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NEW CHALLENGES FOR XXI CENTURY CITIES

Multilevel scientific approach to impacts of global warming on urban areas,
energy transition, optimisation of land use and emergency scenario

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Laboratory of Land Use, Mobility and Environment
DICEA - Department of Civil, Building and Environmental Engineering
University of Naples "Federico II"
Piazzale Tecchio, 80
80125 Naples (Italy)

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The cover image shows a composition of two photos of the Temple of Serapis in Pozzuoli (Italy). Giuseppe Mazzeo took them in January 2009 and March 2025. At the top, the 2009 image shows the temple flooded, with the pavement not visible. In the down, the 2025 image shows the temple's pavement dry and exposed. The Temple of Serapis is one of the leading visual indicators of the bradyseism phenomenon in the Phlegraean Fields. The bradyseism phase, highlighted by comparison, started in the first years of this century, as shown by the data published by the National Institute of Geophysics and Volcanology (INGV) on the website dedicated to the phenomena (<https://www.ov.ingv.it/index.php/il-bradisismo>).

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Situating walkability: examining walkability elements on recurring routes

Jani Tartia

Tampere University, Faculty of Built Environment, Finland

e-mail: jn.tarti@outlook.com

ORCID: <https://orcid.org/0009-0008-4739-2300>

Abstract

Walking is widely regarded as a ubiquitous, affordable, healthy and zero-carbon mobility mode that enhances the liveliness and inclusivity of urban spaces. In recent years, the concept of 'walkability' has emerged as a central criterion for assessing the sustainability and liveability of cities. Walkability elements and metrics are often employed to map urban environments, evaluating their capacity to facilitate or hinder walking from the perspective of experts and professionals. However, how do these metrics relate to the situated subjective walker-street relations, contexts and experiences? This study employs ethnographic mobile research methods to examine the connections between walkability elements of the physical built environment and the everyday walking experiences on recurring day-to-day routes in two mid-sized cities in Finland. Utilizing walkability metrics related to visual urban design elements from research literature, the study explores the role of the elements in shaping the walking experience in the context of regularly travelled routes and the subjective body-environment relations. The study highlights that the walkability elements can act as important anchoring points in the study of the body-environment relations in the context of the habitual everyday urban mobility. The importance of 'imageability' and 'complexity' elements is discussed, as well as the role of temporality and 'rhythm' in the walking experience.

Keywords

Mobility; Walkability; Body-environment relations; Urban space; Urban temporality.

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1. Introduction

No city can solve its transportation problem if it neglects the greatest self-propelling vehicle of all: the pedestrian. (Mumford, 1964: 119). The American sociologist Lewis Mumford wrote about the neglected role of the pedestrian over sixty years ago. Walking has only in the past two decades started to regain attention in urban development discourse as a mobility mode to be taken 'seriously,' after almost a century of car-oriented city planning and urban mobility system development (Urry, 2007; Speck, 2012; Middleton, 2018). City planners are increasingly recognizing the importance of walking for the creation of healthy city districts and neighbourhoods (Boyce, 2010; Adkins et al., 2012) and liveable and attractive public spaces (e.g. Cervero et al., 2017; Balcetis et al., 2020). As cities face the urgent need to transition to sustainable transportation systems to reduce local greenhouse gas emissions and meet carbon-neutrality targets, walking has emerged as a key component in this development discourse as a zero-carbon and equitable urban mobility mode. For instance, cities such as Vancouver (City of Vancouver, 2012) and London (Greater London Authority, 2018) have elevated walking to the top of their transportation hierarchies, prioritizing it in the design and revision of traffic and zoning plans. The concept of the '15-Minute City' (Moreno et al., 2021), which has been a central conceptual approach to urban development in the wake of the recent COVID-19 pandemic, similarly prioritizes walking as a mobility mode, and challenges excessive private car dependency and mono-functional urban land use practices that have propelled urban sprawl in the past (e.g., Cargnin et al., 2024). The pandemic also gave the development of walking conditions a general boost, as cities placed new emphasis to public spaces, local green areas, and their accessibility on foot (Paydar & Fard, 2021). However, walkable urban infrastructure, in many cases, remains unevenly distributed between different populations and locations (Patton, 2007).

In this paper, I explore the role of recurring walking routes and subjective body-environment relations in the analysis of urban walkability. The term *walkability* generally refers to the level and quality of walking conditions provided by the built environment, including factors such as the quality of infrastructure, access to services within a reasonable walking distance, the integrity of the pedestrian network, and the 'human-scale' of urban spaces. There is not just one, but multiple practical-theoretical approaches to walkability (Forsyth, 2015), each with its own set of elements, metrics, and units of analysis, ranging from policy measures to spatial design elements (Ewing & Handy, 2009; Speck, 2012; Adkins et al., 2012; Dovey & Pafka, 2020; Roper et al., 2023). Walkability is often approached from the (objective) expert's – the researcher's, the planner's, the architect's – perspective through the measurement and quantification of physical elements for comparisons and the setting of target values (Forsyth, 2015; Shashank & Schuurman, 2019). However, there has been less emphasis on the experiential and embodied dimensions of walkability (also Fancello et al., 2020), and this paper aims to further contribute to that emergent theoretical and practice-oriented discussion.

