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Capturing the Socio-Spatiality of Walking: A Historical Coding of Stockholm's Street Life

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Abstract

Walking develops in a dynamic relationship to its socio-material environment. A historical perspective helps nuance the multiplicity of interrelating factors that influence the practice. This article focuses on walking in Stockholm between 1880 and 1939, a period of great change to the city's streets and movement within them. Through a detailed coding of 466 photographs, depicting more than 3,000 pedestrians, we examine micro-scalar elements, such as the use, material, and demographic of the pavement, to allow us to plot developments in the socio-spatial character of walking over time. The results reveal stable patterns as well as both gradual and rapid change. The intensity of pedestrians remained over time as did the sociality of streets. With increasing automobility, however, pedestrians were increasingly found on pavements rather than roadways. A slightly skewed gender balance also remained across the studied period, though men's and women's more specific street use varied substantially. Meanwhile, the presence of children in streets and their independent mobility declined radically. Some of these patterns also varied across different types of streets. These findings are discussed in relation to urban automobility, wider societal trends, and their relevance to walkability studies and present-day efforts to increase walking.

Keywords

street life; urban history; walkability; walking practices

1. Introduction

Mobility practices are always changing. This article offers a historical analysis of walking in Stockholm from the late 19th century until World War II through a detailed study of street photographs. By employing a quantitative, statistical method to analyse photos, we trace qualitative change and variation in pedestrian

street use and relate it to overall mobility patterns, transformations in the built environment, and broader societal change. We posit that a historical perspective on walking helps nuance the multiplicity of interrelating factors that influence the practice.

Walkability—the theme of this thematic issue—typically refers to the built environment's capacity to enable walking. Whether through street connectivity and land-use mix, or the micro-scale level of street design, walkability studies suggest a one-way causality where spatial and material conditions shape walking (de Vos et al., 2023). There is much more to pedestrian space than walking, however, as people linger, socialise, demonstrate, play, care, and consume within it. Recent scholarship has extended perspectives to also consider "walkability as a capacity that may or may not be actualised" (Masoumzadeh et al., 2023, p. 355). Scholars have highlighted the importance of incorporating qualitative attributes of the pedestrian environment, including whether it is safe, interesting, or conducive to social, non-walking activities (Girling et al., 2019; Mehta, 2013). Walkability studies have also come into question for "operating on an aggregate level" (Shields et al., 2023), neglecting the heterogeneity of pedestrians. When perceptions are also factored in, walkability varies by socio-demographic characteristics such as age, gender, and ethnicity (de Vos et al., 2023). Reflecting sentiments in the "mobilities turn" within the social sciences (Sheller & Urry, 2006), Shields et al. (2023, p. 36) emphasise walking as a "richly social" and relational activity, suggesting that walkability studies should therefore seek to capture "not only transportation and mobility capacities, but also the social qualities of these environments as social spaces."

Taking stock of such extended views on walkability, our contribution seeks to further understandings of walking as a variegated social practice that develops under the influence of the urban environment as well as socially constructed ideas about who belongs in the street and its appropriate use. We posit that a historical understanding affords greater sensitivity to the role of wider social processes in shaping mobility practices and broader street use. Although historians are restricted in their reliance on available records, access to long-term change in both the urban environment (e.g., streets) and its use (e.g., walking practices) affords a greater understanding of the continuous interactions between the two. In this article, we seek to evidence the changes in walking practices that purportedly resulted from their dynamic relationship with their socio-material environments.

Previous research into the history of walking indicates that in the 20th century, pedestrians in increasingly car-centric cities were marginalised through traffic regulations, police enforcement, urban planning, and evolving social norms regarding street use. These shifts were primarily driven by efforts from various stakeholders to regulate the coexistence of pedestrians and cars in city streets. Scholarship also testifies to pedestrian subversion and opposition to expected "appropriate" behaviours around, for example, pavement use, respect to yielding patterns, and deference to designated crosswalks (for a review, see Emanuel & Normark, 2023). Meanwhile, the detrimental effect of urban automobility on the sociality of streets is often taken for granted. Many have argued that streets were deprived of their multifunctional character and social role as spaces for play, commerce, protest, and meaningful interaction as they increasingly transformed into traffic arteries (Habermas, 1989). As Richard Sennett puts it, under the influence of modernist planning, public space became a "derivative of movement" (Sennett, 2017, pp. 15–17). However, while cities undoubtedly transformed in response to urban automobility, research has also stressed that changes to street sociality were already well underway and that the motor car only accelerated the departure of many non-traffic activities from city streets (Brown-May, 1996, pp. 49–50; Ladd, 2020; Lofland, 1998, pp. 17–18).

Focusing more specifically on women and children, other historians have sought to understand their access to, and agency within, urban public space and the often morally charged debates concerning their presence there. The industrialisation of Western cities in the 19th century led to a great influx of working-class people. As cramped living conditions pushed them out of their homes, streets turned into places where people of all sorts gathered and intermingled, which, in the eyes of the new urban middle-class elites, posed a threat to social order (Dennis, 2008). Despite reformers' ambitions to remove them through regulation and moral consternation, working-class women and children in the 19th century often used streets to socialise, perform daily chores, work, and play (de Coninck-Smith, 1990; Stansell, 1982). Middle-class women's participation in public life was also circumscribed by bourgeois discomfort at their alleged vulnerability, yet scholars have highlighted how they were able to, within limits, renegotiate and extend their boundaries (Domosh, 1998; Ryan, 1990). In the new century, as women enjoyed increasing employment opportunities and engaged in new shopping and leisure practices, they also appropriated public spaces in new (though still gendered and culturally constrained) ways (Hickey, 2023; Sewell, 2011). Meanwhile, concerns around traffic and perceived threats to children from street crime and violence led reformers, and later city authorities, to spatially segregate them, building playgrounds to lure them off the streets, though seemingly with limited success (Hart, 2002; Karsten, 2002). Children preferred less "programmed" spaces for play and, as they grew older (as diaries and oral history testimonies have shown), increased their radius for playing, courting, and working (Laakkonen, 2011; Sleight, 2016).

This knowledge is primarily derived from text-based sources: archive documents, published reports, newspaper articles, and diaries, which, while effective in capturing actor sentiments and articulated tensions, struggle to capture the mundanity and extent of walking. While we know that pedestrian resistance to dominant ideas about appropriate and legitimate street use existed (Emanuel, 2021a, 2021b; Norton, 2021), we do not know to what degree. Similarly, while we know that women's and children's presence in the streets was a contentious issue, we lack a thorough understanding of how this presence changed in reality, as well as whether streets became more or less sociable. Here, we argue, photographs can help qualify, support, or challenge findings from text- and memory-based historical research.

