Designing for Urban Health and Well-being by Revisiting Proximity, Walkability, and Accessibility

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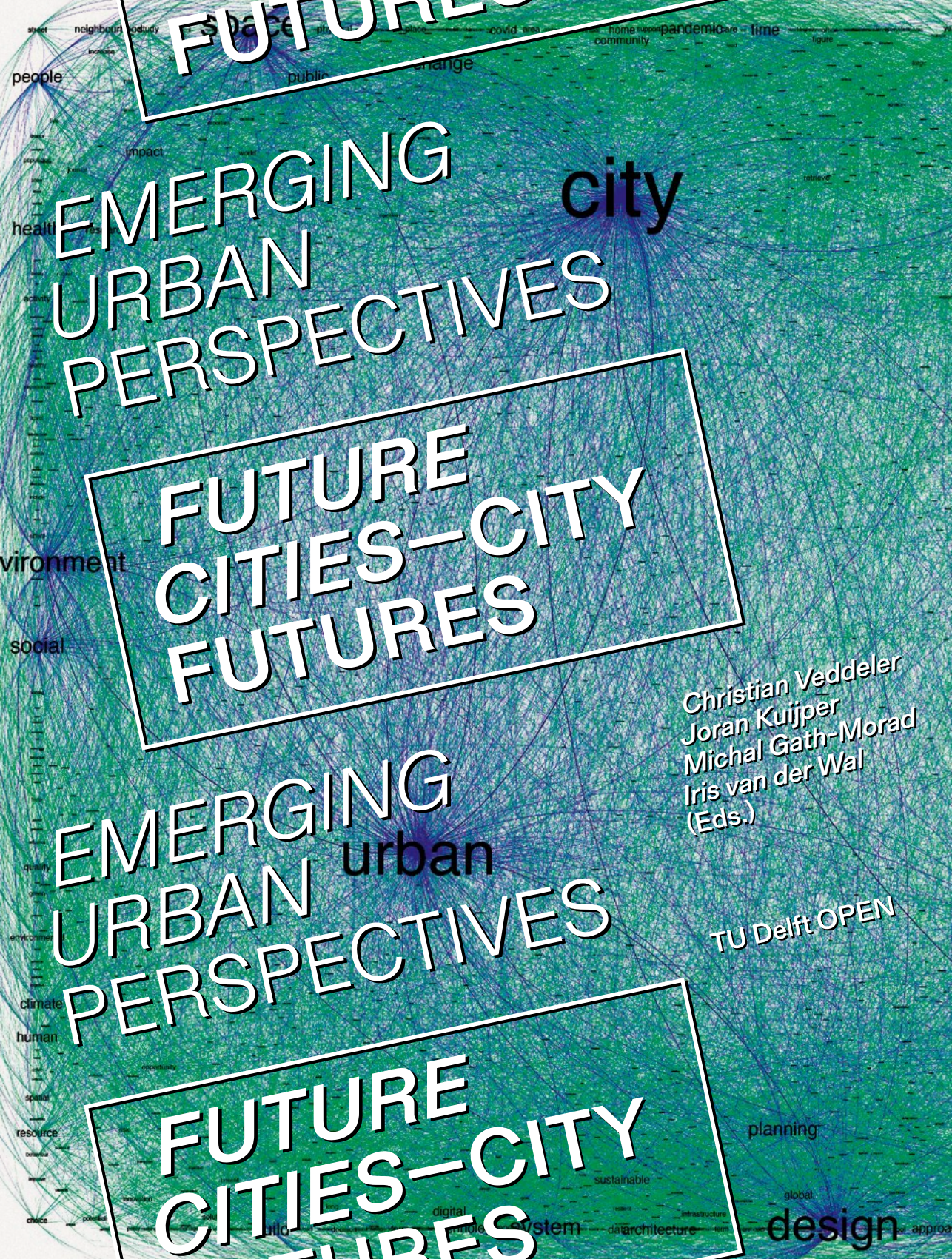
Publication date
2023

Document Version
Final published version

Published in
Future Cities—City Futures

Citation (APA)
Psyllidis, A. (2023). Designing for Urban Health and Well-being by Revisiting Proximity, Walkability, and Accessibility. In C. Veddeler, J. Kuijper, M. Gath-Morad, & I. van der Wal (Eds.), *Future Cities—City Futures: Emerging Urban Perspectives* (pp. 152-163). TU Delft OPEN.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Future Cities—City Futures
Emerging Urban Perspectives

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KEYWORDS
City; Future; Urban; Design; Building; Architecture; Environment.

