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COVID-19 street experiments: a vehicle of change in urban mobility?

How European cities are adapting mobility and public space in response to the pandemic, and what might be the longer term implications

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A woman riding a bicycle in Parma, Italy, wearing a face mask. Photo by Gabriella Clare Marino

CLEAR

Introduction

The challenges posed to our cities by the COVID-19 pandemic are profound and far reaching. We find ourselves in a new reality that highlights many of the weaknesses of our 'old ways of doing things' and forcefully challenges us to rethink society. Cities around the world are now rising to the challenge of making structural changes to urban mobility systems: to re-align them with current and future realities. This means 'COVID-proofing' public transport and making sure that pedestrians and cyclists can safely move through the city, but crucially, for many cities it also means thinking ahead and redesigning city streets for a sustainable future. For example, the sudden stagnation of traffic during the COVID-lockdown has prompted cities like Milan, Paris, London and Barcelona to seize the moment and fast-track the construction of miles of extra bicycle infrastructure[1]. The pandemic has also made us reconsider how public life in the city can/should look like, as streets are not just for traffic, but also for people. One the one hand, many activities involving large gatherings of people have been cancelled or restrained, but on the other hand, bars, restaurants and other initiatives have often been successful in reclaiming extra space for a diversity of social functions, such as the open-air cafes in Vilnius[2], the parklet-style pub gardens in Munich[3] and outdoor restaurant spaces in Paris[4].

Planning efforts to make urban mobility smarter, safer and more sustainable have now been underway for over three decades. This started out with concerns over making travel more efficient and limiting negative environmental impacts, but our understanding of what sustainable mobility means has gradually evolved and become more holistic, as it continues to extend towards issues of liveability (Holden, Gilpin & Bannister, 2019). At the beginning of this century, some urban scholars already saw some social and technological indicators of how urban mobility could shift beyond the dominance of the automobile, such as the rise of electric mobility (Westbrook, 2001). However, efforts to transform mobility have, above all, shown how difficult true change is: complex interdependencies cause a lock-in that prevents radical change towards a 'post-car' system (Berger et al., 2014; Urry, 2004). Therefore, in a time when climate emergency looms large, efforts now converge on understanding and facilitating these complex 'socio-technical' transitions (Grin, Rotmans & Schot, 2010). This preoccupation with enabling transitions is also reflected in the fact that urban experimentation has become a dominant paradigm in many urban policy fields (Evans, 2016; Karvonen & Van Heur, 2014). It is in this context that in recent years, scholars in urban planning have also begun to investigate how 'street experiments': temporary interventions in the use, form or governance of city streets, can prefigure a transition of mobility systems, uncover barriers and drivers of change (Bertolini, 2020; Lydon & Garcia, 2015). There are several types of street experiments, ranging from relatively simple and modest redesigns such as parklets or pop-up bike lanes to projects that aim to repurpose street space to accommodate people rather than traffic (Bertolini, 2020). In Barcelona's 'superblocks' project, this is even happening on the scale of entire neighbourhoods[5]. CLEAR operates in line with this street experimentation perspective.

In addition to the huge challenges that the pandemic has posed for cities, it also presents us with huge opportunities to remodel urban mobility and public spaces to find a new sustainable equilibrium. The lockdown-effect on existing street experiments is still unclear -and poses interesting research possibilities- but what has gained a lot of media attention is the manifold temporary measures and interventions in public space that were implemented in response to the pandemic[6]. Although they are principally designed to enable

[1] https://www.theguardian.com/environment/2020/may/01/city-leaders-aim-to-shape-green-recovery-from-coronavirus-crisis
[2] https://www.theguardian.com/world/2020/apr/28/lithuanian-capital-to-be-turned-into-vast-open-air-cafe-vilnius
[3] https://www.muenchen.de/essen-trinken/aktuell/2020/freischankflaechen-schanigaerten-muenchen-verlaengert.html
[4] https://www.theguardian.com/world/2020/may/31/paris-cafes-bars-and-restaurants-to-reopen-outdoor-space-row-pavements-parking-coronavirus
[5] https://www.theguardian.com/world/2020/nov/11/barcelona-launches-10-year-plan-to-reclaim-city-streets-from-cars
[6] http://pedbikeinfo.org/resources/resources_details.cfm?id=5209

the continuation of everyday life in the short term, in some cities they are also explicitly linked to longer-term (policy) goals in areas of sustainable urban development. Even if they are not, these temporary measures may still have lasting effect on urban mobility systems, which makes it interesting to approach this from the viewpoint of socio-technical transition literature. Can the temporary COVID measures in public space be regarded as transition experiments; perhaps even as a special category of street experiments (Bertolini, 2020)? As such, what can we learn from them about transforming urban mobility systems? Although answering these kinds of questions does not primarily fall within the present scope of CLEAR (City LivEAbility by Redesign), the overwhelming circumstances posed by the pandemic disrupted normalcy and called into the foreground new issues, adding a further dimension to the urban experimentation paradigm that this project is rooted in. In that sense, COVID-19 has presented a hugely valuable learning opportunity. This paper aims to stimulate and give direction to further scientific and professional debate on the subject.