Although historians tend to prioritise written documents over photographs as sources, they have nonetheless made use of the medium. Photographs help grasp the lives and circumstances of "ordinary people," track groups that have otherwise left little trace in traditional sources such as women and children, and access details of practices that are often so taken for granted as to not warrant mention in contemporary text-based sources (Burke, 2019; Jordanova, 2012). Correspondingly, we are not primarily interested in the deeper cultural meanings or messages of the images we study, but rather in how they can help understand walking in its social context and material environment.

Inspired by recent academic readings of large series of street photographs, we seek to uncover walking practices in Stockholm within the context of a changing urban environment. Through the coding of photographs of two European downtown streets, Cochoy et al. (2015) provide a comparative analysis of long-term (1875–2011) change in what they call "pedestrian logistics," that is, what pedestrians carried and how. They also consider pedestrians' increasing tendency to use crosswalks and pavements. Gruber et al. (2018) focus on the streets around the Vienna State Opera in the period 1860–1949 and employ a broad coding scheme, tracing changes in street space and street life beyond mobility. Their extensive quantitative dataset allows them to track specific patterns across time, though their socio-spatial analysis primarily draws

from qualitative interpretations of photos, rather than a cross-referencing of quantitative trends. Both studies share a focus on centrally located and rather atypical city streets. While it allows them to address place-specific interactions between street use and design, it forgoes city-wide analysis. Männistö-Funk (2021), on the other hand, explores a much broader territory, studying gendered walking practices in Turku, Finland. In her reading of 3,500 photographs between 1890 and 1989, she focuses on the spatial gender distribution across the city's grid plan area, finding that men were centrally concentrated, while women were more evenly distributed across the city. She also touches on gendered differences and the associated trends in carrying items, accompanying children, and walking alone or in groups. Collectively, these studies point to the free use of the street by pedestrians in the early 20th century, as well as their subsequent displacement under the influence of urban automobility.

Our contribution to these studies is two-fold. Firstly, we employ a wider coding scheme for recording pedestrian practices and characteristics that incorporates and builds upon those of the previous studies. This allows us, through cross-analysis, to chronologically outline changes in walking as a socio-spatially variegated practice (that is to say, who walks where and with whom) at a more detailed level than in previous studies. Secondly, in making our codebook and dataset available (see Supplementary Material), we open for future comparisons with other cities.

2. Methodology

This article employs a close "reading" (coding) of street photographs to study changes to walking as a socio-spatial practice in Stockholm between 1880 and 1939. With a scope incorporating what is today referred to as the inner city (corresponding roughly to the grid-patterned neighbourhoods) our search yielded 466 photos containing a total of 3,008 pedestrians. As the photographs were distributed across three periods with different levels of car traffic (P1: 1880–1905, practically none; P2: 1906–1920, very low levels; and P3: 1921–1939, early expansion; see Figures 1–3 for two examples from each), the cross-period analysis allows for an assessment of the impact of early urban automobility on walking. Including the post-war period may also have contributed, but for this article, we prioritised a wider scope of coding rather than a longer period. With additional layers of coding (further explained below), we are able to reveal patterns related to age, gender, sociability, and spatial characteristics.

Photographs have both strengths and challenges as historical sources. As well as their intended subject, they also capture incidental information, making them a rich source for studying both objects and activities (Gruber et al., 2018, p. 296). When analysed systematically, as here, they allow the historian to move beyond the possible—that is to say, historically noteworthy phenomena more likely to be documented—to grasp the typical (van den Heuvel et al., 2020). At the same time, chronologically tracking the smaller details of mundane practices (such as walking) allows us to question the stability and universality of their character (Cochoy et al., 2015, pp. 2268–2269).

Regarding the challenges associated with photographic source material, Cochoy et al. (2015, p. 2272) offer four core criticisms to be aware of: the subjectivity of the photographer; the capture of content but not meaning; the flexibility of interpretation; and the time-specific conventions of photographic practice. With respect to photographic conventions, Gruber et al. (2018, p. 296) stress how "the zeitgeist…might determine what is worthy of depiction," offering two further criticisms of which to be aware: the intentions of the

photograph's commissioner and the awareness of the subject(s) being depicted. We mitigate the last point by excluding photos that were obviously staged (e.g., subjects are lined up) or include subjects overtly gazing into the camera. With regards to the more salient problematisations, and in line with Cochoy et al. (2015, p. 2272), we stand by the assumption that the "aggregation and comparison of a larger collection of photographs" helps to "escape the framing of a single image," freeing us somewhat from photographer and commissioner influence. With regards to the challenges related to meaning and interpretation, these are largely irrelevant in our case, as we code only for the presence (and location, movement, gender, and age) of people and objects, without attempting to read deeper cultural meaning from the photographs.

Our use of street photography as source material is, however, not free from limitations. Notably, as technological developments allowed for camera operation in darker conditions, photos from the later periods could be taken with less preparation and during daytime/seasons of lower light. The challenge of shifting conventions within photographic practice is also not overcome by the large dataset. Furthermore, much of the collection, particularly during P1 and P2, is drawn from only a few photographers, each with their own style and preference. Kasper Salin, for example, is responsible for 153 of our 466 images. As well as being an amateur photographer, Salin was Stockholm's city architect whose desire to capture soon-to-be demolished buildings, particularly in the less-developed district of Södermalm, stemmed from his critical take on the city's development (Forsmark, 2012, pp. 38–39). This reliance on Salin in the early periods represents a thematic, political, and social bias which, due to the limited number of alternative photographs, we can but acknowledge.

The source material stems largely from three main collections. The Stockholm City Museum's digital archive (https://digitalastadsmuseet.stockholm.se), which since 1932 has gathered photos from both public and private collections (Forsmark, 2012), formed the foundation of our search. Keywords ("streets," "street life," "street environment") were used to identify relevant photos. As this search yielded less data for P1, we bolstered our dataset using a photo book (Josephson et al., 1930) and postcards of street life from a published collection (Rosell & Dyhlén, 2009). Most of the online source material detailed location and time, though often with a fairly broad estimate regarding the latter. Estimates often straddled two of our periods, thereby demanding subjective categorisation. As well as using information external to the image (knowing Salin's preference for shooting older, soon-to-be-demolished buildings, for example), the period in which the date range most lay was typically chosen.