PUBLISHED BY
TU Delft OPEN Publishing, Delft University of Technology, The Netherlands

ISBN 978-94-6366-642-8
DOI https://doi.org/10.34641/mg.55

Electronic version of this book is available at https://books.open.tudelft.nl/

PROOFREADING
Simon Milligan

BOOK BLOCK DESIGN/TYPESETTING
Joran Kuijper

SPECIAL THANKS TO
Roberto Cavallo, Delft University of Technology, Faculty of Architecture and the Built Environment, Department of Architecture; Werner Sübai, Gerhard Feldmeyer, and Joachim Faust, Helmut Hentrich Foundation; Lola Ben-Alon, Columbia University, Graduate School of Architecture, Planning and Preservation (GSAPP), New York City

Cover graph by Michal Gath-Morad, edited by Christian Veddeler and Joran Kuijper

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EMERGING URBAN PERSPECTIVES

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ABSTRACT

Can planning and design influence health and well-being in urban settings? Even though it was the public health issues faced by industrial cities that originally gave rise to the field of city planning, their paths have diverged over the years. However, how human settlements are planned, designed, and built can drastically improve or harm human health and well-being through factors that either promote or obstruct healthier lifestyles. Global organizations currently advocate city designs that enhance access to a wide range of resources and experiences for all. But how do we evaluate the successful translation of these goals into healthy, resilient, and socially cohesive human settlements and communities? This chapter revisits fundamental concepts of proximity, walkability, and accessibility that are omnipresent in planning and design directives for healthier communities. It critically examines prevailing conceptualizations and measures and offers alternative directions for operationalizations that accommodate the variety of human behaviours and the complex linkages between factors in the urban environment.

KEYWORDS

urban health; well-being; proximity; walkability; accessibility.

Chapter 9—Designing for Urban Health and Well-being by Revisiting Proximity, Walkability, and Accessibility

Achilleas Psyllidis

Since the rise of the industrial city in the nineteenth century, it has become increasingly evident that health and well-being are strongly determined by environmental and socioeconomic factors. Overcrowding prompted by urban population growth, poor sanitation, insufficient infrastructure, air pollution, and unequal access to resources such as clean water compromised health and accounted for the rapid transmission of communicable diseases (Hall, 2014; Freestone & Wheeler, 2015).

ENVIRONMENTAL DETERMINANTS OF URBAN HEALTH AND WELL-BEING

In recent years, it has also become clear that numerous elements of the built, natural, and social environments are partly responsible for various chronic physical and mental illnesses, including obesity, cardiovascular and respiratory diseases, stress, and sleep disorders (Giles-Corti et al., 2016). Infectious diseases cannot be excluded from consideration either. The COVID-19 pandemic has underscored the critical links between the way cities are designed and used and potential transmission risks (Psyllidis et al., 2021). To contain the spread of the virus, people around the world were mandated to stay at home and limit their mobility to locations in their immediate vicinity. This emphasized that where we live and the quality of our surroundings matter. It further accentuated existing inequities in access to opportunities such as proximal outdoor public and green spaces for physical activity and recreation, often leading to distress and, thus, to reduced levels of physical and mental well-being.

Remarkably, the challenges that modern cities face and can impact

health and well-being have much in common with the issues encountered in nineteenth-century human settlements. Noise and air pollution are associated with negative physical and mental health effects in cities worldwide. Increasing levels of urbanization and built-up space compromise the size and quality of green spaces. Population sprawl and land-use diffusion create large dependencies on car and motorized vehicles, limiting pedestrian and cycling infrastructure and discouraging active travel, which in turn leads to increased levels of obesity. Socioeconomic and sociodemographic disparities in access to education, job opportunities, affordable housing, and ethnic and age segregation jeopardize well-being and social cohesion and are further accentuated by spatial inequities. Limited access to clean water, quality food supplies, and sanitation facilities are still preponderant issues for cities in developing countries, especially in informal settlements of the global South.