This report has four parts: in the next section, we give a brief overview of how the City Club Members of EIT have responded in terms of public space- and mobility-related policy during this first year of the pandemic. Then, on the basis of online news and press releases, the policy responses of Amsterdam, Munich and Milan will be described in more detail, as these cities are at the core of CLEAR and have all implemented interesting, but very different measures. Thirdly, on the basis of news articles, policy documents and stakeholder interviews, we further analyse the case of Amsterdam by introducing and using the conceptual framework that Bertolini (2020) laid out. Amsterdam stands out from the others because, rather than seeing the pandemic as an opportunity to change urban mobility, the municipality explicitly chooses to keep the COVID-measures separate from its ambitious 'car-light' policy agenda. That political decision makes this an interesting case to learn from about the barriers and opportunities of using the pandemic as a catalyst for sustainable transformations in urban mobility and public space. In the discussion we will reflect on the lessons that we can draw from these cities' experiences, and options for further research are sketched.

I. Overview of responses in EIT cities

This overview is based on an internet search for COVID policy responses, using keywords such as [city name] + mobility/transport/car(free)/pedestrians/cyclists + COVID(-19)/corona/pandemic. An additional useful source was the PBIC shifting streets dataset[7] and an OECD report[8] of policy responses to COVID-19. No policy responses were found for EIT-cities Copenhagen, Hamburg, Helmond, Istanbul, Lublin, Stockholm and Warsaw.

Amsterdam (Netherlands) wields a flexible approach, targeting crowded places in the city. The main aim of their measures is to attribute more space to cyclists and pedestrians to safely move around. Measures include shared streets, speed reductions, but also a reallocation of street space away from cars and towards cyclists and pedestrians. Amsterdam also implemented 'holiday streets' for recreational purposes.

Barcelona (Spain) has seized the pandemic as an opportunity to transform 'streets for traffic' into 'streets for people'. Using a fast and simple approach, they have taken city-wide, but differentiated measures. Highlights include widening pavements, and removing motorcycles from them, reclaiming 34 streets for exclusive pedestrian use and extending the cycling infrastructure with an additional 21 km's. There is an explicit link with the experimental 'open streets' programme.

[7] http://pedbikeinfo.org/resources/resources_details.cfm?id=5235
[8] http://www.oecd.org/coronavirus/policy-responses/cities-policy-responses-fd1053ff/

Eindhoven (Netherlands) launched an interactive map where citizens can register crowded hotspots in the city. Specific measures were then taken to create more safe pedestrian space, such as hiring city hosts, car bans and LED screens.

In **Helsinki** (Finland), there were two examples. First, WHIM, a platform for shared mobility, offered discounts on its services in the spring of 2020. Secondly, in Ehrenströmintie street, measures have been taken to reduce car traffic and encourage cyclists and pedestrians; 40 parking spots have temporarily been replaced by street furniture and flowers.

Milan (Italy) introduced their famous 'Strade Aperte' plan in March. Similar to Barcelona, this is a holistic but differentiated plan to reduce car dominance in the city to create safe and sustainable city streets via relatively simple redesigns, including: 35 KM's of extra bicycle paths; traffic free zones; speed reduction; change of traffic flow; widening sidewalks for pedestrians and restaurants/bars. Interesting here as well is the explicit link between COVID-measures and existing long-term tactical urbanism interventions under the name of 'Piazze Aperte'.

Munich (Germany) used three formats of street experiments. 1. By simple street remarking, five pop-up bike lanes were constructed, to enable safe and sustainable traffic. There seems to be resistance to connect these temporary interventions to long-term infrastructure goals. 2. The city implemented fourteen 'summer streets', including four plays streets, to allow for COVID-safe pedestrian movement as well as more recreational possibilities. 3. To enable bars and restaurants to safely operate, they were allowed to create more outdoor space for parklet-style beer gardens. Many temporary measures were extended after success.

Prague (Czech Republic) temporarily transformed street space in the city centre, to be dedicated to beer gardens instead of traffic or car parking. It is unclear whether it could become permanent.