Beyond basic data about the period, photographer, source, and location, each photograph was coded for street characteristics (roadway and pavement material, type of street, and district location), traffic, and the social and spatial characteristics of each pedestrian. Regarding social data, we coded for age and gender as well as company incidence and composition. Age (adult or child) was determined subjectively, which in rare instances demanded a somewhat arbitrary classification (see Figure 1b for an example of a pedestrian recorded as "man" when "boy" may also have fitted). Gender was recorded based on our perception of historically rigid appearance and attire binaries, which rarely resulted in ambiguity. Similarly clear was company incidence, which was noted if pedestrians were in an obvious group or walked side-by-side (see the children in Figure 2a or the two men in the distance in Figure 2b). Company composition (whether uniform or diverse in terms of age/gender) was judged by the aforementioned subjective gender and age interpretations. We feel that the subjectivity and researcher bias in social coding is, as mentioned above, mitigated by the large sample size.

With respect to spatial characteristics, pedestrian movement and position on the roadway or pavement was recorded, which we could then plot against social data for each pedestrian. This allowed us, for example, to identify the degree to which pedestrians used pavements for walking, how this developed over time, and to what extent the pattern differed across gender and age, as well as street type (main or minor). Our coding selection allowed for the spatial-temporal comparisons we set out to explore, which, with acknowledgement to the inherent limitations of both our method and the photographic medium as source material, we discuss in the following sections.

Figure 1. Period 1: (a) Junction of Norrtullsgatan and Odengatan (one "main street" and one "minor street"); the corner house was torn down in 1902; two men ("homo-social") have stopped in the macadam roadway for a conversation, despite oncoming horse-drawn traffic, while two women ("homo-social") cross the street; a male pedestrian walks down the right-hand cobble-stoned pavement; (b) Drottninggatan ("main street"); all pedestrians stick to the pavement, despite traffic absence. Sources: (a) Salin [ca. 1900–1902]; (b) Salin [ca. 1885–1907].

Figure 2. Period 2: (a) Junction of Sankt Paulsgatan and Timmermansgatan ("minor streets"), 1912; children play together in the roadway as a female cyclist passes; other pedestrian types inhabit the streetscape beyond, among them a still-standing man and a ("hetero-social") moving couple on the sett-stoned left-hand pavement; (b) Birger Jarlsgatan ("main street"), Norrmalm, 1907; the majority of pedestrians stick to the pavement in spite of no traffic. Sources: (a) Heimer (1912); (b) Heimer (1907).

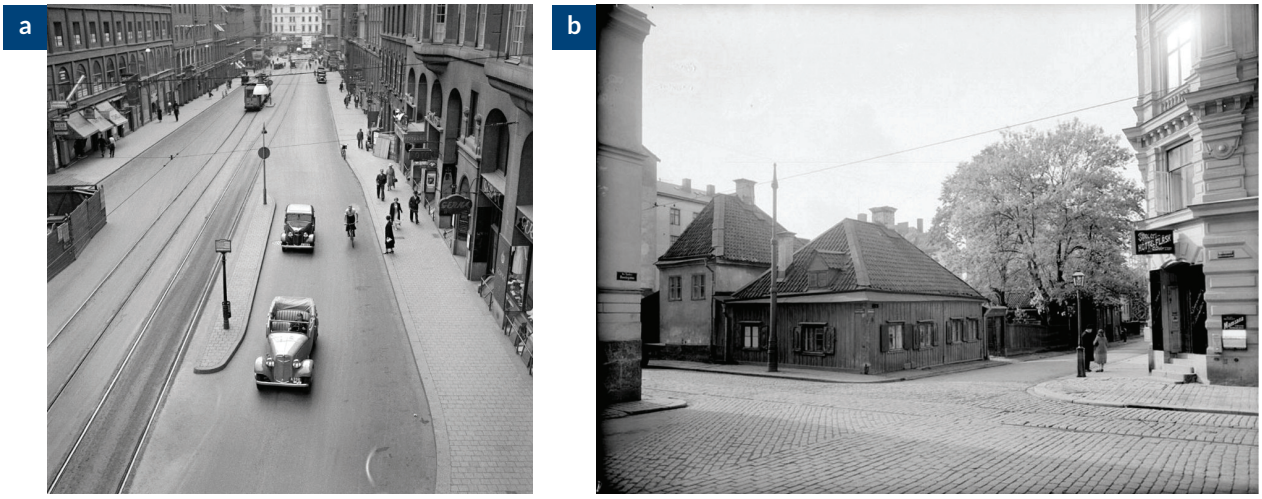

Figure 3. Period 3: (a) Kungsgatan ("main street"), 1938/39; all pedestrians are adults, moving, largely unaccompanied and using the left-hand pavement; some women carry handbags; no pedestrians use the edge of the concrete pavement, besides the woman awaiting cycle and vehicle traffic to pass before crossing the asphalted roadway; (b) corner of Bondegatan and Renstiernas Gata ("minor streets"), 1929; the wooden house was demolished the same year; two women stand opposite, occupying an otherwise empty street. Sources: (a) Lange [ca. 1938–1939]; (b) "Hörnet av Bondegatan" (1929).

3. Walking as a Traffic Mode

The turn of the 20th century marked Stockholm's transformation into the industrial centre of Sweden, its population tripling to 300,000 as it evolved from a trading and shipping town just 50 years earlier. The urban elite sought to capitalise on this growth by modernising the city with new infrastructure systems, a Haussmann-inspired street layout, and a streetscape featuring gutters, levelled surfaces, and smoother pavements and roadways (for more details and full references, see Emanuel, 2023). In the first half of the 20th century, Stockholm outgrew today's grid-patterned inner city, with tramways servicing suburbs that allowed families to leave the centre for a life in the outskirts (Hall, 2009). As a result, although the entire city's population in 1940 (590,000) was almost twice that at the turn of the century, more than 20% (ca. 130,000) now lived outside the inner city. Although the first automobiles appeared in Stockholm's streets as an elite means of pleasure mobility early in the century, the 1920s was the first period of real expansion, with motorised traffic outgrowing horse-drawn, a worrisome growth in traffic accidents, and the introduction of various forms of traffic control, including pedestrian crossings (Dufwa, 1985, pp. 76–108).

Previous research into the history of walking points to the paradoxical combination of the marginalisation, yet omnipresence of pedestrians in 20th-century cities (Pooley et al., 2021). While they may have remained dominant in number, pedestrians had to adjust to higher traffic intensity and increasingly car-oriented street design (Hornsey, 2010; Rooney, 2018). The question remains, however: When and to what degree did pedestrians adapt to these changes?