Planning and design directives for urban health primarily emphasize the regulatory role of the physical and natural environments. Originally, the focus was on tackling direct physical effects such as overcrowding and the deleterious impact of contaminated water and air by increasing available greenery (Ebenezer Howard's 1898 garden-city movement is a prime example), reconfiguring the street layout, and zoning land uses such as separating polluting industry from residences (Barton, 2015; Freestone & Wheeler, 2015). More recently, the World Health Organization (WHO) introduced the 'Healthy Cities' programme to promote health development and well-being in urban settings, additionally highlighting the role of social determinants of health (Tsouros, 1995; Barton & Tsourou, 2013; WHO & UN Habitat, 2016). The core values and principles of this initiative are further reinforced by the recent Sustainable Development Goals (SDGs), developed by the United Nations (UN) (United Nations General Assembly, 2015). A common denominator across these approaches and strategies is the plea for improved and equitable access to a wide range of resources, opportunities, and experiences.

It is abundantly clear that achieving healthier lifestyles and well-being in urban settings depends on accessibility. Therefore, to design health-promoting urban environments that cultivate interactions and social cohesion, we in fact need to design for accessibility. But how do we evaluate the successful realization of SDGs and Healthy Cities' goals? How do we operationalize the achievement of improved and equitable access to resources, opportunities, and experiences? Which indicators are currently used? And is the current arsenal of planning, design, and policy-making tools appropriate? What do they capture and what do they leave out? Common indicators that are broadly used in urban health planning and design revolve around generic metrics such as the number and mixture of facilities within fixed radii, maximum walkable distances to the nearest resources, and proportions of public and green spaces within a buffer or neighbourhood unit. Although relatively easy to operationalize, these metrics generally lack specificity. How can we improve on one-size-fits-all indicators and metrics? The following sections revisit fundamental and interrelated concepts of proximity, walkability, and accessibility, to account for different age groups, population demographics, needs, and preferences.

PROXIMITY IS IMPORTANT, BUT IS IT ALWAYS ENOUGH?

Proximity is at the heart of urban planning, design, and public health approaches and strategies. It is a prerequisite for easy access to resources and facilities, a key indicator of potential exposure to environmental factors such as noise, air pollutants, and vegetation, a catalyst for walking and cycling, and a principal component of human-scale urban form. Most importantly, it is the baseline ingredient of essentially all walkability and accessibility measures. Therefore, designing for accessibility

Figure 1a ▸ p. 160

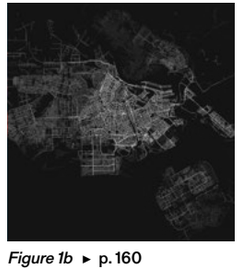


Figure 1b ▸ p. 160

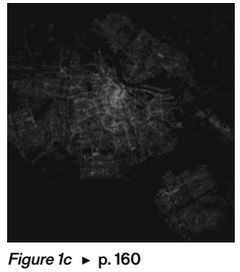


Figure 1c ▸ p. 160

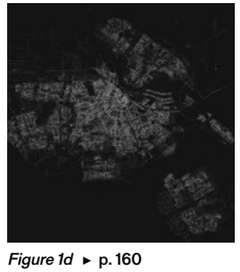


Figure 1d ▸ p. 160

implies that we need to begin with proximity. But how do we conceptualize and operationalize proximity? What makes something proximal? And proximal to what?

Proximity is commonly understood in spatial terms and is predominantly captured by Euclidean or travel-time measures of distance or in relation to a spatial unit such as a neighbourhood unit or catchment area (Clifton et al., 2008; Kimpton, 2017; Xu, 2019). We usually choose to live close to a school or a park, have dinner at a nearby restaurant, and prefer to shop within walking distance from a metro station. All these examples have the concept of proximity at their core. But there is always the need for a reference point. Home location is by far the most common reference when operationalizing proximity. The reach of resources and facilities is almost exclusively assessed relative to where we live, often by drawing circles around the residential space, the 'first place' in Oldenburg's (1999) famous taxonomy of places, or by calculating the number and percentage of facilities within a neighbourhood defined by a census tract or postcode area. But it might sometimes be at least as important to also consider what is proximal to our workplace, the 'second place', or the places where we spend our free time, the 'third places'. Even though this might sound trivial, it is quite striking that spaces outside of the home are barely considered when operationalizing proximity.

