings as well as the street.
Figure 5 Street inter-visibility of the six neighbourhoods

Figure 5 shows the street inter-visibility analyses of the six neighbourhoods. The green colour shows the inter-visible streets, whereas the red colour shows the street that are not inter-visible. Again, Solheimsviken and Møllendal score lowest. In Møhlenpris, the neighbourhood’s edges have naturally streets with no inter-visibility. Sandviken has the highest number of inter-visible streets.

3.4 Topological depth between private and public space

The topological depth between private and public space is about the number of semi-public and semi-private spaces one has to walk through between the private and public space. When the entrances are directly connected to the street or has a small front garden where the entrances and windows are faced towards streets, value 1 is given. When walking through a garden, or the entrance is placed on the side or backside of the buildings, value 2 is given. The topological depth between private and public space give indications on the degree of access from buildings to streets.
Figure 6 shows the results from the topological depth between private and public spaces of all six
neighbourhoods. The newer areas, Solheimsviken and Møllendal, has the lowest number of streets with
entrances connected directly to the streets. Møhlenpris and Sandviken scores highest on these analyses.

3.5 Space Syntax analyses of the six neighbourhoods

We applied the space syntax analyses on all six neighbourhoods for identifying how they are connected
to the whole city, to adjacent neighbourhoods and how the street structure are internally inter-connected.
For the segment integration analyses, thus the to-movement potentials, the city centre has the highest
values on the global scale. Figure 7 shows segment integration analyses with a high (above) and a low
(below) metrical radius. All neighbourhoods, except Sandviken, has high segment integration on a city
scale (figure 7 above). In the segment integration analysis with the low metrical radius of 500 metres,
Sandviken, Marken and Engen has the highest values. Solheimsviken and Møllendal has the lowest
values, followed by Møhlenpris.
Figure 7 Segment integration analyses of Bergen centre with high metrical radius (top) and low metrical radius (below) with the location of the six neighbourhoods.

Marken and Engen have a large range of choices of amenities, such as theatres, cinemas, student pubs, shops, and cafes. The function mixture is very high in these two areas. Møhlenpris is dominated by dwellings, and cafes and offices located close to the fjord. Conversely, Sandviken has only dwellings with some kindergarten and a local food shop. Møllendal has only one food shop and consists of student housing and some offices, all located between the graveyard and the fjord. Solheimsviken consists mostly of new dwelling blocks and office buildings. There are some food shops at the western edge of the area.
Street life is also dependent on a sufficient number of people in streets in terms of a natural mix of random visitors and locals. The angular choice analyses with different metrical radii show the through-movement potentials on local and city scale level. Figure 8 shows the through movement potentials for city level (above) and local level (below) for Bergen centre. All neighbourhoods, except Møhlenpris, has integrated main routes running through the neighbourhood (figure 8 above). In the angular choice analysis with the low metrical radius of 500 metres, Sandviken, Marken and Engen has the highest values, whereas Solheimsviken, Møllendal and Møhlenpris has the lowest values.

Sandviken and Møhlenpris are known as silent and traffic safe neighbourhoods suitable for families with children who wants to live adjacent to the city centre. Solheim is aiming for the same in the municipality’s policy documents. However, Solheim has heavy car traffic flows on the main route running through the area. The street profiles in Solheim facilitate a car-dominated use, whereas it is a balanced use between vehicles and pedestrians in Møllendal, Engen and Marken.
3.6 Results from the street interviews

Figure 9 shows all the areas that are pointed out as perceived to be unsafe from the 200 respondents. Common features pointed out for all neighbourhoods is that the perceived unsafe areas are unconstituted streets, or streets with many topological steps between private and public space, no intervisibility and low density of entrances. The degree of street network integration has little influence on these issues.

Figure 9 The perceived unsafe streets of the six neighbourhoods

The spatial features of the perceived unsafe areas in Solheimsvecik are pointed out from the locals to be concentrated around buildings with blind walls lacking doors and windows on ground floor level towards the streets. It can be along the water front, the side streets as well as towards the heavy trafficked main route running through the neighbourhood.

For Møllendal, the newly established pedestrian route along the water is pointed out to be unsafe from the locals. Likewise, along streets with large buildings lacking entrances and windows on ground floor level are perceived to be unsafe. All these areas have in common that they have many topological steps between private and public space, the streets are un-constituted and not inter-visible at all. In short, all
the perceived unsafe streets lack buildings with active frontages towards streets. It is not enough to establish a walking path along the water. This path needs also a natural surveillance from adjacent buildings.

In Møhlenpris, streets at the edges of this neighbourhood are perceived as unsafe. Many of these streets are constituted, but they lack inter-visibility. In particular streets facing towards the motorway bridge, the park and towards old industrial buildings are experienced as unsafe.

In Marken the un-constituted small side streets lacking inter-visibility are pointed out as unsafe by the locals. For Sandviken, the only street that is un-constituted and lacks inter-visibility are pointed out to generate an unsafe feeling by the locals.