To explore the interconnections between walking experience and walkability elements, I approach the topic by focusing on the recurring body-environment relations that emerge on repeated walking routes. There is a growing body of research on mobility, which underlines the experienced and embodied nature of mobilities (Sheller & Urry, 2006; Middleton, 2011; Jensen, 2013). Here, I utilize predefined walkability elements from existing research literature and ask: What role does the recurring and situated embodied context of a 'walking route' play in defining the walkability of a space? I explore how the different walkability elements, which focus on the quantities and qualities of the physical space, can be used to provide practical anchors for studying the experienced and embodied aspects of urban spaces. The study's research data is composed of participant-produced photographs and related route narratives from urban walking routes in two major cities in Finland, collected originally for a doctoral dissertation (Tartia, 2020). The dissertation focused on the temporal body-environment relations and rhythms in street spaces, and towards the end of the dissertation process, the aspect of walkability was also highlighted as a prospective analytical approach, warranting a focused look at the topic here.

The structure of the paper is as follows: First, I present the key walkability metrics, and the overall theoretical framework, that was used in the exploration of the situated walker-street relationships. The methods and data are presented in more detail next. Then, the analysis of the research data through the selected walkability metrics is presented, followed by a discussion highlighting the key insights gained. The conclusion follows at the end.

2. Walking and walkability

Walking is a complex phenomenon that can be understood from multiple perspectives. It can be approached as a mode of physical transportation (Cappe, 1987; Tekolla et al., 2024), a place-making practice (Gehl, 1971), a mode of social interaction (Middleton, 2011; 2018), a mode of dwelling (Thoreau, 1862; Ingold, 2004), a form of physical travel linked to health and well-being (Adkins et al., 2012), or even as a political act (de Certeau, 1990; Lorimer, 2011; Coverley, 2022; Beaumont, 2024), among others. Nearly all human movements and modes of mobility involve walking in some form (Urry, 2007: 63-64). As a result, all spaces in the city – whether private or public, indoor or outdoor – must address walking and its facilitation in some manner, either explicitly or implicitly. Improving walking conditions, therefore, involves tackling a multifaceted issue that encompasses policy and legislation issues, social and cultural dynamics, and the physical transformation of the built environment, as well as changes in practices and mobility cultures (Urry, 2007; Cresswell, 2010).

In recent years, walking has become almost synonymous with desirable built environment quality in urban planning and design literature (Forsyth, 2015; Cervero et al., 2017; Dovey & Pafka, 2020; Fonseca et al., 2022; D'Amico, 2024). Walking has been highlighted for its health benefits and place-making qualities of attractive and lively public spaces (Forsyth, 2015). Walking has been targeted in many contemporary urban development plans, either in district-level development of the 'walking grid' or in the general 'betterment' of a public space, especially related to the sustainable urban development frameworks (Banister, 2008). Many contemporary (positive) urban future visions are based on walkable and green and close-community-based districts and neighbourhoods – in contrast to visions of the early and mid-20th century that often focus on the facilitation of private car use (Dunn & Cunerton, 2020: 48). Currently, walking possibilities are, however, unevenly distributed between cities and different areas within cities (see Aparicio et al., 2024; Patton, 2007), and the history of automobile-focused planning paradigms – that have dominated urban planning and development processes for most of the 20th century (Böhm et al., 2006) – have generally had a negative impact on walking as a mobility mode.

From a research perspective, walking can be approached from multiple methodological perspectives (Türken & Conticelli, 2024). The theoretical background of walkability metrics can be traced partially to the influential work of Lynch (1960) on the perceived city image and 'imageability', Jacobs (1961) on the 'sidewalk ballets', Cullen (1961) on the 'serial vision' of space experienced in motion, Gehl (1971) on the nurturing of 'life between buildings', and Appleyard (1981) on the 'liveable street ecology', among others. Their works all emphasize, in different ways, the experienced aspects of the urban environment and the relations between the walking body and the environment. Forsyth (2015) identifies various uses of the term 'walkability' by academics and practitioners: walkability is used to describe either the 'means' (e.g., physical accessibility, safety, and compactness of urban spaces) or the 'outcomes' (health benefits and exercise, sustainable transportation, liveliness of urban space), or it can be used to convey meanings related to a 'better' urban environment in general.

