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Can street-focused emergency response measures trigger a transition to new transport systems? Exploring evidence and lessons from 55 US cities

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ABSTRACT

Transport planning and policy is increasingly being called to action in ways that differ from practices of yesteryear. Varied segments of society are increasingly looking to city streets—the workhorse of a city’s transport system—as places to enact change. Namely, to change their character away from the type of streets pervasive in auto-oriented urban environments. Acutely experienced during the disruption of the COVID-19 pandemic, emergency response measures from many cities across the world abruptly altered the nature and purpose of street space. These “street experiments” fueled an opportunity, in part, to explore a transition to practices prioritizing forms of sustainable mobility such as walking and bicycling. This research inventories street-focused emergency response measures from the 55 largest cities in the US. We devise a rubric to systematically assess and locate characteristics of these measures that enable a transition. Results show that five “innovator” and several “early adopter” cities are using COVID conditions to test new forms of streets and in some cases, street networks. These cities excelled in conveying a vision for alternative future, articulating implementation pathways, leveraging political capacity, and circulating information. After six months, half of the cities continue their efforts, including only six which have expanded. The few showing continued strength demonstrate endeavors to evaluate the experiments, validate their feasibility, and embed the experiments into existing sustainability policy. These components, when leveraged together, could seed innovative breakthroughs in how city streets are used, designed, and standardized. The paper establishes baseline evidence on which future research efforts can build and provides empirical evidence on early stages of the experimentation and transition processes of urban mobility systems.

1. Headline results

1.1. Key findings

- Among 30 of 55 US cities, the most common emergency response affecting streets, as induced by COVID, are experiments with “open street” or “slow street” applications
- Relative to previously studied street experiments, the experiments among the 30 cities are more spatially extensive, longer lasting, and substantive in character, suggesting potential transformative qualities
- We found evidence of ambition to, i.e., “reimagine” streets as public spaces, with high levels of support and engagement from elected/appointed city officials
- “Innovator” cities exhibited efforts to embed new street programs into existing policy efforts, sometimes incorporating a network approach to street alterations
- Few cities demonstrate cross-departmental or intergovernmental collaboration; few explain evaluation efforts or pathways to scale up
- 6-month follow-up assessment shows 50 percent of programs (15 cities) are in progress, including 6 cities which expanded and/or made permanent some experiments; the remaining are reduced, discontinued or lack sufficient status information
- The few expanded programs indicate an interconnectedness between "feasibility" components, establishing synergies with on-going policy, and engage with the public for evaluative and participatory endeavors

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1.2. Policy implications

Results point to “slow streets” as highly transferable policies, quick to gain traction both among the public and policymakers, and capable of accelerating the typical slow pace of public administrations. There is evidence that “innovator” and some “early adopter” cities excelled at articulating implementation plans and leveraging existing, publicly vetted sustainability polices (i.e., bicycle master plans) and on-going street improvement programs (i.e., Vision Zero). The evidence suggests that pre-existing capacity and policy support augmented specific planning efforts which benefited the feasibility of the programs and possibly contributed to enhanced legitimacy of the street experiments.

Additionally, advanced and enduring programs show collaboration with multiple parties, i.e., departments of public health, urban planning, parks and recreation, police, and then also advisory boards, city councilmembers, and Mayor’s offices. The planning and implementation for such a program might exceed the capacity and traditional breadth of knowledge for many Departments of Public Works. This suggests a specific role for and benefit of inter-departmental and -governmental coordination of street experiments.

Furthermore, these research efforts provide evidence of enthusiastic and continued support from policymakers and from the vocal public. Public acceptance appears high in the few programs with demonstrated extensive public engagement and evaluative efforts. This suggests that not only are staff allotted (ample) time for these tasks, but a potential synergistic relationship between the documentation of public support and public support itself. Evidence suggests that authorities work with stakeholders not conventionally associated with active mobility or transportation. With many cities tying street experiments to economic recovery, the business communities (i.e., retail, restaurant) have shown to be valuable partners in transformations.