Table 1 shows the mean number of the different kinds of human-operated "mobile units" per photograph, as well as the percentage share of all types (i.e., the "modal split") for the respective periods. While pedestrians easily outnumbered all other mobile units, their share of traffic gradually declined, falling from 84% in P1 to 74% in P3. Motorised traffic, negligible in P2, grew significantly, making up 16% of all traffic in P3, with the

first half of the 20th century seeing a partial transition from human and animal propulsion to fossil fuel. The presence of trams and cyclists also grew slightly in P3, likely a result of suburbanisation, which also prompted the use of bicycles as a cheap means to commute (Emanuel, 2012). Relatively speaking, motorised vehicles increased, and pedestrians decreased, particularly after the First World War. However, when considering the number of pedestrians *per photo* in each period, which can be said to correspond to the intensity of pedestrian traffic, we find a slight increase from around 6 per photo (or "per street") in P1 and P2 to 7.6 in P3. These findings reflect those of previous research. Pedestrians remained "the biggest modal group" on Turku's streets (Männistö-Funk, 2021, p. 234), while in central Gothenburg (Cochoy et al., 2015), despite the increasing number of cars in the interwar period, they amounted to less than 15% of the number of pedestrians (compared to 22% for Stockholm in P3).

Table 1. Modal distribution across the three periods.

	Pedestrians	Horse-drawn vehicles	Cyclists	Motor vehicles	Trams	Carts	Total
P1	5.84 82.7%	0.52 7.4%	0.07 1.0%	0.01 0.2%	0.09 1.3%	0.52 7.4%	7.16
P2	6.04 80.9%	0.52 6.9%	0.13 1.7%	0.05 0.7%	0.09 1.3%	0.64 8.6%	7.47
P3	7.57 73.7%	0.10 1.0%	0.47 4.6%	1.64 16.0%	0.22 2.1%	0.27 2.6%	10.27

Notes: Mean per photo appearances of different mobile units in respective period, and their percentage distribution (the modal split); only moving vehicles were counted (not parked cars/bicycles).

While pedestrians did not decline in number (on the contrary, their presence increased in line with Stockholm's growing population), their whereabouts in the street changed considerably. As Stockholm began establishing pavements in the mid-19th century, they focused initially on centrally located districts (Emanuel, 2023). However, aside from a few peripheral locations in the earliest period studied here, all consulted photographs feature pavements. Overall, pavements had smoother paving than the roadways and, at least in pre-car times, were a matter of pedestrian comfort as much as traffic safety. Cobblestone pavement had been all but abandoned by the turn of the century, the city administration instead preferring sett stones, before turning to asphalt and concrete in the 1920s. Paved roadways followed a similar (though later) trajectory, with the development of gradually smoother surfaces (Dufwa, 1985, pp. 50–51). Our findings are in line here, with one-third of roadways remaining unpaved in the earlier periods, falling to just 3% in P3.

Noticeable in Table 2 is the relatively constant degree of roadway presence among pedestrians in P1 and P2 (36% and 39%, respectively), but a sudden decline to 15% in P3. That is, pedestrian use of pavements increased dramatically to 85% in the interwar period. This mirrors anecdotal evidence regarding pedestrian freedom around the turn of the century in using the entirety of the street (Faire & McHugh, 2014, p. 23; Joyce, 2003, pp. 215–216), although a majority nonetheless chose the pavement for reasons of comfort rather than to stay safe from traffic (see Figure 1b). Pedestrians' shift to pavements in P3 was, we argue, due to the increase in motorised traffic and related danger in the roadway rather than the improving smoothness of pavement surfaces. Between 1914 and 1927, the number of reported accidents in Stockholm rose from 600 to 2,100, with pedestrians accounting for two-thirds of traffic fatalities and nearly 60% of those injured (Dufwa, 1985, pp. 98–100). A decline in accidents during the 1930s was likely due more to the stabilisation in the growth rate of motor vehicle use during the Depression than to effective traffic education, although such had been

initiated on a smaller scale in the 1920s and made mandatory in 1936 (Emanuel, 2021b; Swedish Government, 1948, pp. 249–250, 357). This interpretation is supported by previous scholarship, which has argued that, as motorised traffic grew, streets became increasingly ordered, flows more separated, and pedestrian use less ambiguous. They progressively knew their place, stuck to the pavement, and learned to cross the roadway in an organised fashion (Cochoy et al., 2015; Gruber et al., 2018; see also Moran, 2006).

Table 2. Pedestrian position and movement in the street.

	Overall street use					Pavement use				
	Position		Movement			Position			Direction	
	Roadway	Pavement	Moving: Along the street	Moving: Crossing the street	Still	Middle	Towards the roadway	Towards the buildings	Left pavement	Right pavement
P1	2.10 36.0%	3.74 64.0%	3.76 64.4%	0.57 9.8%	1.50 25.8%	1.75 46.8%	1.15 30.8%	0.84 22.4%	56.9%	43.1%
P2	2.34 38.8%	3.70 61.3%	3.40 60.2%	0.76 12.6%	1.64 27.2%	1.90 51.4%	1.11 30.1%	0.69 18.5%	61.0%	39.0%
P3	1.16 15.3%	6.41 84.7%	5.01 66.3%	0.69 8.8%	1.89 24.9%	3.75 58.5%	1.35 21.1%	1.31 20.4%	55.7%	44.3%

Notes: Appearances per photo and percentage distribution of pedestrians' street use; left and right pavement (columns to the far right) in relation to the direction a pedestrian was walking.

Table 2 also reveals other less dramatic as well as less easily interpretable patterns of continuity and change in pedestrian practice. Firstly, a stable pattern of greater use of the left-hand pavement compared to the right. This might be explained by the fact that, since the late 19th century, local regulations recommended pedestrians do so to facilitate their efficient circulation (Emanuel, 2023). Meanwhile, pedestrians increasingly used the middle section of the pavement, while walking close to the roadway declined (see Figure 3a, for example). This can be interpreted in different ways. An early preference for smoother kerbstones (Emanuel, 2023) might have been offset by the entire pavement surface becoming smoother (as discussed above and also seen in our data, which suggests a steady decline in cobblestone pavements: 19% of photos in P1, 12% in P2, and none in P3). Alternatively, over time, pedestrians may have avoided the pavement section closest to increasingly fast-moving traffic. One feature that shows little variation over time, but is nonetheless interesting, is that a quarter of pedestrians were still. Whether they played on the spot, stopped to talk to friends, browsed shop windows, waited to cross the street, or observed their surroundings, while on foot, they did not walk (see Figures 1–3 for examples of stillness). Why this did not change, despite the street increasingly becoming a space of movement and circulation, is hard to say. A greater understanding of how dominant "ways of being still" varied over time may provide an answer, though our current method does not capture this. Nonetheless, the relatively high share of non-moving pedestrians emphasises that walking is not just about transportation, but a practice with social qualities. As we will see below, it also shows variations across social groups.