Different walkability metrics have emerged to map and score factors that enable or hinder walking. Southworth (2005) explores criteria for a pedestrian network, including its connectivity, linkages with other mobility modes, and safety. Speck (2012) approaches walkability as a policy and planning issue, which can be distilled into practical planning and design rules, including setting limits for private car use and developing mixed-use districts. Roper et al. (2023) explore walkability as a metric for access, considering both spatial and temporal

factors facilitated by the street grid. Similarly, Dovey and Pafka (2020) explore walkability through metrics such as city-level and district-level density, mix of uses, and access. Adkins et al. (2012) present an audit tool for walkable and green streets. The walkability elements have also been coded into different digital tools, such as the WalkScore website (WalkScore, 2023). Ewing and Handy (2009) approach walkability through visually perceivable urban design elements that affect the walking experience, which is utilized as the main reference of this study.

2.1 Walkability as visual urban design elements

In this paper, walkability is approached through visually perceivable urban design elements, following the work of Ewing and Handy (2009) (also Ewing & Clemente, 2013). They identify fifty-one 'perceptual qualities' from urban design and planning literature that contribute to the level of walkability of the built environment. They argue that these perceptual qualities are shared and identifiable elements of the space, which can be assessed by an objective observer, as they hold relevance in the walkability of the environment regardless of the ultimately *subjective* experience of walking (Ibid.). They highlight five key qualities of the environment, which their studies show to be most significant and relevant to walkability based on various case studies: 'imageability', 'enclosure', 'human scale', 'transparency', and 'complexity'.

Imageability refers to 'the quality of a place that makes it distinct, recognizable and memorable'. This includes landmarks and other specific recognizable and memorable signs that give perceivable identity to the place.

Enclosure elements are 'visual termination points' that define and delineate a space, separating it from its surroundings. *Human scale* 'refers to a size, texture, and articulation of physical elements that match the size and proportions of humans and, equally important, correspond to the speed at which humans walk'.

Transparency 'refers to the degree to which people can see or perceive what lies beyond the edge of a street and, more specifically, the degree to which people can see or perceive human activity beyond the edge of a street'. *Complexity* 'refers to the visual richness of a place. The complexity of a place depends on the variety of the physical environment, specifically the numbers and types of buildings, architectural diversity and ornamentation, landscape elements, street furniture, signage and human activity' (Ewing & Handy, 2009: 71-81; Ewing & Clemente, 2013).

In this paper, these five perceptual qualities of the environment form the focus for exploring the relations between situated subjective experiences, recurring walking routes, and the built environment. In the next section, an empirical study is presented that makes use of participant-produced photographs and mobile interviews from recurring daily walking routes to examine the role of the recurring and situated body-environment relations in the context of walkability. It should, however, be noted that the elements examined below - related to the built environment quality and its uses – can only be considered relevant once the basic requirements of the walking practice are met, including considerations of distance, accessibility, and physical ability, among others (Adkins et al., 2012).

3. Data and methods

The research data consists of in-depth qualitative interviews and participant-produced visual material documenting ten (10) recurring walking routes in urban areas. These routes represent the day-to-day walking routes of ten different individuals in their home cities of Tampere and Turku, Finland – cities which are located in the second and third largest urban areas by population in the country, after the capital Helsinki metropolitan region, each with approximately 200,000 inhabitants. The data were collected for a doctoral dissertation that examined the various urban rhythms that contribute to the (re)making of urban space (Tartia, 2020).

The research employed ethnographic mobile methods, including 'go-along' walking interviews (Kusenbach, 2003) and collaborative visual methods (Pink, 2007; Foster et al., 2023), namely photo-elicitation (Harper, 2002), where participants took photographs during the walking interviews of the issues discussed, and these

photographs were later discussed in a more traditional sedentary interview (Tartia, 2020). Walking interviews, in general, are versatile in style and can be used in both researcher-driven settings – where the area of interest is predefined by the researcher – and in participant-driven research settings – where the focus is on the subject's interests, everyday environments, and specific locations of personal significance (Evans & Jones, 2011). The former approach is often employed in walking environment studies and participatory urban development processes, such as 'planning walks' or other citizen engagement activities in zoning and urban planning (Raisio & Ehström, 2017). In this study, the participant-driven approach was adopted.

The goal of the empirical study was to join individuals in their daily travel and gain an understanding of their urban experiences and embodied interactions with the built environment, all within the context of the recurring route. The focus on the route context here entails three specific aspects: (1) a route is a path travelled repeatedly, often with a certain frequency (e.g., daily, weekly); (2) a route is a succession of spaces, connected by the specific context of 'the movement from place A to place B'; and (3) a route is more or less fixed in both spatial and temporal terms. Recurring walking routes ground us in our surroundings, and the route itself can be conceptualized as a specific (recurring) 'mobile place' (Jiron, 2010; Tartia, 2020). This view echoes Jacobs' (1961) observations on the urban neighbourhood feel, where frequent interactions with the built environment generate a deep understanding of its spatial and temporal dynamics, and the emerging 'sidewalk ballets'.