A widespread proximity-based assumption is that people use locations near their homes. Although this assumption holds some truth on some occasions, proximity does not imply actual use. Assuming use because of proximity can have substantial implications for how we assess exposure to environmental factors. For instance, if people live close to a park but never really use it, are they exposed to the health benefits of greenspace? This assumption can be primarily attributed to the scarce availability of actual human activity data. During the COVID-19 lockdowns, proximity played an important role because people were often allowed to perform outdoor activities only within a limited distance from their homes. This, in turn, could have affected the spread of the disease as several aspects of urban form and human activity on nearby streets might have influenced the transmission risk, as shown in Figure 1 (Psyllidis et al., 2021). Besides the obvious spatial aspects of proximity, social space may have other 'hidden' influences, such as on interpersonal relationships and ties (Chande et al., 2020). Adding this dimension to the conceptualization and subsequent operationalization of proximity could be essential, especially in the context of communicable diseases, and could open new avenues for approaches that are not constrained by typical geographical boundaries.

TOWARDS A WALKABILITY INDEX FOR ALL

Healthy community design is inextricably linked to walkable community design. WHO, the Centres for Disease Control and Prevention (CDC), and the Active Living by Design programme, among others, endorse daily walking and cycling as important forms of physical activity for healthier lifestyles (Healthy Places by Design, 2008; CDC, 2017). Proximity to a variety of facilities and activities is considered the cornerstone of any walkable environment. In spatial terms, short distances encourage walking and cycling, whereas long distances often result in car dependency, which is considered an important determinant of obesity. Therefore, several city planning, design, and policy directives have long promoted a mixture of land uses and activities within walking distance of people's residences to achieve walkable communities. The '15-minute city' model is one of the most recent hypes of this type (Song et al., 2013; Carpio-Pinedo et al., 2021). But how are short and long distances defined? Do they mean the same thing to everyone? Are the density and mixture of destinations the sole factors that influence the walking behaviour

of various population groups? And what about the quality and experience of the walks to these destinations?

The widely used shortest paths, though easy to measure, can barely capture actual walking behaviours, let alone elicit what encourages people to walk or not. Subtler qualities that relate to how people perceive the street environment, including the size, texture, and configuration of such physical elements as street furniture and paving materials, the feeling of safety, and the time of the day or night, may strongly influence walking choices and behaviour (Ewing & Handy, 2009; Ewing et al., 2013). With a few notable exceptions, these qualities and perceptions have barely been considered in urban design literature and practice, owing primarily to difficulties in objectively measuring them, especially at scale. Other socioeconomic and sociodemographic factors such as age, gender, income, and ethnic background may also influence choices about active travel (Ma & Banister, 2006). Do children and the elderly make similar walking choices or have comparable activity spaces? Do people from different income groups and ethnic backgrounds engage equally often in active travel? An inclusive walkability measure should consider these aspects in combination, ideally with varying weights depending on context. Similar considerations apply to an inclusive cyclability measure. However, limited data availability on the actual travel behaviour of specific population groups often results in them being underrepresented or entirely neglected in related indices, designs, and policies. Moreover, to achieve successful operationalization at scale, planners and designers need to draw on reliable and appropriate methods from geographic information science and urban analytics.

DESIGN FOR EQUITABLE ACCESSIBILITY SHOULD ALSO BE DESIGN FOR CO-ACCESSIBILITY

Goals 3 and 11 of the SDGs set specific targets for 2030: adequate and equitable access to resources, services (targets 3.7 and 11.1), and facilities such as transport systems (target 11.2) and green and public spaces (target 11.7) must be ensured universally (United Nations General Assembly, 2015). According to recent UN statistics, only half of the world's urban population have convenient access to public transport, and the average global share of urban areas allocated to streets and open public spaces is 16 per cent—far from the 30 per cent target (UN, 2021). Such generic metrics give some insight, but more specificity is required when assessing the achievement of the defined targets.

The concept of spatial accessibility draws heavily on those of proximity and walkability described above, and its objective measurement is conditional to the factors discussed in the previous sections. The way we measure spatial accessibility matters and can strongly influence how we evaluate the success of access-promoting designs and policies. Figure 2 illustrates this with an example around access to greenspaces.