Given a post-pandemic environment, personal mobility habits may easily revert to pre-pandemic characteristics. To eschew regression toward unsustainable practices and advance towards sustainable and active mobility aims in streets, evidence suggests that select cities are cementing notable changes. Local government should capitalize on these experiences but also be certain to give voice to communities traditionally underserved and overlooked, garnering wider acceptance for sustainable practices for transport systems.

2. Introduction

Transport planning and policy is increasingly being called to action, summoned to respond to changing transport technologies, environmental predicaments and radically altered conditions in society. Many of the actions being called for play out in city streets—space typically servicing car movement in urban areas—and space that is increasingly viewed to fulfill other key urban functions (von Schönheld and Bertolini, 2017). For almost a century now, the design and use for most streets have overwhelmingly served automobiles. But with mounting pressures to transition towards sustainable transport, this dominant mode of street planning is being questioned (Banister, 2008; Holden et al., 2019).

Streets are increasingly being looked to as fertile grounds where emerging innovation systems could offer “smart” and “sustainable” mobility, including ride-hailing, car-sharing, and delivery (e.g., post, courier, on-line retail and eateries). Furthermore, innovative and human-scaled modes such as (electric) bicycles and scooters yield even more claimants to a crowded, fast-moving stage. Cumulatively, such trends underscore growing activities to consider how slower, human-scaled (and less automobile-focused) activity plays out in streets, with concomitant and evolving design needs (Forsyth and Krizek, 2011; Liu et al., 2018).

Acutely felt in early 2020 emerged an additional breed of pressure: social distancing requirements. Prompted by COVID-19, municipal transport services rapidly adjusted to meet yet other demands and threats. Due to physical distancing and stay-at-home orders, some of the most apparent changes to transport systems—for elected officials, planners, and the public at large—centered on re-purposing valuable city spaces; they involved prioritizing activities and travel options other than driving cars and taking public transit.

In early 2020, a global trend of re-purposing streets swiftly ascended, circulating (social) media outlets (Combs, 2020). Hundreds of cities worldwide “bandwagoned” (Pojani, 2020), installing temporary, “pop-up”, or “tactical” changes to the space allocation, use, or character of city streets. Many of these efforts couched street change efforts as an experimental exploration of new mobility arrangements that could extend beyond COVID-19.

“Street experiments” are defined as “an intentional, temporary change of the street use, regulation and/or form, aimed to explore systemic change in urban mobility” (Bertolini, 2020, p. 2). Little research has enquired into the conditions such street experiments should meet in order to enable a transformation – or at least a shift – of the mobility system (Bertolini, 2020) away from dominant “regime” of auto-dependency (Loorbach, 2010) and towards “sustainable mobility”. Recent academic discussions acknowledge the potential for such types of COVID-induced street experiments (Capolongo et al., 2020; Lovelace et al., 2020; Musselwhite et al., 2020). However, little detail describes how novel policy options could evolve to help spur sustainable transport networks, beyond the COVID public health crisis.

We therefore inventoried 55 of the largest U.S. cities to analyze how municipal emergency response measures could serve as potential triggers for transition in sustainable urban mobility. We lean on sustain-ability transitions theories (Grin et al., 2010) and emerging literature on street experiments (Bertolini, 2020; von Schönheld and Bertolini, 2017) to respond the research question: How can street design and management of COVID-19 emergency response measures be relied on to trigger transformative change in urban mobility? We operationalize this question into three sub-questions:

(1) Where have emergency response measures in city streets been implemented and to what scale?
(2) What dimensions of transformative change are present, absent, or ambiguous in the measures?
(3) How do groups of cities compare to each other?

Our research contributions are threefold. We build and apply a methodological tool, a rubric, to systematically assess and locate characteristics of response measures that have the potential to enable transformative change. We employ the rubric to assess street experiments across multiple locations and offer it as a tool for continued testing and adaptation (Sengers et al., 2019). Second, we establish a baseline of evidence on which future research efforts can build—important as increasing signs suggest more changes along these lines. Third, we provide empirical evidence on early stages of the experimentation and transition process, including an assessment of continued development six months after our initial analysis.