In this study, ten in-depth mobile interviews were conducted on location. The walking routes studied here are regularly used in the participants' everyday lives, and they are all (partially) located within the urban centres of Tampere and Turku, Finland. The participants were recruited through social media and email lists of local grassroots organizations. The criteria for the selection of the participants were kept quite open to reach people with different kinds of socio-economic backgrounds. The selection was based on two main things: the participant had a recurring walking route in one of the studied cities' centres, and the person was over 18 years of age. The studied walks were typical urban routes within the city centre, such as trips between home and the office, grocery store, or university. The participants, aged 26-73, included eight women and two men. The occupations of the participants were diverse, ranging from a university teacher to a worker in the public sector, and some of the participants were retired or unemployed. The routes varied in duration and length - ranging from about 1 to nearly 4 kilometres. The routes were primarily walked for convenience due to their relatively short distances (in most cases), though participants occasionally travelled by car, by bicycle, or by public transportation the similar types of trips due to hurry, bad weather, or other practical reasons.

The 'go-along' walking interviews were conducted to engage in a three-way dialogue between the participant, the interviewer, and the environment (Jokinen et al., 2010). The participants were given a task to draw a mental map of their route, and they were given a camera for the duration of the walk and asked, and encouraged during the walk, to take photographs of the things they were talking about, and also things that describe their route and their travel experience but were not discussed during the walk. A follow-up thematic interview (Aronson, 1995) focusing on the produced visual material was conducted after the walk.

The photographs, produced by the participants during the walking interview, are used here as the main source for the walkability analysis as they provide direct, practical anchoring points for the body-environment relations. As smartphones and cameras are nowadays found in almost every pocket, photographing has become a ubiquitous and mundane part of daily life (Foster et al., 2023). The photos were examined through the participant's own narration, which provided context for the photo, including the intended point of interest of the photograph, possible temporal relevance ("this always happens", "this has never been here before"), and whether the subjective experience was seen as positive, neutral or negative. Whereas in previous analyses of the same research data, a more interview-driven approach has been adopted focusing on the content analyse of the interviews (supported by the participant-produced photographs and mental maps) and focusing on the holistic experience of walking (Tartia, 2020), here the analysis was geared towards the photographs, examining them through the walkability metrics framework. Each photo was assigned one or more of the

previously identified visual design elements based on the thematic analysis of the interviews describing the photographs (see Tab.1). An example of this is provided below (quote translations from Finnish into English by the author):

Then we are at the train station [#imageability: neutral connotation], we've just passed the tunnel through [#linkages: neutral]. There's only three people in this photo but around four or five in the afternoon there are lots of commuters [#complexity: neutral, with temporal relevance], it looks interesting when people masses come in those kind of pulses, and then they stop here at the traffic lights to wait, so it is, like some kind of a heart or an organ that pumps people into the traffic [#imageability: positive, with temporal relevance]. There's also this nice brick facade [#human scale: positive] (Interviewee #9, Fig.2A).

As Tab.1 shows, the elements are closely related, and the boundaries between different elements are difficult to define strictly as they often overlap with one another. The elements should therefore not be treated as fully separate aspects of the urban experience, but strongly interconnected aspects emphasising slightly different sections of the built environment.

This exploration also highlighted the importance of three additional elements to the five previously mentioned: 'linkages', 'territoriality', and 'rhythm'. *Linkages* refer to the physical and visual links between different spaces acting as thresholds (Stevens, 2007), signalling continuation between two or more distinguishable spaces (Ewing & Clemente, 2013: 20). *Territoriality* refers to the visual signs and embodied practices of appropriation, such as street graffiti, or embodied practices challenging the space's uses and general narrative (such as through play and playfulness) (Rapoport, 1982: 152-153; Kärrholm, 2007; Stevens, 2007). *Rhythm* refers to the visual or physical signs of temporal patterns (Lynch, 1972: 70-77), and to the temporal changes in who occupies the space and how it is appropriated (Kärrholm, 2007; Tartia, 2020). In the next section, the visual research material and the different elements are examined.