An aspect which is consistently neglected when designing for equitable accessibility is the likelihood that individuals from different population groups use similar services and facilities concurrently. This aspect corresponds to co-accessibility to opportunities, resources, and destinations (Milias & Psyllidis, 2022). Widely used accessibility indicators and metrics often do not distinguish between facilities that are accessed by large yet homogeneous, population groups and those that are frequented by more diverse populations. This calls for new approaches that extend the conventional conceptualization and operationalization of accessibility. Recent evidence on this subject suggests that the chance of encounters between population groups is influenced by the location and spatial distribution of services and facilities and the time required to reach them, as shown in Figure 3. Designing communities that facilitate interactions between population groups can have several societal and mental

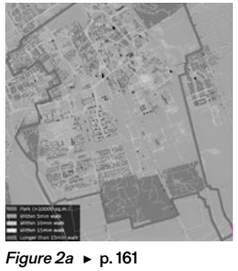
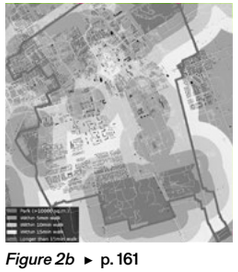


Figure 2a ▸ p. 161



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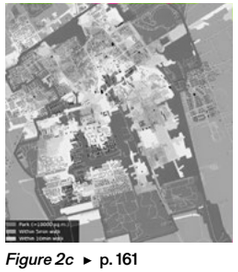

Figure 2c ▸ p. 161

"What is needed is an enhanced understanding of the linkages between the various environmental determinants of urban health and well-being."

health benefits, and new operationalizations of co-accessibility can open new avenues for how we understand and evaluate spatial segregation.

PROSPECTS FOR HEALTHY CITY FUTURES

What makes a city healthy and sustainable? Emerging voices from the planning, design, and public health domains and related global organizations increasingly acknowledge the vital role of environmental determinants in people's health and well-being. Healthy and sustainable neighbourhoods, cities, and human settlements provide equitable access to a wide range of resources, opportunities, and experiences through walkable street environments that host a variety of amenities and accommodate quality green and public spaces within short distances. However, successful delivery of the potential health and well-being benefits to all citizens in urban areas across the world requires new approaches to conceptualizing, measuring, and designing the core attributes of urban environments. This chapter contested widely used indicators and metrics of proximity, walkability, and accessibility and provided recommendations on how to make them more inclusive by accommodating the needs and behaviours of diverse population groups. We should also bear in mind that cities are complex interlinked systems, and as such they demand place-based systemic approaches to design and planning. What is needed is an enhanced understanding of the linkages between the various environmental determinants of urban health and well-being. To achieve this, universal access to high-quality and reliable data is key. New methods, especially from the fields of geographic information science and urban analytics should also be employed to allow operationalization and analysis at scale. Putting people, health, and well-being at the heart of design and planning and acknowledging their complex interlinkages can help shape healthier, liveable, and more resilient human settlements and communities.

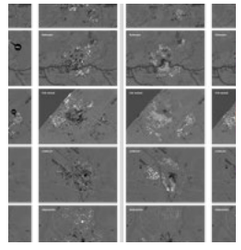

Figure 3 ▸ p. 162

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a
Inverse sidewalk width

b
Street integration

c
Activity exposure

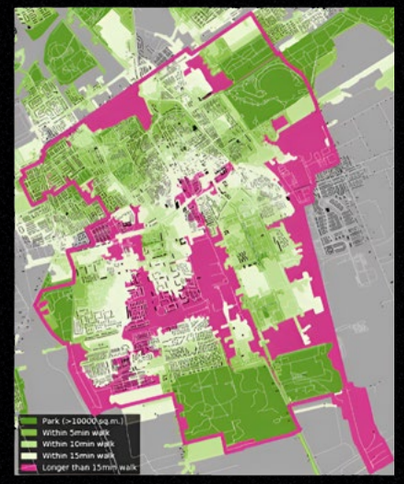
d
Pedestrian flows for weekdays

low
medium
high

Figures 1a b c d
Factors pertaining to urban form and human activity along streets in Amsterdam, the Netherlands that have a variable impact on potential transmission of the novel coronavirus (graphics by Psyllidis et al., 2021).