The following sections clarify the theoretical foundation of this work by drawing on transitions literature. We then provide an overview of street changes induced by COVID that is contextualized against a broader backdrop of literature addressing streets, innovation and changes resulting from emergency responses. We then describe our research approach. In Findings, we report the results from the inventory and rubric analysis, exploring our research questions stepwise. In the Discussion, we propose implications for policy and practice and close with directions for future research.

3. Transitions toward sustainable urban mobility

Calls for deep transport reform are many (Banister, 2008; Bertolini et al., 2008; Willson, 2001), yet breakthroughs are few and far between; many reasons explain why progress is difficult. For example, deep-rooted cultural preferences around transport are embedded...
A key component of transition management strategies is transition experiments: “short-term actions through which alternative structures, cultures, and practices are explored” (Roorda et al., 2014, p. 32). Assessing current emergency measures in city streets as transition experiments can convey which conditions might have transformative potential. We thus situate streets that have changed, propelled by responses to COVID, as the object of study, arguing that actions to re-prioritize and re-allocate street space away from automobiles and towards active modes triggers larger socio-technical transitions, and experimenting with their character is a means to that end.

Furthermore, an acute challenge in this landscape revolves around a need to cultivate acceptance for interventions that could potentially advance breakthroughs—efforts to blaze new paths to enable organizational, political and public support (Stead, 2008); lacking such, progress will be limited (Banister, 2005). Bold narratives are needed if cities are to transition to sustainable mobility (Holden et al., 2019). An approach to address the need to cultivate acceptance for alternative mindsets is through street experiments and street experiments have the potential to facilitate such a breakthrough—one that could clear pathways to land support in ways needed to match the scale of change required.

4. Impact of health crises on transport systems and mobility

Responses to health crises, such as infectious diseases, have historically and radically affected the transportation sector and human mobility. Most investigations in this domain have explored corresponding behavioral responses to international air travel restrictions (Bajardi et al., 2011), while less commonly studied are local measures, such as reduced public transit use (Lau et al., 2003). Comparative analyses of past health crises (i.e., SARS in 2003; H1N1 in 2009) indicate that full recovery from COVID-19 could take the transportation sector a very long time (Abu-Rayash and Dincer, 2020). Responses to environmental crises or disaster recovery efforts have, furthermore, posited the relevance and importance of the role and skillset of urban planners to aid community rebuilding (Campanella, 2006; Olishansky et al., 2006). Specifically, some of these efforts are tied to opportunities to leverage a sustainability agenda (Seeger et al., 2005; Smith and Wenger, 2007).

In mid-March of 2020, with stay-at-home orders in effect owing to COVID-19, most daily rhythms for personal mobility abruptly halted. With car traffic at historically low levels, a valuable part of any city’s transport system, its streets, lied dormant. City officials leveraged emergency powers and turned to streets as a space asset with currently underutilized public health benefits. Seemingly overnight in many cities, the purpose, use, and character of select streets were altered by, for example, severely limiting car traffic. These “emergency response measures” allowed citizens to walk, bike, exercise, travel to and from places of work and “essential” businesses, while maintaining distance from others.

As stay-at-home orders fluctuate, aiding economic recovery has required transport planners to connect design solutions with specific problems: physical access of customers to reopening street retail and catering outlets. Although the pandemic situation continues to evolve, many cities recognize their spatial inability to absorb an influx of private automobiles. Social distancing measures compound the difficulty and require more space than before the crisis. Again, timely adjustments to the transport system are needed and pressures are mounting to find space on streets to allow movement via means other than cars. Actions in many cities mostly point in the same direction: dedicate more space to facilitate the movement of human-scaled modes. Burgeoning empirical work indicates moderate behavioral changes in active modes, particularly cycling, for example in New York (Teixeira and Lopes, 2020) and Australia (Beck and Hensher, 2020). However, research has not yet documented the effects of specific street changes on individual mobility behavior nor a substitution effect (i.e., cycling trips replacing car trips as studied by Piątkowski et al., 2015). Furthermore, to our knowledge, the re-purposing of city streets to facilitate active modes has not yet been studied as a measure to prevent highly communicable diseases or as a crisis recovery strategy.