Visual design element	Assessed attributes in the photographs
Imageability	Physical elements that capture attention
	Perceived identity of the place
Enclosure	Vertical surfaces defining the space
Human scale	Building details
	Pavement textures
	Trees and bushes
	Street furniture
Transparency	Perceivable human activity beyond the edge of the street
	Described human activity beyond the edge of the street
	Transparent vertical surfaces, openings to small spaces
Complexity	Visual richness
	High number and variation of type of buildings
	Architectural diversity
	Landscape elements
	Human activity
Linkages	Physical elements signalling route continuation

Territoriality	Physical signs that create the feeling of belonging to oneself
	Physical signs of appropriation of space
	Perceivable human activity and appropriation of space through different uses
Rhythm	Time-sensitivity of the depicted scene

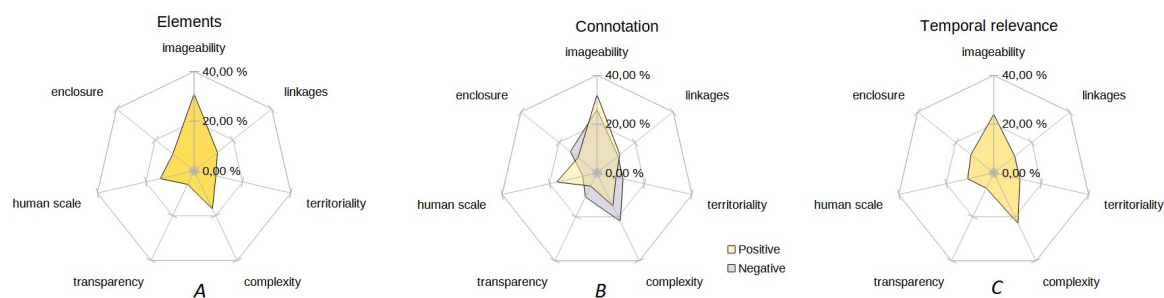
Tab.1 Visual design elements and attributes related to walkability

4. Examining walkability in the context of a recurring route

In this section, the analysis of the photographs from the walking routes is presented through the visual design elements related to walkability. In the analysis, I examine how the different walkability metrics from previous research literature are represented in subjective and situated walking experiences on recurring urban walking routes.

In Fig.1, the share (%) of photographs related to the elements (based on the attributes presented in Table 1) is depicted to show how often the specific elements appear in the research data. The Fig.1A depicts the general frequency of the elements in the research material based on the process of combining the analysis of the participants' route narrations (interviews) with the pre-existing design elements, as described in the previous research literature.

The analysis also shows that the different elements are closely linked to one another: it was possible to assign two or more elements for half of the photos based on the narrations (1 element=51%, 2=27%, 3=16%, 4=5%, 5 elements or more=1%).

**Fig.1 The share of the photographs relevant to different visual design elements**

The elements of 'imageability' and 'complexity' were the most frequent elements identified in the participant-produced photos. The Fig.1B shows the share of positive/neutral and negative connotations of the elements identified in the photos, as the photographs were taken by the participants to show both positive/neutral and negative aspects of the environment and the general walking experience.

Around one-fourth of the photos presented negatively perceived elements of the environment, which, based on the participants' own narrations, mostly related to the lack of something desired – such as the lack of a perceivable identity of a place or urban life – or there being 'too much' of something, such as difficult to pass crosswalks due to heavy motor traffic.

The Fig.1C presents the level of time-sensitiveness of the pictures: around two-thirds (63%) of the photographs were time-sensitive, meaning that the passing of time and changes – *rhythm* – in the activities of the space on a daily, weekly or seasonal level were critical for the described (by the participant) environmental experience (whether positive/neutral or negative).

The different elements are examined next in more detail with quotes from the participants and examples of the examined photographs (Fig.2).



Fig.2 Participant-produced photographs A-P

4.1 Imageability

Imageability is a recurring element in the data: around one-third (31%) of the photos depicted aspects related to imageability. Positive imageability relates to the perceived identity and character of a specific place, its pleasing or 'eye-catching' environmental aesthetics, or the general enjoyable atmosphere of the environment: *Here's everything I like in this route. There are those birds [plastic material bird-shaped art installations] in the river (laughter), which are nice. Then there are those old buildings on the other side [of the river], I like them because they have those pastel colors. Then you can see the [name] bridge there, it's really, I like it a lot, sometimes I go that way [the other side of the river, across the bridge] even though it is kind a more inconvenient route for me* (Informant #8; Fig.2B).

The aspects related to imageability were often time-sensitive. The research participants described the effects of the time of the day on the perceived identity and the specific characteristics of the space that make it 'that' space. This temporal element was mostly related to different human uses of the space, which were inseparably linked to the space's perceived character and atmosphere:

[...] there's the [name] department store, it is really like an old landmark in the city, everyone knows it and goes there, for their own business. Now since it is a rainy day, it is a bit quiet here [the city's main market square], but especially on Saturday mornings the market is always full and there's a lot of vendors here [...] Informant #3, Fig.2C).

Likewise, the negative remarks on imageability were aspects related to the absence of these identifying characteristics, including perceived lack of character or 'anything special'. Such in-between spaces do not raise attention or have distinguishable characteristics. These also may have been lost due to redevelopment of a specific area, such as the construction of highways and new development sites (Fig.2D).