4. Walking as a Socially Differentiated Practice

Besides traffic, streets are social spaces, shared by people of all classes, ages, and genders, though not all groups are necessarily equally present. Table 3 reveals the age and gender distribution of pedestrians in the

Stockholm photographs. We notice a striking increase in the number of adults per photo (men and women) in P3 compared to earlier periods and an equally striking decline in the number of children. That is, the slight increase in pedestrian presence noticed above masks a more remarkable trend: Making up approximately one-fifth of all pedestrians in P1 and P2, children's share decreases to just 6% in P3. Boys' presence declined more rapidly than girls', to the degree that they were almost equally absent in P3. How can we understand this dramatic change? School was compulsory for Swedish children aged 7–14 in 1882 and Stockholm's official statistics suggest that almost all children were registered at one. Although some families likely failed to comply with government regulations, children did not swap the street for the schoolyard to any large degree during the studied period. Local demographic change takes us further. The influx of young adults seeking work in the capital, paired with an exodus of families to Stockholm's new suburbs in the 1930s, reduced the population share of children in the inner city from 25% in the late 19th century to just above 10% in 1940 (calculations based on data in *Statistical Yearbook of Stockholm*; City of Stockholm, 1905–1940). Yet, as we will see, other factors were also at play.

The gendered pattern among adult pedestrians shows more stability. Across time, women made up a share of 35–40% of adult pedestrians. Though they were fewer than men throughout the studied period, their overall number in the street also increased. These findings align with those of Männistö-Funk (2021, p. 235), where women in Turku's inner city were "almost as numerous as male pedestrians."

Table 3. Pedestrians' age and gender.

	Men	Women	Boys	Girls	Adults	Children
P1	2.97 63.0%	1.75 37.0%	0.72 65.0%	0.39 35.0%	4.72 80.9%	1.11 19.1%
P2	3.06 64.5%	1.69 35.6%	0.79 61.2%	0.50 38.8%	4.75 78.5%	1.29 21.5%
P3	4.41 61.9%	2.72 38.1%	0.24 55.4%	0.20 44.6%	7.13 94.2%	0.44 5.8%

Notes: Appearances per photo and percentage distribution of pedestrians across age and gender; the percentages represent men's and women's share out of adults (left), boys' and girls' share out of children (middle), and adults' and children's share out of all pedestrians (right).

Table 4 reveals the degree to which pedestrians populated streets either on their own or in groups. We understand this as a measure of the sociality of the streets. Throughout the studied period, an intriguingly high share (40%) of pedestrians frequented streets in the company of others: walking in pairs or groups, standing together, or sharing in play (see Figures 1–3 for examples of sociality). This alone testifies to streets as social spaces, a feature that survived at least the early stages of automobility.

There is more to say in terms of who walked with others and the characteristics of their company. Women, while less prevalent in the streetscape overall, were in company more often than men. That said, the majority of women in all periods walked alone, which aligns with Männistö-Funk's (2021, p. 231) find that in Turku, women of all social classes commonly walked unaccompanied, despite the many claims of its inappropriateness. Across time, a similar number of men and women were in hetero-social (male/female) company. Meanwhile, while men featured less in company overall, homo-social male company was twice as common when compared to women. (See Figures 1—3 for examples of "hetero-social" and "homo-social"

Table 4. The sociality of walking.

	Social state		In company				Kind of adult company and gender				Kind of company and age			
	In company	Alone	Men	Women	Boys	Girls	Men hetero-social	Men homo-social	Women hetero-social	Women homo-social	Men with child	Women with child	Boys with adult	Girls with adult
P1	2.19 37.5%	3.65 62.5%	0.84 28.1%	0.61 34.9%	0.44 60.9%	0.30 77.4%	0.16 5.3%	0.64 21.4%	0.16 9.4%	0.33 19.1%	0.04 1.5%	0.11 6.5%	0.05 7.0%	0.12 30.6%
P2	2.59 42.9%	3.45 57.1%	1.04 34.2%	0.73 43.3%	0.45 57.1%	0.36 72.5%	0.15 4.9%	0.82 27.0%	0.13 7.5%	0.45 26.9%	0.06 2.1%	0.15 9.0%	0.12 15.1%	0.15 30.0%
P3	2.86 37.9%	4.70 62.1%	1.42 32.2%	1.08 39.8%	0.20 83.3%	0.16 82.8%	0.36 8.3%	0.97 21.9%	0.32 11.9%	0.57 21.1%	0.09 2.0%	0.18 6.7%	0.09 38.9%	0.11 55.2%

Note: Appearances per photo and percentage distribution of pedestrians in company or alone; how often each age/gender category was in company; how often (adult) pedestrians were in company with someone of their own or the opposite gender; and how often adults accompanied children and children were accompanied by adults (% of respective age and gender group).

companies.) Women also accompanied children to a much higher degree than men: While 6–9% of all women accompanied a child, only around 2% of all men did.

Turning to children's sociality, they were much more often in company than adults and particularly so in P3. Girls were most often in company (73–83% across the periods) and more frequently than boys in P1 and P2, but not in P3. The two far-right columns of Table 4 also reveal two striking patterns: Children were increasingly accompanied by parents (or other adults), and girls much more so than boys. This reflects previous research that suggests girls, especially from the middle classes, were more constrained in their mobility than boys. That is to say, they were more often accompanied and their excursions from the home shorter, though their freedom in these respects increased after the turn of the century (Sleight, 2016, pp. 107–111). That said, the percentage difference declined in P3, when 40% of boys and 60% of girls were accompanied by an adult. It is important to remember that the shares need to be understood in the context of children being less frequently present on streets altogether. For example, the share of girls of all pedestrians is consistently the least of all groups, falling to 2.6% in P3.

From this data, we can conclude that while women often visited streets in their husband's or other men's company, men were much more often with male acquaintances. The data also suggests that children's (particularly girls') independent use of streets declined as they became increasingly escorted by their parents or other adults and that boys tended to frequent streets more often in groups.