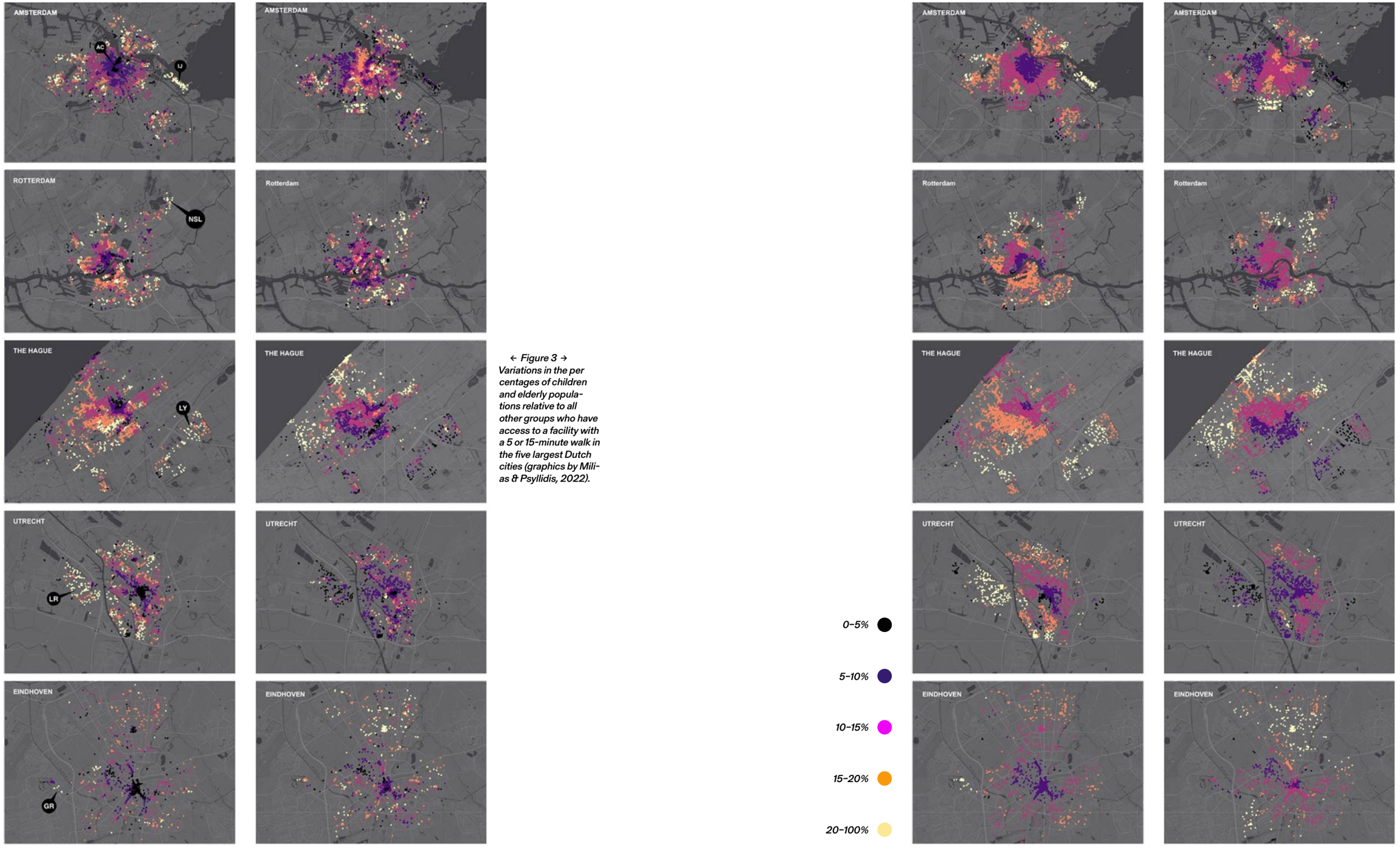
a

b



c

Figures 2a b c
Evaluating access to urban parks in Delft, the Netherlands, using different measurement approaches. (A) distribution of parks, (B) measuring access using Euclidean buffers, and (C) measuring access using network buffers. With Euclidean buffers (middle), only 0.1 per cent of inhabitants are estimated to lack access to a park within a 15-minute walk. In contrast, network buffers (right) estimate that 14.3 per cent of inhabitants lack access to a park (graphics by the author, visualization by Roos Teeuwen).



← Figure 3 →
Variations in the per centages of children and elderly popula- tions relative to all other groups who have access to a facility with a 5 or 15-minute walk in the five largest Dutch cities (graphics by Mili- as & Psyllidis, 2022).