4.2 Complexity

The presence or absence of human activity, and the perceived liveliness of the environment – in the form of different spatial uses, social groups, and social interactions - were key attributes related to *complexity* in the data. Most (89%) of both positive and negative aspects related to complexity were also time-sensitive:

- *[...] the people of this area have, in a way, claimed this place [a small park next to the river] to as their own, but that, all this liveliness and vividness is mostly due to the fact that the [name of a university] buildings are right over there you should just come and see here the buzz and chatter you hear on a summer day* (Informant #4, Fig.2E);
- *[...] now in this photo there is no police car or ambulance, but it is really a recurring sight around that [a large street-side bench made of a stone slab]. It always varies who is causing the disturbance, that whether it's the younger people or the older people or what, but this is a bit chaotic place* (Informant #9, Fig.2F).

As expected, complexity was more prominent in squares, market areas, major pedestrian streets, and other pedestrian-friendly places on the route, which are connected by more corridor-like spaces between with less perceived complexity (and imageability, see above). Some notes on architectural, aesthetic, and visual complexity were also highlighted (Fig.2G). The absence of human activity, and the related perceived 'emptiness' of the space, was one of the key negative aspects related to the topic of complexity, especially in areas that are focused on motor-traffic optimization and an emphasis on car use (Fig.2H).

4.3 Human scale

In the data, attributes related to human scale included small physical and visual landscape features, street furniture, urban art (Fig.2N), pavement textures, and green spaces (see Fig.2I). The small details of the built environment were also often highlighted in the street scenes:

Well, this is, like, beautiful, this gate, this fence and the gate. [...] These kind of things are the highlights of any street, and I don't think that all things that are old should be preserved, not at all, but it's sad that we can't, in a way, afford to make these kinds of craftsmanship or other works anymore, so that those that still are left, even if it is a small gate, it should be preserved so that it shows this diversity and expressiveness (Informant #4, Fig.2J).

In some cases, the lack of such features was noted, particularly in relation to specific places where the informants regarded there being potential to add these kinds of features to improve the space. It should be noted that human scale elements are closely linked with the imageability and complexity elements, each representing a slightly different perspective on the same issue of places with distinguishable character. The analysis of the data highlights the two other elements more than the human scale, which is more about the finer details – textures, fixtures, and others – of the space, which are part of the larger in/tangible characteristics of the space (imageability) and the social liveliness of the space (complexity).

4.4 Enclosure

Enclosure refers to the physical or visual boundaries that define a space. From a positive perspective, the creation of clearly defined spaces, or distinct physical and/or visual barriers between motor-traffic and pedestrians through street-side fixtures (Fig.2K), was noted in the route narrations. This also creates boundaries for how the environment is perceived, which can direct the attention towards the different 'human scale' elements (or the lack of them) in the experience of the space.

However, the enclosure of the space can also evoke negative feelings and anxieties, particularly at night or in narrow passages or other similar places with limited visibility ('transparency'):

[...] this is maybe a bit darker section, or shadowy section of the walk [...] there are those hollow spaces [under the balconies of an apartment building] [...] it's not nice to walk past these, you always get this feeling that someone might be lurking there [...] (Informant #5, Fig.2L).

4.5 Linkages

Elements related to linkages connect different places along the route together, and they also signal transitions between different distinct places as well as different route contexts (Fig.2B). In the data, these elements included crosswalks, intersections, street corners, and 'gate-like' thresholds - both tangible and physical, and intangible and imaginary - that separate different distinguishable places or neighbourhoods.

These linkage elements can also act as points of friction along the route, such as specific crosswalks where the speed and priority of different mobility modes (e.g., pedestrians, cyclists, motor vehicles) have to be negotiated every time through the movements and the emerging choreographies of the different bodies in motion (Figure 2M).

4.6 Territoriality

Elements of territoriality in the data included different signs of spatial appropriation by different people and groups. These were mostly related to the physical presence of people, and to what kind of activities they were engaged in (Fig.2F). The user groups and their uses were notably perceived as varying depending on the time of day and season:

[...] [talking about a small kiosk building] this is kind of a meeting place in the neighbourhood, especially for men, this terrace is often full of different groups of men that talk loudly and who seem to comment on everyone who passes by and so on. (Informant #3, Fig.20).

Additionally, these appropriations of the space also took more implicit and less direct forms, such as street art, graffiti, and street-side advertising stands, which all mark the space through various visual signs and physical materialities:

I took a photo of that cat [a cat-shaped graffiti on a concrete wall], this is the kind of street art that we usually try to look for [while walking] with the kids (Informant #8, Fig.2N).