As seen in Table 5, roadway use declined significantly in P3 for all age and gender categories, particularly among children. Significantly, around half of all boys used the roadway in P1 and P2 (far more than girls as well as adults), but in P3 were mostly found on pavements. Women used pavements slightly more than men in P1 and P2, which might reflect greater concern about appearing respectable in public. However, this

gendered difference levelled out in P3. Interestingly, pedestrians in P1 who attended streets in groups were more often in the roadway when compared with the average pedestrian, while in P3, the situation reversed: Groups were more often found on pavements compared to the overall pattern among pedestrians. These findings suggest that the increase in traffic forced sociality from roadways onto pavements by shaping new norms about appropriate pedestrian behaviour (as exemplified in Figure 3a, pedestrians often socialised on pavements despite no traffic in sight).

Table 5. Position in relation to age, gender, and sociality.

	Men		Women		Boys		Girls		In company		Alone	
	Roadway	Pavement	Roadway	Pavement	Roadway	Pavement	Roadway	Pavement	Roadway	Pavement	Roadway	Pavement
P1	1.08	1.89	0.54	1.21	0.36	0.36	0.11	0.28	0.88	1.31	1.22	2.43
	36.4%	63.6%	30.9%	69.1%	50.4%	49.6%	29.0%	71.0%	40.2%	59.8%	33.4%	66.6%
P2	1.18	1.88	0.50	1.18	0.44	0.35	0.22	0.28	1.03	1.57	1.31	2.13
	38.5%	61.5%	29.9%	70.1%	55.6%	44.4%	43.8%	56.3%	39.6%	60.4%	38.1%	61.9%
P3	0.68	3.73	0.43	2.29	0.04	0.20	0.01	0.19	0.33	2.53	0.82	3.88
	15.5%	84.5%	15.7%	84.3%	16.7%	83.3%	3.4%	96.6%	11.6%	88.4%	17.5%	82.5%

Note: Appearances per photo and percentage distribution of pedestrians' position in the streetscape across age and gender, and whether they are in groups or alone.

As we saw in Table 2, roughly 75% of all pedestrians across all periods were walking, while 25% were sedentary. Yet, as seen in Table 6, there were large variations within this across gender, age, and sociality. Unsurprisingly, social pedestrians show a much greater tendency to be still than those using the streets alone. Intriguingly, roughly half of all children were still (more so for boys than girls); roughly twice as high a percentage when compared with adults. While we did not code for specific activities of still pedestrians, we nonetheless assert that children who were still either just "hung out" or engaged in street play on pavements or roadways (see Figure 2a).

Table 6. Movement in relation to age, gender, and sociality.

	Men		Women		Boys		Girls		In company		Alone	
	Moving	Still	Moving	Still	Moving	Still	Moving	Still	Moving	Still	Moving	Still
P1	2.18	0.79	1.63	0.12	0.31	0.42	0.21	0.18	1.43	0.75	2.90	0.75
	73.4%	26.6%	93.2%	6.8%	42.6%	57.4%	54.8%	45.2%	65.5%	34.5%	79.5%	20.5%
P2	2.24	0.82	1.43	0.26	0.41	0.38	0.32	0.18	1.70	0.89	2.70	0.75
	73.3%	26.8%	84.7%	15.3%	51.6%	48.4%	63.8%	36.3%	65.5%	34.5%	78.3%	21.7%
P3	3.30	1.11	2.17	0.55	0.14	0.11	0.08	0.11	1.99	0.87	3.69	1.01
	74.7%	25.3%	79.9%	20.2%	55.6%	44.4%	41.4%	58.6%	69.6%	30.4%	78.5%	21.6%

Note: Appearances per photo and percentage distributions of pedestrians' movement in the streetscape across age and gender, and whether they are in groups or alone.

Strikingly, across periods, men moved considerably less than women, although women also became increasingly sedentary. It seems as if women's use of city streets in the early 20th century was busier and more utility-oriented than men's. This interpretation is strengthened by the data on pedestrians' carried

items (see Supplementary Material), which shows that women, although fewer in number than men, carried a comparable number of items. Thus, the proportion of women carrying items was significantly higher: around 25% of women compared with 16% of men in P1; and 20% compared with 10% in P3. Considering dominant gender roles and women's overall responsibility for social reproduction (managing the home and children as well as putting food on the table), it is unsurprising that they moved through the streets with greater urgency and were more frequently burdened with belongings. Their increasing stillness over time is not as easily interpreted, though might be explained by an increasing purchasing power that allowed them to engage in the emerging consumer culture (Husz, 2004). Stockholm saw a dramatic levelling out of income inequalities after 1920. By 1920, more than 50% of women over 15 years old in Stockholm were employed out of the home; not least young women who had moved to the capital for work (Bergman & Kock, 1938, pp. 471–475). As more women joined the labour market, and as working women increasingly shifted from domestic to clerical work after 1920, their income levels began to catch up with that of men (Bengtsson & Molinder, 2024). While this did not increase their comparative presence in city streets, it might have brought changes to how women (and men) used streets as well as when and where.

5. Walking as a Spatially Differentiated Practice

Streets were social spaces, and many features of street use (presence, whereabouts, movement patterns) were differentiated across age, gender, and sociality. Walking and street use also varied across different types of streets and districts (though the latter is not included in our analysis here). Of the 159 photographs in P1, 159 in P2, and 148 in P3, 40, 41, and 59 respectively were taken in streets that we categorise as "main streets": 14 larger streets, cutting across city districts, which still today structure the cityscape of inner-city Stockholm. All other streets were classified as "minor streets" (see Figures 1–3 for examples of main and minor streets). Table 7 reveals that the pedestrian share of all traffic was slightly higher on minor than main streets, while motor vehicles show the reverse pattern. The number of pedestrians per photo was 50% higher on main compared to minor streets in P1 and P2 and 80% higher in P3—which broadly mirrors the overall traffic distribution over main and minor streets. Whether it was due to appeal or necessity, pedestrian use of main streets remained.

Table 7. Modal split in main and minor streets.

	Pedestrians		Horses		Cyclists		Motor vehicles		Trams		Carts		Total	
	Main	Minor	Main	Minor	Main	Minor	Main	Minor	Main	Minor	Main	Minor	Main	Minor
P1	7.98	5.12	0.88	0.40	0.10	0.06	0.03	0.01	0.18	0.07	0.93	0.39	10.1	6.1
	79.2%	84.7%	8.7%	6.7%	1.0%	1.0%	0.2%	0.1%	1.7%	1.1%	9.2%	6.4%		
P2	7.93	5.38	0.68	0.46	0.27	0.08	0.12	0.03	0.10	0.09	0.90	0.55	10.0	6.6
	79.3%	81.7%	6.8%	6.9%	2.7%	1.2%	1.2%	0.4%	1.0%	1.4%	9.0%	8.4%		
P3	10.29	5.76	0.14	0.08	0.63	0.37	2.34	1.18	0.36	0.12	0.41	0.18	14.1	7.7
	72.7%	74.9%	1.0%	1.0%	4.4%	4.8%	16.5%	15.3%	2.5%	1.6%	2.9%	2.3%		

Note: Appearance per photo and modal split on main and minor streets in Stockholm.