Stuttgart (Germany) also implemented pop-up bike lanes in response to the pandemic. There is not as much official news on this as in Berlin and Munich, but it seems to be similar in nature. They also hosted 'Car free Hofener Straße': a temporary closure of the street to motorized traffic on Sundays and public holidays to encourage safe pedestrian and cyclist movement. Lastly, in order to further promote healthy travel during the pandemic, city government offers its citizens free use of a bike navigation app for one year.

Tel Aviv (Israel) decided this year to extend existing pedestrian streets and to create an additional 11 streets for exclusive pedestrian use.

II. Policy responses in Munich, Milan and Amsterdam

Munich

Using street experiments to quickly improve the safety and quality of public space

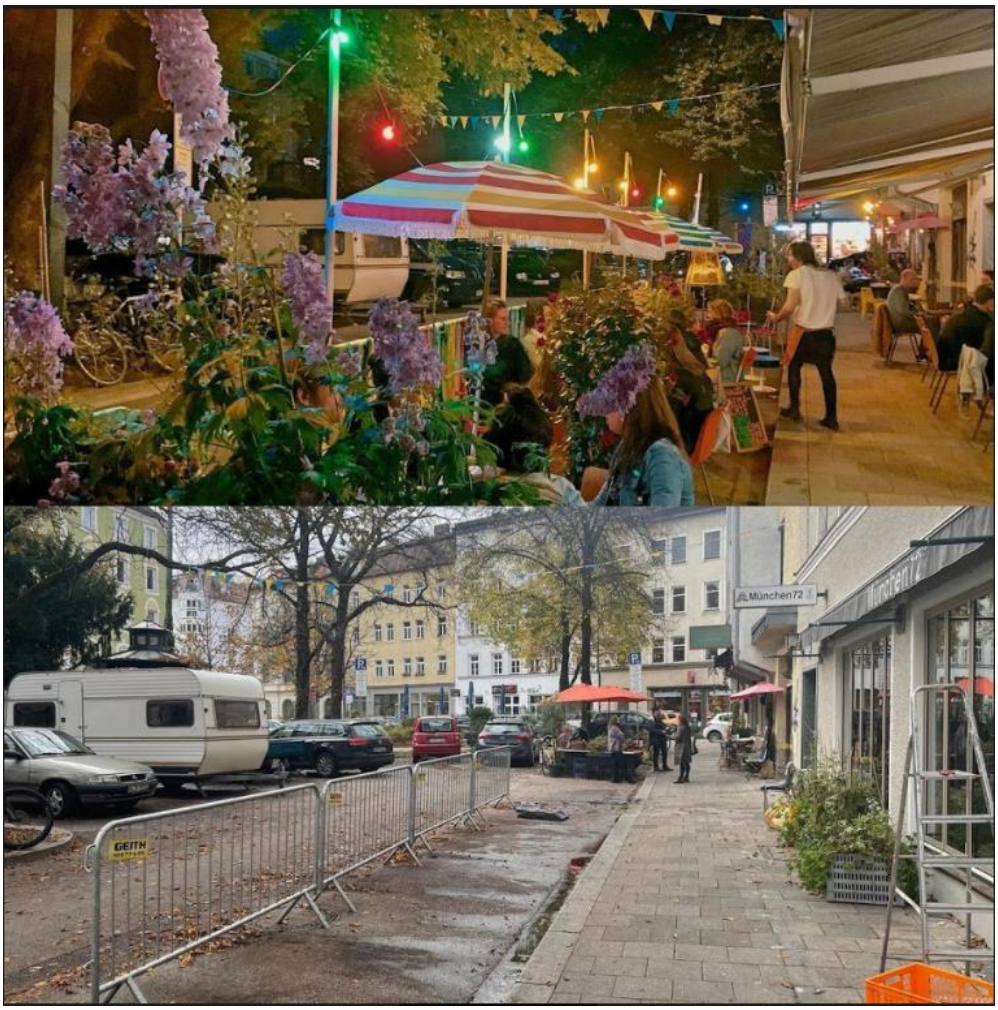

Photo by München 72

Pop-up bike lanes

In order to prevent citizens from resorting to their cars as the only safe means of transport during the pandemic, the municipality of Munich has created 5 temporary bike lanes over the summer. The measures are intended to stimulate bike-use, but are also used to accommodate the already increasing flow of cyclists that the city is experiencing[9]. They did this cheaply and quickly by re-marking existing busy streets with paint and traffic cones, making them more suitable for cyclists. Specifically, these tactical urbanism-style interventions were implemented in the following streets: the Rosenheimer Straße (at two different places); the Zweibrückenstraße; the Elise-weg; the Theresienstraße and the Gabelsbergerstrasse, see map below. Policy makers are cautious about the possibility of permanence: although they say this might be an option in some places, nothing will be decided without due participatory processes, according to the *Süddeutsche Zeitung*[10]