4.7 Transparency

The least relevant visual design element in the data was transparency (6%). Notably, most of the transparency-related elements were negative in connotation, often related to the lack of transparency and obscured visual aspects of the space, such as windowless ground floors of street-side buildings (Fig.2H and 2L). There were also a few positive aspects of transparency highlighted, such as window shopping as a form of passing by certain buildings and stores (Fig.2P), but overall, transparency did not play a significant role in the participants' narrated experiences.

5. Discussion

The analysis has explored how the different walkability elements, identified in research literature, relate to the subjective and situated walking experience on recurring routes. The analysis has highlighted both the rich variation of different aspects related to specific built environment qualities in the subjective route narrations as well as their broader, collective patterns. Here, we focus shortly on three elements, which appeared frequently in the data – imageability, complexity, and rhythm – to discuss their potential to inform urban planning and development processes to enhance the walkability of urban environments. In the context of developing sustainable and walkable cities, increased imageability and complexity, as attractive and distinct public spaces, and mixed-use urban areas, respectively, are often desired planning and design outcomes, as

they can support the utilization walking as a mobility mode and lower carbon dioxide emissions, and to increase possibilities for social interaction and participation (Gehl, 1971; Cervero et al., 2017).

While these walkability elements emerge frequently in the data, it is important to recognise that the research setting, the chosen analytical methods, and the cultural practices related to visualizing the urban environment (as photographs depicting the route) (Harper, 2002), among others, all influence the results. Furthermore, it is important to note that the research setting particularly focuses on the aspects of the urban environment which *were* photographed by the participants – the data cannot provide insight on why something was *not* photographed, and what kinds of visual urban design elements remain not visualised between the shots along the route. In the next section, further below, we continue to assess the used methods.

Imageability, the memorability and distinctiveness of the space, is, as Ewing & Clemente (2013: 6) note, a sort of a 'net effect' of multiple different elements, and its appearance in the narrated walking experiences was therefore also anticipated. In the data, imageability is both subjective (e.g., personal focus, points of interest) and collective (e.g., distinctive landscapes, historical spaces), and both tangible (e.g., specific urban forms, unique details, also related to 'human scale' elements) and intangible (e.g., personal memories, experiences of past interactions and happenings). While imageability certainly refers to visual markers like 'landmarks', as identified by Lynch (1960), it also encompasses the more subjective and less tangible meanings of the space, as suggested by the data. For example, the linkage elements, which also appeared in the data frequently, are closely connected with imageability, and affect the walking experience by signalling context-dependent cues of the route progression for the body-environment relations, or the transfer from identifiable 'place' to another, which might not be evident for the outside observer (Ewing & Clemente, 2013: 21-22).

Similarly, complexity of the urban environment is multifaceted. Complexity can mean both purely visual and physical form as well as human presence related aspects. In the recurring walking experience, though, complexity seems to be related more often to the perceivable human activity and less to the visual richness or architectural diversity of the space. From a planning perspective, multi-use and mixed-use areas, create the conditions for complexity to emerge. Designing for complexity can also be seen as designing for 'connectivity' (Southworth, 2005), which can support the increase of walking as a mobility mode beyond a specific public space. But at the same time, depending on the embodied and situated context of movement, this complexity can, however, be positive or negative: complexity can be a driving force for an attractive urban space – lively and busy, people attracting other people (Ewing & Clemente, 2013; Gehl, 1971) – which awakes interest also in the context of the routine walking route, as evident in the data, and at the same time the same space can seemingly be overrun by different mobilities, practices, and uses of the space, creating undesired friction and sensory overload (Ibid.). Creating complexity through planning and policy means a balancing act between these two opposites.

Furthermore, the route narratives in this study highlight the temporal dimension of the body-environment relations in terms of the walking experience, or the element of rhythm. The relations change and oscillate corresponding to the various the daily/weekly/yearly rhythms of the space, which are affected by different patterns of uses of the space, such as the opening times of shops and services, the intensities of the people flows (daily peaks/lows, events), and the various appropriations of the street space by different people groups (Kärholm, 2007; Werner et al., 2018, Lynch, 1972). Here, especially the cyclical patterns of everyday activity are highlighted in the walking experience. These various recurring patterns, related to the space and its perceived users and uses – which make the space familiar, 'known' and one's 'own' (Jacobs, 1961) – often intertwine with other temporalities, including the more linear processes of urban (re)development (construction, decay, demolition). This temporal dynamism of urban space is difficult to translate into direct planning and development tools, practices, or policies (Tonkiss, 2013) - as it is closely linked to different larger time regimes and cultural perceptions of time that cross-cut everyday lives in complex ways (Fernandes et al., 2015) – but the results of this study, however, highlight their importance in the everyday walking experience,

and, thus, should be paid increasing attention in urban development for more walkable urban environments. Here, for example, the connections between the space and its regulation (Kärrholm, 2007) can be identified as one mechanism to promote different uses of the space by different groups and individuals.