Table 8 shows pedestrian position, movement, and sociality in the streetscape, but now offers comparison between different "kinds of" streets. While the data on position reveal little of interest, pedestrians were more mobile but less commonly in company with others in main compared to minor streets throughout the studied period. Even if pedestrians did not apparently shy away from main streets, stationary sociability was

more likely in minor streets with less traffic (see Figures 1a and 3b). Meanwhile, main streets arguably served more as pedestrian corridors for the circulation of unaccompanied, predominantly male, individuals.

Table 8. Street behaviour in main and minor streets.

	Position				Movement				Sociality			
	Main		Minor		Main		Minor		Main		Minor	
	Roadway	Pavement	Roadway	Pavement	Moving	Still	Moving	Still	Company	Alone	Company	Alone
P1	2.85 35.8%	5.13 64.2%	1.85 36.0%	3.27 64.0%	6.15 77.1%	1.83 22.9%	3.72 72.9%	1.39 27.2%	2.78 34.8%	5.20 65.2%	1.99 38.9%	3.13 61.1%
P2	3.00 38.9%	4.68 61.1%	2.11 38.7%	3.36 61.3%	5.90 76.8%	1.78 23.2%	3.87 70.9%	1.59 29.1%	2.80 36.4%	4.88 63.6%	2.52 46.1%	2.95 53.9%
P3	1.34 13.6%	8.44 86.4%	1.03 16.9%	5.07 83.1%	7.49 76.7%	2.29 23.3%	4.48 73.6%	1.62 26.4%	3.34 34.1%	6.44 65.9%	2.55 41.7%	3.55 58.3%

Note: Appearances per photo and percentage distributions of pedestrians' position, movement, and sociality in the streetscape in main and minor streets.

The gender distribution among adult pedestrians shows little difference between main and minor streets (Table 9). However, children were considerably more present in minor than main streets. Meanwhile, while there is a stable gendered pattern of children's presence in minor streets (60% boys, 40% girls), there is a rather spectacular levelling out of their differing presence in main streets: from 85% boys and 15% girls in P1, to an equal gender distribution in P3. This levelling out is due to the significant increase in girls' presence (particularly when compared to the presence of boys) in main streets between P1 and P2, followed by an even more significant decrease in the presence of boys (again, particularly when compared to girls'). Firstly, this aligns with the aforementioned suggestion in previous research of an increase in girls' freedom of movement (P1 to P2). Secondly—and cross-reading with findings from the previous section—boys, who in general had a high presence in main streets and roadways in earlier periods, show a particularly strong trend in moving to pavements and side streets. Their whereabouts appears to have been particularly impacted by traffic, which we understand as resulting from their greater engagement in street play.

Table 9. Age and gender in main and minor streets.

	Main		Minor		Main		Minor		Main		Minor	
	Men	Women	Men	Women	Boys	Girls	Boys	Girls	Adults	Children	Adults	Children
P1	4.58 64.9%	2.58 36.1%	2.44 62.3%	1.47 37.2%	0.73 85.7%	0.10 14.3%	0.72 60.0%	0.49 40.0%	7.15 89.6%	0.83 10.5%	3.91 76.4%	1.21 23.6%
P2	4.27 67.9%	2.02 32.1%	2.64 62.8%	1.57 37.2%	0.93 66.7%	0.46 33.3%	0.75 59.1%	0.52 40.9%	6.29 81.8%	1.39 18.2%	4.20 77.0%	1.26 23.0%
P3	5.90 62.5%	3.54 37.5%	3.43 61.3%	2.17 38.7%	0.17 50.0%	0.17 50.0%	0.29 58.1%	0.21 41.9%	9.44 96.4%	0.34 3.6%	5.60 91.6%	0.51 8.5%

Note: Appearances per photo and percentage distributions of pedestrians' age and gender in main and minor streets.

6. Discussion

The analysis above focussed on walking as a mode of traffic and as a socio-spatial practice. Using a large sample of street photographs, we have uncovered trends and aspects of walking and street use that are often hidden in other historical sources. It is important to note that while photographs are useful in capturing pedestrian whereabouts and street use over time, the data gathered from our coding alone offer limited explanatory power. However, details about actual walking, rather than how it was discussed and fought over, can help us to interrogate findings, claims, and narratives based on textual historical sources. As previously noted, shifting photographic conventions throughout the periods, an overreliance on certain photographers, and a gradual shift in focus to more central districts containing a greater number of livelier main streets are likely to have skewed our data somewhat. However, the observed trends and changes are often so great as to offer insight despite these factors.

Treating walking as a mode of traffic, we found that throughout the studied period, pedestrians far outnumbered all other kinds of road users. Even the early onset of urban automobility did not curb walking in city streets, though our results suggest that in many ways, it did contribute to changing dominant pedestrian behaviours. Of particular note is the drastic decline of pedestrians found in the roadway after 1920. Instead, their use of pavements increased from 60–65% in the earlier periods to 85% in the interwar period. Such radical change in behaviour is partly explained by the greater intensity and danger brought to streets by increasing car traffic and corroborates findings in previous historical research (Errázuriz, 2011). Targeted campaigns to change pedestrian behaviour also played a role, as did material change in the streetscape (Emanuel, 2021b; Norton, 2007; Rooney, 2018).

Our detailed reading of Stockholmers in the streetscape uncovered other significant details and trends that are, we argue, relevant for a wider understanding of pedestrian street use. One illuminating result is that, over time, around 25% of all pedestrians were still; they resided in city streets but did not walk. Hence, they ignored sidewalk regulations that, since the late 19th century, framed the streetscape as primarily a place for pedestrian circulation (Ehrenfeucht & Loukaitou-Sideris, 2007; Emanuel, 2023; Mackintosh, 2017, Chapter 5). Also of note is the fact that, over time, 40% of all pedestrians populated city streets in company (rather than alone). Notwithstanding dominant ideas about the value of speed, circulation, and uninterrupted flows in contemporary society (think of Le Corbusier's axiom "death of the street," as well as later interpretations about streets becoming monofunctional traffic arteries devoid of social life), our data suggest that a significant minority of pedestrians rejected this transformation and continued to inhabit streets as social creatures, lingering in the flow despite having less space at their disposal for doing so as they were increasingly relegated to the pavements. Hence, our study suggests that some facets of walking and street use are surprisingly resilient.