[9] https://www.sueddeutsche.de/muenchen/muenchen-stadtrat-pop-up-bike-lanes-1.4914010
[10] https://www.sueddeutsche.de/muenchen/muenchen-corona-pop-up-radwege-1.4915026

SZ-KARTE / MAPS4NEWS.COM / © HIER. Retrieved from https://www.sueddeutsche.de/muenchen/muenchen-corona-pop-up-radwege-1.4915026

Summer streets

Inspired by the summer street initiative of *Levande Stockholm*[11], Munich introduced their 'Sommerstraßen' for the first time in 2018 with two pilot projects. This summer, due to the ongoing COVID-restrictions, these initiatives proved extra relevant as an alternative for people who couldn't go on holiday. In total 14 summer streets were created in 2020, with the general aim of making the city more pedestrian-friendly. The summer streets created more safe space to walk around and for businesses to host more customers. The focus was thus on social and on economic drivers. Among the summer streets were also 4 'play streets', which were completely closed to cars and had a special focus on the wellbeing of children.

Parklets

In May 2020, the municipality of Munich decided to let bars, cafes and restaurants temporarily create more outdoor space for dining and socializing, in response to social distancing requirements during the pandemic. Sometimes parking spaces were cleared for this, resulting in 'parklet' pub gardens. They were a big success: by October, over 900 businesses made use of this policy to create and extend their outdoor space to responsibly host customers. During the summer, the rules were even relaxed further as application procedures were made more lenient and pubs could stay open and serve drinks until midnight[12]. The permits have now been extended until the end of March 2021, and business owners are even allowed to use heaters for their outdoor spaces during the winter, provided they use sustainable energy sources[13]

[11] https://trafik.stockholm/gator-torg/levande-stockholm/
[12] https://www.muenchen.de/aktuell/2015-04/freischankflaechen.html
[13] https://www.muenchen.de/essen-trinken/aktuell/2020/freischankflaechen-schanigaerten-muenchen-verlaengert.html