5. Emergency response street changes as “transition experiments”

Streets represent a critical agent in any type of transport transition. The range of activities permitted on city streets represent vital components of cities that local governments can control and change, thereby suggesting an effective level to design and implement sustainability strategies addressing climate change (Bulkeley and Betsill, 2005; Castán Broto and Bulkeley, 2013). Municipal decisions determine how streets are used and the types of activities prioritized. Such choices are reflected in standards,1 and accompanied by increased calls for new forms of governance that address the needs of changing the character of local streets (Glaser et al., 2020).

We argue that the conditions presented by COVID-19, generally, provide a springboard to potentially transition toward sustainable practices through urban experimentation. “Transition experiments” explore how well alternative structures, cultures, and practices might gain traction (for an overview, see Sengers et al., 2019). Experiments typically begin in a certain, bounded context and through periodical rounds of assessment and adjustment, eventually leading to replication and scale-up in other and more contexts (Sengers et al., 2019). As such, experiments provide a forum for “learning-by-shifting” thereby generating new insights and providing an evidence-base to build legitimacy—all while possibly cultivating political and community support (Smith and Raven, 2012). They provide a powerful means to rethink the use, design and purpose of city streets while simultaneously allowing the transport planning process to recognize and define (somewhat “re-understand”) new values and meanings that have emerged through the process.

We argue that municipal response measures represent transition experiments of a particular sort: “street experiments”. Experimenting with streets is not a novel idea. Yet, few empirical studies exist. A recent review, finding only 25 empirical articles on the topic, provided a typology of street experiments and compiled impacts (Bertolini, 2020).2 Impacts of street experiments highlight significantly increased physical activity and a behavioral shift away from car-based mobility towards active modes (Bertolini, 2020). The review pertinently concludes that no

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1 Vega-Barachowitz, D. (2013). Changing the DNA of City Streets: NACTO’s Urban Street Design Guide and the New City Street Design Paradigm. Institute of Transportation Engineers. ITE Journal, 83(12).

2 For example: re-marking streets, re-purposing on-street car parking spaces, or re-purposing sections of streets.
studies that have attempted to illuminate the scope of policy or planning activities that address such experiments, nor how street experiments might trigger or scale-up transformative practices. One reason cited for this gap is that systematic ways to measure such transformation process, particularly across multiple locations or varietals of experiments, have yet to be developed. Learning the characteristics of and conditions for these experiments could meaningfully influence a transition to sustainable mobility.

To illustrate an assessment framework for how street experiments might realize an ability to trigger systemic change in urban mobility, Bertolini (2020) explains five criteria by which experiments must fulfill (Table 1), derived from the transition management literature (Nevens et al., 2013; Roorda et al., 2014). These characteristics inform our methodological approach, explained in section 6.

6. Research approach and methodology

6.1. Sample

We explored our research questions by analyzing the content of public documents which were used to describe the various response measures. We used the 55 largest city regions (by population) in the United States as our sample. We first inventoried response measures from the city regions through a systematic process to cull cities that had response measures, which served as documentation for the analysis stage. Given our investigation’s orientation—streets—we focused on efforts from cities that change how they allocate street space—use and character—as opposed to measures like push-button actuation or altering public transit services. An inventory of responses and documentation for 30 cities proceeded to the next stage of analysis (see Appendix A).

6.2. Rubric

The manner in which municipalities documented and publicized their street changes provided data to understand how a “communicative policy act” has both “symbolic meaning and [helps] convey messages” (Norton, 2008, p. 433). Analyzing the content of transport planning documents has a strong history, both on municipal level (Bista et al., 2020; Norton, 2008) and state levels (Dill et al., 2017). We included a variety of documentation (i.e., press releases, date-stamped webpages) to capture emerging street planning processes and the mindsets behind the measures, ultimately to shed light on transition qualities.