The treatment of walking as a mode of traffic here roughly corresponds to mainstream walkability research's consideration of walking as a homogeneous practice. Considering pedestrians not as a whole, but instead part of a socially differentiated practice, reflects the more recent interest in walkability studies to account for sociodemographic variation. Walking is shaped not only by the material-spatial environment but also by its social character and non-walking activities. In some instances, considering age and gender uncovered variations that were otherwise masked when assessing pedestrians as one. Regarding gender, our data suggest a rather stable distribution between adult men (60%) and women (40%) present in city streets.

This is a somewhat unexpected finding given previous research's suggestions about women's increasing appropriation of public space.

Our finer-grained analysis helps nuance things further. Women, compared with men, were more often in company (including with children), moving, carrying items, and using pavements rather than roadways, though this disparity diminished somewhat after 1920. These findings amount to a seemingly paradoxical image of women in the street: on the one hand, having less time to linger than men, busy carrying out their daily chores; on the other, socialising more and attending to their children. However, drawing on the work of feminist scholars, these two features can be interpreted as facets of women's walking as a relational activity (Heddon & Turner, 2012, as cited in Männistö-Funk, 2021; Middleton, 2010, as cited in Männistö-Funk, 2021). Through walking, women maintained meaningful relationships and attended to the needs of those around them. Indeed, throughout the studied period, walking remained a gendered practice. However, whereas the inequality in women's and men's street presence remained stable over time, the gender gap in their use of streets was closing.

Regarding age, we found a remarkable decline in the street presence of children, from roughly 20% of all pedestrians in the earlier periods to only 5% after 1920. While the exodus of families to Stockholm's suburbs takes us some way in explaining this dramatic decline, further explanation is found in our data on changes in children's independent mobility, which is most likely related to the onset of urban automobility. While children often frequented streets on their own or in other children's company during the earlier periods, after 1920, 40% of boys and 50% of girls were accompanied by an (often female) adult. Meanwhile, children's tendency to use pavements rose significantly: for boys, from 50% to more than 80%; for girls, from 70% to almost completely. In many respects, the gendered pattern among adult pedestrians also applies to children, with imbalances often levelling out somewhat over time. Evidence from England and Germany shows that children's independent mobility has been on the decline since the 1970s (Shaw et al., 2013), but our findings suggest that, in fact, this decline set in considerably earlier.

Our more fine-grained analysis points to a need to consider spatial differences, with different streets offering different opportunities to pedestrians, not least children. While busier main streets did not deter pedestrians, they stand out as particularly catering to their flow, with an overrepresentation of single males and those on the move. Smaller streets, on the other hand, seem to have offered alternative life worlds: more stillness and sociality as well as an overrepresentation of children across the studied period. Regrettably, we did not code for children's activities, though still feel confident in stating that there were many instances of street play in the earlier periods, which reduced dramatically after 1920. As street play was more prevalent among boys, its decline also helps explain why gender differences levelled out over time. For example, while 93% of boys roamed the city street on their own in the earliest period, only around 60% of them did so after 1920 (the corresponding figures for girls are 70% and 45%). Whether they were no longer allowed, or practically unable, to play in city streets, the rapid change in boys' use of street spaces after 1920 is surely connected to the marginalisation of play from inner-city roadways and pavements. This can be compared to the new suburbs, where opportunities for children's play were often put centre stage after the Second World War (Moll & Kuusi, 2021).

The strength of the structured photograph coding employed here is in its capturing of pedestrian number, whereabouts, and movement patterns, as well as associated sociodemographic and spatial variations. With

the interpretative support of qualitative historical research, it also allowed us to make claims about how they reflect social norms around street use, notably concerning children's play in streets, and how the role of women as caregivers intertwined with their walking practices. Attending to such facets of walking and related street use would, we argue, be a valuable expansion of walkability studies. Hence, our findings fuel the recent trend in embracing the full social complexity of walking, understanding it not just as transport, but as a relational activity shaped by street design and socially produced spatial connections (cf. Masoumzadeh et al., 2023; Shields et al., 2023). This includes, among other things, addressing both how well a pedestrian space accommodates non-walking activities and the variegated experiences of different social groups.

What are the implications of our findings for current efforts to improve the conditions for walking in cities? The period under study in this article is far removed from the present day and we are reluctant to make any linear projections based on the trends we have found. Nor will we, based on the more stable patterns, make any essentialist claims about the nature of streets, walking, or street life. Yet our study shows that the early onset of automobility—although not the only factor at play in changing historical street use—had multifarious and demographically varied effects. This means that, while much needed, current agendas and efforts to create "streets for people" rather than cars (Bertolini, 2020) or create car-free inner cities (Nieuwenhuijsen & Khreis, 2016), might produce similarly uneven effects on different social groups and types of activities. Therefore, efforts to make streets more walkable, whether by road closure or traffic reduction, must ensure that they are open to the types of activities that make them attractive spaces for all.

7. Conclusion

This article set out to understand continuity and change in pedestrian street use through a detailed coding of photographs in Stockholm between 1880 and 1939. Recording mundane details concerning pedestrian type and location within the streetscape afforded a cross-referencing across time and space that revealed both expected and surprising relationships. Two of the most notable findings—the rapid drop in the number of children on city streets after 1920 and the stable 40% incidence of pedestrian groups—serve as examples of each. While our sample size of photographs and their contents arguably prevents any watertight conclusions, the ability to document developments across space and time offers evidence otherwise absent from historical research on walking in cities. We have, for example, been able to quantify the gendered nature of streets, document the relationship between the rise of the automobile and the marginalisation of pedestrians to the pavement, and describe not only the incidence of urban sociality but also its type.

Inspired by previous scholarship (Cochoy et al., 2015; Männistö-Funk, 2021), the article moreover explored the potential of coding historical photographs as a method for unearthing and contesting socio-spatial trends of walking in cities. Despite the initial ambition to record material change in the built environment, this proved complicated beyond our scope. A concerted effort to do so again, alongside a finer coding of variegated pedestrian type (dress, objects carried) and activity (types of stillness, children's instance of play), leaves room for future development. As does an expansion of the timespan and/or location, which would open up further diachronic analysis and useful city comparisons.

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Conflict of Interests

The authors declare no conflict of interests.

Supplementary Material

Supplementary material for this article is available online in the format provided by the authors (unedited).

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