Milan

Seizing the moment to accelerate a sustainable urban transformation

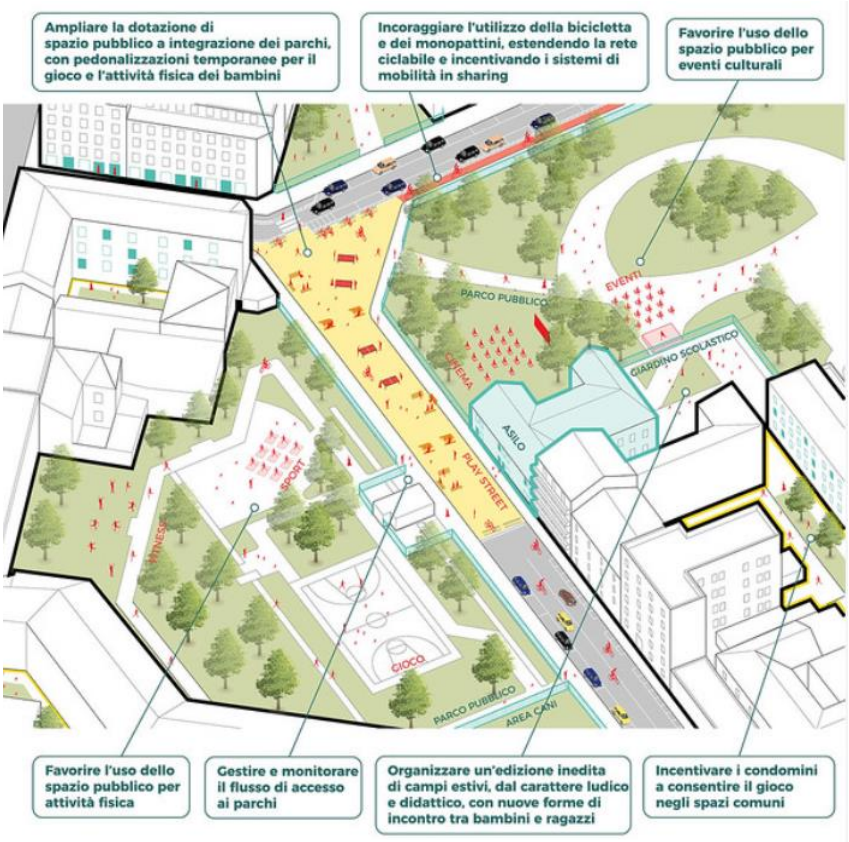

Photo by Comune di Milano

Strade Aperte

When in April, the municipality of Milan published the ambitious 'Strade Aperte' (open streets) programme, it quickly caught the attention of news outlets around the world[14]. Contrary to some interpretations in the media, Strade Aperte is not so much an anti-car scheme as an attempt to reconsider and redesign urban mobility and public space; with a long-term vision of a more sustainable and liveable city at the core. This year, that ambition converged with the need to socially distance because of the pandemic[15]. Encouraging sustainable travel, safeguarding play spaces, creating new public spaces and improving the quality of existing public space were already important policy issues for Milan (per their Territory Governance Plan), but now the immediacy of the crisis provides local government with leverage to accelerate these developments. According to their Adaptation Strategy[16], the time is right for three reasons: firstly because there is a reduced traffic flow. Secondly, there is now a need to act fast and with reversible measures. Thirdly, there is less resistance to change due to the crisis. Concretely, the programme focuses on creating more public spaces for both children and adults, and boosting a modal shift away from car use, by prioritizing pedestrians and cyclists. Similar to developments in Barcelona[17], the plan is holistic but varied. Highlights include: 35 kilometres of extra bike lanes; traffic free zones; shared streets speed reductions; parklets; widening sidewalks for pedestrians and restaurants/bars.

[14] https://amp.theguardian.com/world/2020/apr/21/milan-seeks-to-prevent-post-crisis-return-of-traffic-pollution
[15] https://www.comune.milano.it/-/quartieri.-con-strade-aperte-nuove-aree-pedonali-ciclabili-zone-30-e-spazi-pubblici
[16] Commune di Milano (2020). *Adaptation Strategy: open streets*. Retrieved from https://www.comune.milano.it/documents/20126/7117896/Open+streets.pdf/d9be0547-1eb0-5abf-410b-a8ca97945136?t=1589195741171
[17] https://www.barcelona.cat/covid19/en/lockdown-exit-strategy-city?p=mobility

Strade Aperte manifests not just an overlap of goals, but also of strategy and methods. Particularly interesting here is the explicit link between the policy response to COVID-19 and existing experimental interventions in public space that have been trialled under the *Piazze Aperte* programme since 2018. Examples include parklets, pop-up bike lanes and pavement-to-plaza initiatives: these are the kinds of tactical urbanism-style interventions that Milan has been working and gaining a reputation on, in collaboration with Bloomberg Associates[18] and NACTO (National Association of City Transportation Official). An urban designer of Milan's mobility agency AMAT[19] posits that the smooth implementation of Strade Aperte is made possible at least in part because of the experience that Milan already has with street experiments.[20]

Amsterdam

Redistributing space in a crowded city

Photo by Gemeente van Amsterdam

Temporary measures 'menu'

On the 8th of May, the Municipality of Amsterdam published a 'menu' of temporary mobility/public space measures that can be quickly implemented to create ways for pedestrians and cyclists to move around the city safely, at 1,5 meter distance. As life slowly returned to the streets after the spring lockdown, the menu[21] articulated the guidelines for the ways in which the municipality could quickly act to physically create more space in designated crowded hotspots. For safe mobility, it suggests several options, ranging from relatively small measures such as clearing sidewalks of objects to 'big interventions' such as restricting motorized traffic and redistributing road space to pedestrians and cyclists. It is this redistributive type of intervention that has gained most media attention over the spring and summer. What stands out in Amsterdam is the emphasis on the temporary nature of the measures and their explicit disconnectedness from existing policy goals in sustainable mobility.

[18] https://associates.bloomberg.org/cities/milan/reimagining-milans-piazzas/
[19] https://www.amat-mi.it/
[20] Interview D. Scopelliti (AMAT). 13-11-2020
[21] Municipality of Amsterdam (May 8th, 2020). *Menukaart tijdelijke maatregelen openbare ruimte.*

Press releases and news coverage show that some of the elements of the menu were implemented very rapidly after their publication, under the name 'cyclists to the road' (NL: fietsers naar de rijbaan)[22]. Initially in effect until October 31st, this intervention meant that in a handful of busy streets in the city, cars and cyclists had to share road space so the bike lanes could be reappropriated for pedestrians. For safety, the maximum speed was also limited to 30 km/h, and in the first few days traffic controllers were present to help people navigate the new situation. The measures were purposefully targeted to busy areas with many shops and cafes, but they were tailored to the local situation, and sometimes additional measures were in effect. For instance, in the 'Eerste van Swindenstraat' and the 'Museumbrug', car traffic was made one-way to create more space. In the 'Haarlemmerstraat' and 'Haarlemmerdijk', motorized traffic was not allowed altogether and thus diverted; extra bike parking space was created and pedestrians also have to walk one-way. In the Spuistraat, cycling is now prohibited in a few adjacent narrow alleys. The 'Negen Straatjes' neighborhood was officially designated a shared space[23], a concept that involves all modalities using the same space and in which chaos is thought to make users more careful and considerate towards each other.