Content analysis typically involves developing and administering an evaluation protocol, referred to here as a “rubric,” to interpret and assess text from documents. Specifically, we developed a rubric to discern the extent to which municipal response measures met five defining criteria of “transition experiments”, as argued by Bertolini (2020) and presented earlier (Table 1), necessary for street experiments to trigger systemic change. However, to our knowledge, there are no validated evaluation instruments to measure this. We therefore expanded on each of the five criteria to include elements derived from theories of transition management (Loorbach, 2010; Roorda et al., 2014), transportation governance (Marsden and Reardon, 2017), the shift to sustainable mobility (Banister, 2008), and current research on street experiments (Bertolini, 2020), as described earlier.

The rubric operationalized each criterion through key questions, which were then further specified into discrete items, totaling 44 non-text-based items. To strengthen the rubric’s reliability in gleaning salient factors to seed transitions, we solicited its review from three scholars in the fields of transitions and transport policy. Incorporating their feedback, Appendix C presents the final rubric that was used to guide this research.

The two authors plus two researchers piloted the rubric on two random cities (Seattle, WA, and Washington, D.C.). Unanticipated issues in applying the rubric, including data interpretation and data entry processes, were brought to our attention and resolved through further clarification of decision rules. Two researchers (coders) continued assessing the remaining cities, providing two responses per item per city.

Coders assessed items on a quantitative scale of 0–2, an approach borrowed from at least two other studies using a similar research design (Dill et al., 2017; Norton, 2008). If an item was described in neutral

Table 1

| Criteria | Key questions |
|----------|---------------|
| Radical  | Are the practices foregrounded by the experiment fundamentally different from dominant practices? |
| Challenge-driven | Is the experiment a step toward a potentially long-term change pathway to address a societal challenge? |
| Feasible | Is it possible to implement the experiment in the short-term and with readily available resources? |
| Strategic | Can the experiment generate lessons about how to reach the envisioned fundamental changes? Can the agents needed for such changes access these lessons? |
| Communicative & mobilizing | Can the experiment reach and possibly mobilize the local and broader public? |

Source: Bertolini (2020).

We started with the 50 most-populated cities, according to 2019 US Census estimates, a parameter used by other transportation policy researchers (Dill et al., 2017). However, we noticed several significant cities/regions eschewed this list and therefore compared this list with the 50 largest Metropolitan Statistical Areas (MSA). Five city regions were added, compiling measures from 55 US city regions. All data can be made available upon request to the authors.

While other databases exist (i.e., Combs, 2020; NACTO, 2020), they are populated by crowd-sourced means, often with secondary and tertiary sources (i.e., media and Twitter feeds) which limits their reliability and were thus not included. Additionally, the diversity of scope and scale of the measures listed in these databases leads to comparability challenges.
language or plainly suggested, it was marked “1” (mentioned), whereas descriptions that included elaboration or encouragement of the item were marked “2” (strong evidence). If an item was absent, a “0” was assigned. Using the rubric, researchers then read the documents and coded or “scored” the items, directly from the text, using the numerical scale. The coders did so for all 44 items for each of the 30 cities. Their responses reached agreement of 80% or above on 42 items. The research team decided to remove two items as they yielded low agreement levels (30–49%). The coders also included text-based rationales to support their score which were used to qualitatively inform the analysis. See Appendix B for summary statistics of coded items.

6.3. Data analysis

Summing the possible four points for each item (two per coder) provides initial results among cities which are aggressively enacting change versus not, and those in between. No single approach can provide complete guidance here; however, given that the sample’s total scores naturally divided into quartiles, we found value in borrowing classifications used by Rogers (1962, 2010) to differentiate the groups. Quartiles were labeled “innovators,” “early adopters,” “early majority,” “late majority” and “laggards” (Rogers, 1962, 2010).