The conglomerations of multiple subjective and shared layers of the elements, as evident in the research data, are hard to directly or explicitly (re)create through planning and design practices. The three elements – imageability, complexity, and rhythm – have also been juxtaposed recently in unprecedented ways during the COVID-19 pandemic. Intentional decrease of complexity, and separation of different rhythms through social distancing measures, were some of the ways in which the 'usually' favourable and explicitly promoted elements of proximity and social interaction were turned on their heads, albeit at the same time also other kinds of measures to increase walking and cycling infrastructure were made. It remains to be seen, how much the pandemic era contradiction between personal well-being and public urban life influences the planning paradigms of the near future, and how the different novel concepts that formed as reactions to the pandemic, are integrated, such as the 15-minute-city (Cargnin et al., 2024), and how they come to influence walkability.

5.1 Notes on the method

In the light of this study, the framework of the visual design elements related to walkability is a useful tool to approach the walking experience and recurring situated body-environment relations. The focus on the subjective and situated route narrations can benefit from the vocabulary and categorisation of the physical space through the walkability elements, which can help 'anchor' the subjective experiences to physical, shared typologies of space related to walkability.

Additionally, the utilization of the elements in a subjective and a situated context driven research setting can further expand the view on walkability elements by shifting the focus to three specific issues. First, it highlights the plurality and heterogeneity of the relationships between the bodies and the environment. The elements that are at the forefront of the subjective and situated experience on the recurring walking route might differ from the elements that an expert planner or designer would place emphasis on, based on an objective examination of the space. Second, some of the key elements affecting urban walking experience are created on the grassroots level and in a bottom-up fashion through human activity and appropriation of the built environment. The routine interactions and encounters with the space and its users on the recurring route are essential to the walking experience – the physical space provides the physical setting for these interactions and encounters to play out. And third, the different temporal dimensions of walkability, such as the effects of the time of day or seasons, play an important role in the body-environment relations, and they are highlighted in the subjective narrations of the walking experience.

These insights on what makes urban spaces walkable from an experiential and situated perspective, can support the re-orientation of urban planning and design practices to increase walking in the context of climate change mitigation (Tekolla et al., 2024). However, the study is based on data from only ten in-depth interviews. This means that no definitive conclusions should be made on the individual elements of the walkability framework in general – rather, the analysis here provides an in-depth look at the different ways in which the framework on the visual design elements related to walkability can further enhance the analysis of the subjective and situated route narratives and participant-produced visual research material. As Türken and Conticelli (2024: 93) note, different research methods and technologies provide 'different capacities' in understanding walkability. The research could be further expanded with more participants to draw more definitive conclusions, or more focused attention on a specific element could be made to have a more rigorous understanding of the role of that element in the everyday urban walking experience.

6. Conclusion

This paper has explored the utilization of the framework of the visual urban design elements related to walkability in the context of subjective and situated walking experiences on recurring walking routes. The walkability elements provide 'anchors' for analysing the subjective research material, gathered from mobile interviews and participatory processes utilizing visual methods, providing a shared typology of elements of the urban environment for analysis, including imageability and complexity, which were often represented in the studied data.

The focus on the subjective perspective also highlighted the dynamic and time-sensitive nature of the walking experience, and how the recurring interactions between the body and the environment make the route spaces 'known' both spatially and temporally.

The research data utilized in the study are small in sample size. Further studies utilizing a similar methodological setting could increase the validity of the results presented here, and, perhaps, could also reveal more variety in the different experiences related to specific walkability elements. The results of the study could also be further connected with other types of research materials – including objective assessments of the environment – to validate the results and to draw an even more detailed picture of the interrelations between the walkability metrics and the subjective walking experience. Further studies on the matter could also expand the scope of the study by examining how the walking spaces come to be, and what kind of relations (top-down, down-top) impact their making and remaking.

However, the results of the study can help to expand the view of walking metrics and their dynamism and context-dependency.

The insights from this study can support the utilization of walkability elements as tools for practical planning and policymaking towards walkable urban environments by providing experiential insight into how the 'walkable' urban environment is encountered and interacted with in the real-life context of recurring walking routes. The increase in walking-enabling and walking-encouraging public spaces and street networks is increasingly critical for climate mitigation in the urban context.

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Conflict of interest

There are no conflicts of interest to declare.

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Image Sources

Fig.1: The share of the photographs relevant to different visual design elements. Source: Authors.

Fig.2: Participant-produced photographs A-P. Source: participants.

Author's profile

Jani Tartia

He has a PhD (2020) in Architecture and Urban Planning and Design from Tampere University, Finland. His research focuses on examining the temporal and rhythmic dimensions of cities, spaces, mobilities, human-environment relations, and urban design and planning practices. Currently he works on sustainable development topics in the public sector.