Holiday streets

Somewhat similar to the summer streets in Munich, Amsterdam hosted holiday streets (NL: vakantiestraten[24]) in the Kalmoesstraat, the Putterstraat and the Pelikaanstraat: all located in the city district *Noord*[25]. Holiday streets are based on the Ghent-pioneered concept of living streets[26], which have also been incidentally implemented in Amsterdam for a few years now. All these street experiments aim to temporarily (E.G. 3 or 4 weeks) make a street car-free and more accommodating for play and social interaction, but the unique selling point of holiday streets is that they give citizens a responsible alternative to a vacation abroad. To stimulate this, the municipality has made the application process a lot easier and cheaper, compared to living streets. The emphasis of this experiment in Amsterdam is more on social cohesion than it is on mobility, but nevertheless, some of the citizen-initiators aimed to explore this year how their car free street could become a permanent reality. Whether this can happen, is unclear.

III. Case study analysis Amsterdam

The following analysis was carried out using the conceptual framework set out by Bertolini (2020), see fig. 1 below. At the heart of this framework is the hypothesis that the degree in which a street experiment performs on the five defining characteristics of 'transition experiments' (Nevens et al., 2013; Roorda et al., 2014) determines their capacity for enabling systemic change in urban mobility. The mobility system is in its turn conceived as entailing a material, individual, organizational, and institutional level (Switzer, Bertolini & Grin, 2013). We refer to Bertolini (2020) and to the CLEAR report (VanHoose, Bertolini & Rivas, 2020) for more discussion of this framework. As it is still too soon to assess any impact on system change, the analysis in this discussion paper will be limited to the assessment of how the COVID-19 street experiments in Amsterdam performed on the five defining characteristics of transition experiments. Lessons are then drawn about the potential and the barriers of using COVID-19 street experiments as vehicles of change in urban mobility.

[22] Kruyswijk, M. (May 8th, 2020). *Maatregelen: fietsers naar de rijbaan, maximumsnelheid naar 30km*. Het Parool.
[23] Kruyswijk, M. (June 25th, 2020). *Voetgangers zijn nu de baas in de Negen Straatjes — en dat is wennen.* Het Parool.
[24] https://www.amsterdam.nl/wonen-leefomgeving/vakantiestraat/
[25] https://www.amsterdam.nl/bestuur-organisatie/stadsdelen/stadsdeel-noord/weblog/weblog-esther-lagendijk-vakantie-straat/
[26] https://www.leefstraat.be/

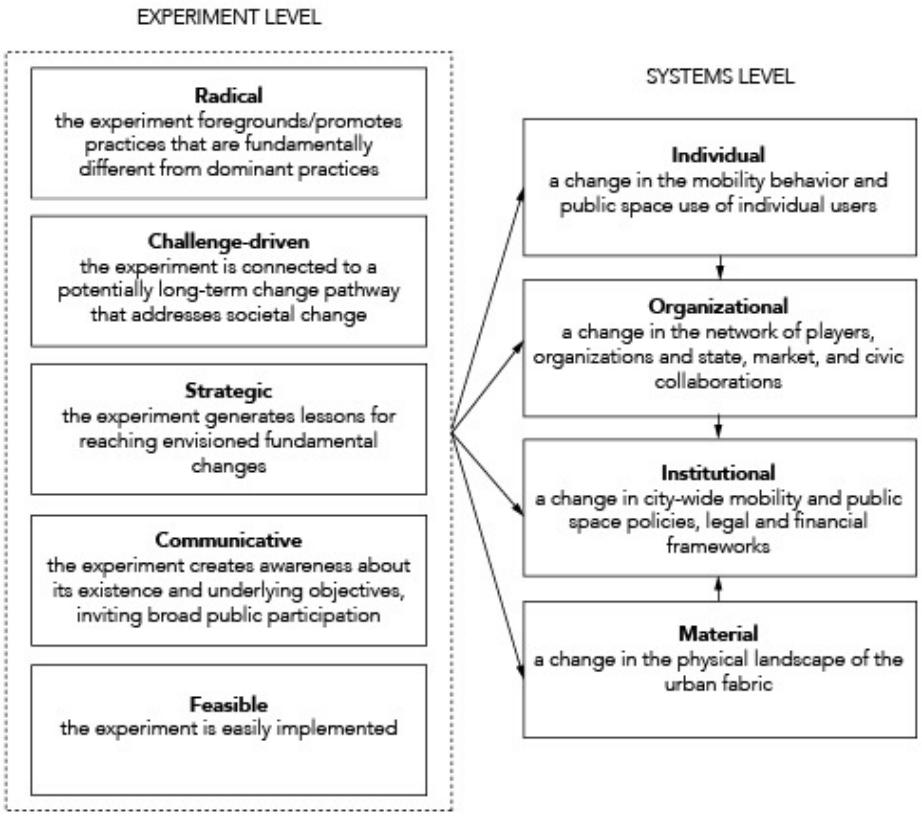

Figure 1. Conceptual framework of the relationship between street experiment characteristics and system change (based on Bertolini, 2020).