We then assessed similarities and differences not only among the quartiles but also within each dimension. Using the quartiles developed through the sums from the rubric scores, each dimension was averaged in order to compare between quartiles and dimensions. We sought answers to analytical questions such as, how do “radical” characteristics of the measures implemented by the innovators compare to other quartiles? How do scores on the “radical” dimension compare to scores on other dimensions, e.g. “feasible”? Given our intent to contextualize this research against the broader aim of transitions, we sought to examine gaps and nuances at scales within each city’s transport planning effort.

7. Findings

7.1. What emergency response measures are being implemented and where?

Our sample demonstrates a limited range of response measures; most commonly observed was an “open street” or “slow street” application. Fig. 1 depicts the geographical distribution of the 30 cities we found to have implemented “slow street” emergency response measures. Five cities were deemed innovators; eleven early adopters; six early majority; and eight late majority.

The “slow street” or “open street” type of street experiment features a “Ciclovia” application (see Kuhlberg et al., 2014; Sarmiento et al., 2017). However, the “slow streets” measure differs from the original conceptualization of “open streets” in several critical regards. One, most describe the “slow streets” measure as a “soft closure” – that is, automobile traffic of local residents only may proceed, while with original open streets and ciclovias all motorized traffic are banned (except for emergency or delivery vehicles for both cases.) Through signs, barriers, and other indicators, car drivers must drive slowly (less than 20mph) and to expect people walking and bicycling (and engaging in other physical activity) in the street. An additional difference is that several “slow streets” are included in the intervention, sometimes forming a network, compared to one corridor or section of a street, as is the case with open streets. Furthermore, open streets are often promoted “events” with limited duration (typically one day), whereas the “slow street” experiments in our sample are lasting many weeks, even months (at time of writing). In essence, while closure to motorized traffic might be less extreme than classic examples of open streets in the US (limiting and slowing down rather than outright eliminating motorized traffic), both spatial extension and, especially, duration are more substantial.

Our analysis found different approaches for how the street changes were implemented. One approach was an application- or permit-based program, usually through a council-approved resolution (i.e., Dallas, Kansas City, Austin, Missouri, Long Beach, Los Angeles). This approach usually requires resident volunteers to initiate, apply, implement, and monitor street changes. In the case of Dallas and Kansas City, municipalities partnered with non-state actors (i.e., non-profit Better Block Foundation) to design and procure materials. Alternatively, efforts are shepherded by the municipality, usually by first “piloting” a small number of streets and then escalating efforts to more locations (i.e., Chicago, Portland, Seattle, Oakland).

Prevalent criteria to prioritize or nominate slow streets included low-volume neighborhood streets, identified routes in the city’s bicycle master plan, in higher density areas, and streets leading to commercial or transit corridors. In some cases, additional equity criteria were used, for example, areas lacking significant access to parks and open space, sidewalks and/or bikeways, areas with lower car-ownership rates, and in rare cases, areas of populations with disadvantaged health outcomes, communities of color and poverty.

7.2. Which dimensions of transformative change are present?

Radical. Half of cities reference a desire to achieve a future state of streets (in rare cases, the entire city) that differs from current, car-dominated conditions. Some use vibrant phrases to express ambitions to “re-imagine,” “transform”, and “envision” different purposes of streets, a common starting point in the process of transition management (Nevens et al., 2013). Many point out the value of streets as public spaces and therefore can serve a range of purposes other than moving cars (e.g., materials from Pittsburgh’s program assert and opportunity to “create a new norm” by “rebalancing vehicle space and people space.”) Few cities, however, explain how the street changes serve populations most in need, how they can form a network, nor how they could be leveraged to shift priorities away from a motorized transport network.