For Engen, the un-constituted streets with no inter-visibility are perceived as unsafe. In particular the height differences in this neighbourhood contribute to large stone walls on one side of some streets. At night time, these streets are perceived as dark and scary.

Figure 10 Images of the six neighbourhoods (For Engen: source Google Street view)

Figure 10 shows a picture of each of the six neighbourhoods. Solheimsviken’s new buildings has an active frontage towards the fjord, but the side and back streets are forgotten regards inter-visibility and street constitutedness. All new buildings in Møllendal are turned away from the streets on ground floor level. Møhlenpris, Marken and Sandviken has a high number of constituted and inter-visible streets with high density of entrances and windows facing towards the streets. Engen has some streets with blind stone walls, contributing to street with low inter-visibility.
3.7 Results from the review of the planning documents

A land use plan for a large area in a city is named Kommunedelplan. When these plans are accepted, legal regulations are added to the map. It is a legal plan in accordance with § 11-5 of the Norwegian planning and building law from 2008. We reviewed all current plans for all the six neighbourhoods and the following were found.

For Solheimsviken and Møllendal we reviewed the legal document for the plan: Årstad, kdp Puddefjorden – Damsgårdssundet, Plan-Id 17330000 (Bergen Kommune, 2010c). Planning regulations regards building entrances are lacking at Solheimsviken. For Møllendal something is mention, such as that all public functions should be connected and have their main entrance oriented towards public squares, or streets.

For Engen, Møhlenpris and Marken, we revealed the legal document for the plan: Bergenhus. Kdp Store Lungegårdsvann søndre del Plan-ID 16850000 (Bergen Kommune, 2007). For all neighbourhoods, we found one paragraph relevant for the building-street interface. The paragraph states that all first floors must have public functions. Shops and warehouses must have their window displays and entrances from the street level. Nothing is mentioned regards buildings entrances and windows on ground floor for dwellings.

For Sandviken, we revealed the legal documents for the land use plan: kommunedelplanen for Sandviken - Fjellisiden Nord, Arealplan-id; 15750000 (Bergen commune 2001a). The following paragraph 6 stated that the buildings must have a coherent structure to the streets, except from squares and parks. The buildings’ façade towards streets must be “approached” towards the streets with windows and entrances. The existing property pattern must be mirrored in the facades. For new buildings, the areas towards streets should be built. In Sandviken, most buildings have entrances and windows oriented towards the streets. Probably this paragraph is made to protect the historical qualities of the area. For the remaining areas, the street-building interface is only mention where there might be shops. For dwellings, regulations on the building-street interface is totally lacking.

4. CONCLUSIONS

The building-street interface matters for the perception of safety of public spaces. It counts for dwellings as well for offices, shops and public buildings for ensuring safe streets. As Jacobs stated; eyes on the streets from buildings matters for natural surveillance mechanism (Jacobs, 2000). Therefore, for the perception of safety, entrances and windows on ground floor level must be enhanced in the densification process of cities. It is thus not enough to have an integrated street network on local and global scale. The building-street interface need to be topological shallow between buildings and streets for ensuring perceived safety.

However, in practice, the opposite occurs. Large modern building complexes tend to use the ground floor as parking and storage space, contributing to blind walls towards streets. In addition, complex entrance situations are made, with many direction changes between the public street and the private space. In Norway, there is a believe that living on the ground floor is not attractive because everyone can look into one’s private space. However, these practices contribute to break up the natural surveillance mechanism, and a lack of street life in cities.

The degree of street network integration on various scale levels influence the presence of people in streets. Changing a street network implies a more complex planning process than making guidelines or planning rules for buildings. Each building is a tiny brick stone for influencing the urban social life in streets. As soon as there are too many buildings turning away from streets, the perception of safety is affected even though the street network integration might be high.

Some legal plans mention the concept that all building should have “active frontages” However, precisions on what the spatial parameters for “active frontages” is lacking. Therefore, we suggest the following paragraph to add to all the legal descriptions to planning documents in new as well as old urban areas:
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“To ensure a safe urban neighbourhood, all buildings should have windows and doors directly connected towards all their streets. Functions such as storage and car-parking should not be located on ground floor level.”

Adding such a paragraph into existing planning documents on all scale levels could be a first step to enhance perceived safe streets in urban areas. On a national level, policies for adding this paragraph into local planning in the national policy documents on coordinating transport and land use planning (Regjeringen 2014) and into the guidelines from the national departments on densification in urban areas (Miljøverndepartementet 1998 and 2000) would help to enhance implementation on a local scale. On a municipality level, such a paragraph could also be added into the overall municipality plan (Bergen 2017 and 2015). The municipality plan is revised every 4 years and guides the administration and private parties when making legally bounded land use plans on a local scale. Moreover, adding general directions on the building – street interface into the municipality plan makes it easier for employees working for the municipality administration to steer and to put requirements on private initiated plans as well as on accepting building applications. It can at least be a first step to ensure eyes on the streets from adjacent buildings.

REFERENCES