Method

News articles and policy documents formed the starting point for investigation in this analysis. By means of snowball sampling, relevant policy makers, civil servants and other relevant stakeholders were identified and interviewed. In Amsterdam, 5 interviewees from both the executive and policy branch of local government were included. All interviews were carried out and transcribed between November and December 2020. Semi-structurally, all characteristics of transition experiments were addressed, and at the end of each interview, experts were asked if and how they think the pandemic can be used to improve urban mobility and public space in the long term, see table below.

Table 1. Topic list for interviews

Topic	**Question (examples)**
Radical	What does the experiment hope to achieve? What underlying objectives and values does it have? Is the street now fundamentally different from before? In what way (design, use, governance)?)
Challenge-driven	Is this more than a one-time event? Does it contribute to wider change? Is there a long-term strategy? Are you planning to replicate, upscale, etc? How?

Strategic	Are you measuring the impacts? How? Why? Is (institutional) learning taking place?
Communicative	What have you done to make this project visible? Who can participate? In what way? During which phases? Has the project been able to communicate its objectives and values to a wider public? Is there now more a sense of community?
Feasible	Did the experiment take place as it was originally conceived? Did the experiment need to be adapted conceptually or practically in any major way in order to realize it?
Long-term change	Do you think the COVID-19 measures have the potential to change urban mobility and public space in the long term? How?

Table 2. Analysis of COVID-19 experiments in Amsterdam

	Temporary measures menu	**Holiday streets**
Radical	Low/Medium - Although car drivers are definitely not the beneficiaries of the measures, generally speaking, the new street arrangements are not very radical. Almost all were about redistributing street space from one group of users (car drivers) to another (cyclists or pedestrians), leaving the basic traffic function of the street unchallenged. The regulation of the street changed accordingly (e.g. different speed limits) and governance was somewhat decentralized within the municipality. However, neither implementation nor decision-making power shifted substantially from the municipality to citizens or other stakeholders.	High - The holiday streets created room for other social and economic functions of the street, away from traffic dominance, and invited more local ownership. As such, they embody a shift from 'streets for traffic to streets for people'.
Challenge-driven	Low - The measures are well-considered and agile in nature. Although they can be extended if necessary, they are emphatically temporary in nature. More importantly, they address the COVID-situation only, and are explicitly not connected to a long-term change pathway.	Medium - The holiday streets are mainly framed as fun recreational alternatives during the pandemic, but also align with the long-term policy agenda of creating more social cohesion and public space.
Strategic	Medium - The situation was closely monitored, so measures could be adjusted if necessary. Both quantitative (traffic flow) and qualitative (opinions of citizens) data was included in the municipality's assessment. However the lessons learned are thus far only used to finetune implementation and are not extended to processes of long-term policy making.	Low - Monitoring is informal. A report is being written, but the outcome of evaluation is unknown.

Communicative	High - The measures did attract some media-attention, especially the most far-reaching interventions 'fietsers naar de rijbaan' and 'shared space'. For more physical visibility of the change, in addition to signs, barriers and street paint, street coaches helped people become aware the first few days. The municipality also communicated these changes via their website. Although there was no formal participation process involved, the municipality did in many cases try to involve stakeholders to generate support for their measures.	Medium - The holiday streets were successful in generating community involvement, but only within the scope of implementation in specific locations. There was almost no larger media attention for these events. Furthermore, they seem to have been stimulated exclusively in the Amsterdam *Noord* district.
Feasible	(very) High - The municipality used an adaptive strategy. The temporary measures could all be implemented relatively easily and quickly, and were adjusted or cancelled when appropriate.	High - Living streets are typically quite complex to organize in Amsterdam, but in these circumstances the procedures for holiday streets have been simplified considerably. Also, mandatory permit applications and parking suspensions have been temporarily made free of charge.