Challenge-driven. Even though a majority (93%) underscore benefits of their programs outside of preventing COVID-19 (i.e., physical activity, enhanced mental health and well-being, and, rarely, economic, transport or climate goals) we found only half to embed the measures into existing planning and sustainability policies, demonstrating an awareness of persistent challenges and potential synergies. Most commonly cited are the city’s bicycle master plan, strategic mobility/transport plans, or Vision Zero, a policy platform aiming to reduce traffic...
Some cities mention that community support and acceptance will drive their programs (e.g., results of satisfaction surveys). However, 40% of cities cited limited staff time and availability of materials as barriers to implementation, while they were also overcoming the barriers through volunteer recruitment and expedited or makeshift materials. We found robust evidence (70%) of support and engagement from elected and appointed city officials, commonly the Mayor, but also council members. The basis of their support varied from economic recovery of local businesses, mental and physical health of residents, equity, promotion of active mobility, and environmental benefits. One-third demonstrate efforts to solicit involvement and support from various community or advocate groups, especially in the business community but also school districts and public health organizations. A majority of cities seek involvement from residents (e.g., through volunteer recruitment) yet few demonstrate resident support of the programs (e.g., results of satisfaction surveys).

Feasible. Only two cities explain objectives for their programs that are specific and relevant, but less measurable and achievable, and only 40% reference an implementation schedule (i.e., phases or stages with a timeline). A few cities cite limited staff time and availability of materials as barriers to implementation, however, they are also overcoming the barriers through volunteer recruitment and expedited or makeshift materials. We found robust evidence (70%) of support and engagement from elected and appointed city officials, commonly the Mayor, but also council members. The basis of their support varied from economic recovery of local businesses, mental and physical health of residents, equity, promotion of active mobility, and environmental benefits. One-third demonstrate efforts to solicit involvement and support from various community or advocate groups, especially in the business community but also school districts and public health organizations. A majority of cities seek involvement from residents (e.g., through volunteer recruitment) yet few demonstrate resident support of the programs (e.g., results of satisfaction surveys).

Strategic. We found limited and mixed evidence of the interventions anchored in reflexive learning and evaluation processes; this is possibly due to the short and compromised time period. In the analysis, no concrete descriptions, from any city, explained how evaluative efforts will feed into long-term policy development. Many mention monitoring and evaluation of their programs, via online surveys, often containing only a few broad questions. Some surveys contain detailed questions (20–30) about specific locations, use, mode choice, perceptions, attitudes and suggestions to improve the program (i.e., Oakland, Seattle, Portland), also tracking demographics and location of residence. While many indicate ambition to scale-up the street changes to more and other locations, (through “adjustments” and “iterations”) in the very short-term, aspirations or pathways to expand programs were less common. Some cities mention that community support and acceptance will drive future decisions of the programs (i.e., Austin, Oakland, Portland, Salt Lake City, Seattle).

Mobilizing and communicative. We found strong evidence that all of the cities’ programs received local media attention; some on the national scale (i.e., Pittsburg, Los Angeles); and only 3 on an international scale (New York, Oakland, Seattle). Several cities devise and disseminate communication campaigns for the program, stimulating public participation, publicize the benefits, garner support, and gain feedback. Some cities maintain a blog function and offer online discussion formats (i.e., Oakland, Seattle). Oakland was the sole city to offer digital community meetings for the program.

7.3. How do different groups of cities compare to each other?

Fig. 2 compares the five criteria across the four quartiles, from which we can interpret salient patterns and characteristics. Cities that scored highest among the sample (“innovators”) included Oakland, Portland, Seattle, New York, and San Francisco. Most striking perhaps is that innovators achieved nearly 60% of possible points in the radical dimension, 54% of possible points in communicative and mobilizing dimension, and 52% of possible points in feasible dimension.

Clearly, compared to other quartiles, ‘innovators’ excelled in conveying a vision for alternative future (radical) and articulating implementation pathways and leveraging political capacity (feasible). Innovators often scored on low-frequency rubric items, such as acknowledging persistent challenges and linking the program to other policy goals (challenge-driven), commonly their Bicycle Master Plans and Vision Zero. These cities also wrote compelling descriptions of how equity deserves a specific and central role in the program. Noticeably, programs from these cities also attracted the attention of inter/national media and conveyed extensive public engagement efforts (mobilizing/communicative).