Emerging patterns

For an overview of the findings, see table 2. Two things stand out from the analysis. Firstly, it is remarkable how easily, quickly and agile the experiments could be implemented (interview 2) - and therefore how *feasible* they are. The immediacy of the crisis dissolved bureaucratic hurdles and sped up decision making processes. For instance: the emergency situation prompted civil servants to produce a guiding policy document within two weeks and allowed them to access funds much more quickly (interview 1). It could even be claimed that the undisputed need for fast governance responses depoliticized some of the measures that would otherwise be seen as 'anti-car policy'. Secondly, and connected to this, is Amsterdam's low to medium score on the *challenge-driven* and *strategic* dimensions. Key policy makers expressed a strong reluctance to use the pandemic as an opportunity to 'force through' policy ambitions, because they felt Amsterdam is already a sustainable frontrunner and it would compromise the political and public support for a sustainable transition in the long term (interview 1 & interview 4). These concerns are rooted in a strong political commitment to the 'car-light' policy (NL: agenda Autoluw) that relies on a very careful and phased implementation to shift urban mobility in Amsterdam towards a more sustainable future. They are currently still in the 'experimentation phase' which involves using specific sites as urban living labs. However, these labs require extensive participation processes; the fear of moving too fast 'under false pretences' shows exactly how politically delicate this issue is. COVID-19 measures and the car free agenda are therefore treated as strictly separate domains and lessons from the pandemic are not formally transferred into existing mobility policies.

Nevertheless, the pandemic has galvanized efforts to improve public space and sustainable mobility, allowing civil servants to temporarily overcome the bureaucratic processes and inter-municipal negotiations that often slow down experiments or keep them from flourishing. There are even some potential lasting effects. The Spuistraat, one of the sites where cyclists and cars now share road space to create extra room for pedestrians, may become a permanent arrangement after evaluation. Also, the procedures for living streets may become simpler in the future, as a result of the experiences with this year's holiday streets. However, for the moment, these are rather examples of 'tweaks' to the system than of radical system change. For that, Amsterdam continues to rely on a careful implementation of its long term policy agenda.

IV. Discussion

So the two questions posed in the introduction remain: can COVID-19 measures be considered vehicles of change in urban mobility, as street experiments, and if so: what can we learn from them? As to the first question: the overview of policy responses in EIT cities makes clear that some cities explicitly choose to approach the pandemic as an opportunity to explore change in public space and urban mobility systems, while others do not. This discussion paper has unveiled divergent strategies, even among relatively progressive cities in Europe. We have shown that in Amsterdam, measures are principally aimed at temporarily redistributing space in a crowded city, for public health and safety reasons, but not for long-term mobility change. In fact, the pandemic is neither framed nor treated as a learning opportunity. In Milan, by contrast, policy makers are not afraid to seize the moment to accelerate processes of sustainable urban transformation. Munich is positioned in between, as it uses different formats of street experiments to improve the safety and quality of public space, but it also leaves open the possibility for long-term change, if deemed desirable. What the long term impacts of the measures will be remains to be seen, so any hard conclusions on their potential would at this point, inevitably, be premature. However, from this analysis emerges a tentative image of the factors that help to determine a city's ability to successfully use temporary measures as leverage for long-term change. From all reviewed materials, we draw these general lessons about COVID-19 street experiments and systemic change in urban mobility.

What can we learn from these experiential responses about transforming urban mobility and public space?

1. Existing street experiment formats (such as living streets, pop-up bike lanes, parklets) are useful ways of intervening in mobility and public space during the pandemic for four reasons. They are often **quick**, **easy**, and **cheap** to implement and they are easily **adjustable**.
2. A repertoire of prior experience with street experiments proved useful for implementing COVID-19 measures.
3. Many efforts to improve public space and urban mobility were galvanized by this crisis; bureaucratic obstacles and other barriers could suddenly be overcome. Therefore, high **feasibility** may be a defining characteristic of COVID-19 street experiments.
4. A crucial factor in determining whether COVID-19 measures can act as vehicles for system change is whether institutional learning is taking place. In other words: are street experiments used **strategically** and **challenge-driven** or are they nothing more than temporary measures?

Next steps

Comparisons of street experiments, both within and between cities, we believe, are very useful because they generate lessons about the drivers and barriers of system change in urban mobility: why does city X succeed in making radical changes through experimentation, while city Y does not? The framework proposed above provides multidimensionality and explanatory power to comparative analyses, although inevitably, many contextual factors are not included. We should investigate further how well cities' emergency responses fit the conceptual model. Follow up research might extend the analysis to the impact on system change, and on relationships between the two. Within projects such as CLEAR, SET and EX-TRA, there are two general directions for further research in this area, which are complementary to each other.

The short term option is to repeat this case study in Munich and Milan or Barcelona?) and compare strategies in terms of the 5 characteristics of transition experiments. How and why are they different? Can we tentatively see different outcomes emerging? Can this be attributed to how well the COVID-response approaches the concept of a transition experiment? The long term option, or rather, the next step is to use Amsterdam, Milan

and Munich as case studies to longitudinally measure and compare how COVID-19 street experiments are changing urban mobility and public space. For example by hosting expert focus group sessions two times a year in each city.

Literature

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