The ‘early adopters’ (11 cities) often scored on the lower-frequency items but did not regularly elaborate and rarely achieved points for; vision, scale and permanence, equity, or embedding in long-term plans. But several compensate with strong evidence of support from elected officials, residents or community groups. Evidence from the ‘early majority’ (6 cities) contained brief and general explanations. Many programs are volunteer-based, so even though some scored on “aspirations to scale up,” these programs did not address a network approach to street changes, rarely embedding the program into existing efforts.

Many dimensions are absent from the ‘late majority’ (8 cities). Descriptions of programs offer ambiguous sketches of isolated activities,
with little evidence of support and only (briefly) acknowledging benefits outside of preventing the spread of COVID.

7.4. Continued development

In efforts to assess development and longevity of the city programs, each was assessed six months following the initial analysis, again using information published on city websites. Gleaning reliable updates was challenging because, for example, some cities transferred their initiatives to other programs or ceased to provide operational updates. Of the 30 cities, 50 percent (15) continue to be in progress, including 6 cities which have expanded and/or made permanent some of the experiments. Furthermore, 30 percent (9) of the programs have discontinued, and 13 percent (4) have been reduced. (Information could not be found for two cities, 7%.) For cities which have reduced or discontinued their programs, many acknowledge encouraging levels of public support but cite costs and limited staff resources as barriers to continue. A few cities indicate plans to re-launch after winter months, depending on resources and the pandemic situation. For example, while Providence ended their program, some street changes were made permanent.

Each of the “innovator” cities have either expanded or strongly continue their programs. Within the classifications of “expanded” and “in progress”, eight cities indicate very active, if not tenacious, expansion or deepening of existing efforts. Programs in Portland, New York, and Oakland are in progress with strong indications of being furthered with updated evaluative and public engagement efforts. Seattle, San Francisco, Washington, D.C., and Boston have spatially expanded their programs with discrete implementation phases and embedding into ongoing equity and mobility policies. Boston, one of the few “early adopters” to have expanded, demonstrates a keen awareness of synergies with on-going sustainable transportation policy efforts, paying specific attention to equitable recovery and mobility needs of vulnerable groups. Tucson has garnered funding to expand their program. Just one-third of the “early majority” and “late majority” programs have endured, most of which were the volunteer-based application. Only one city in the latter category, Washington, D.C., appears to have gained in strength. According to documentation, the city has incorporated an evaluation instrument, embedded their “Slow Streets Initiative” into existing Vision Zero and bike share programs, and has assigned “community engagement specialists” for support.

8. Limitations

In light of COVID conditions, efforts to assess on-the-ground and evolving policy solutions are constrained. Because cities articulate and disseminate efforts using digital publishing platforms (i.e., their websites, blog functions, press releases, social media) the timing of both the publications and our search for them crucially either included or excluded them in our analysis. To cope with this limitation, we performed a second search. Although the data emerged directly from municipalities (i.e., as opposed to blog posts prepared by journalists), the information contained in these published documents may or may not be fully representative. Therefore, we are not able to eliminate all biases in how the documents were written and what they reported (Yin, 2003).

Evaluation instruments, such as the rubric developed for this study, hold the potential to oversimplify complex phenomena. The dimensions we intended to capture (e.g., radical, challenge-driven) may have been abbreviated in their accuracy or precision (Gerring, 2001). Scales intending to measure process, on-the-ground activities, objectives, scale, support, and involvement of actors, can overlook contextual conditions. For example, our rubric did not include metrics for analyzing pre-COVID social, political, organizational, and environmental characteristics, histories, and dynamics. Furthermore, it was unable to gauge shifts in personal mobility that may have emanated from the street experiments. Doing so would require an alternative research design, or at least additional rubric items specifically designed to assess behavior change (see Bertolini, 2020, for an overview of methodologies and impacts from street experiments). We intend for the concepts that we operationalized to stimulate further dialogue, derivation, and application.

9. Implications and discussion

“Overall, the mobility sub-committee saw this time of crisis also as a moment of opportunity. It has been an unintentional demonstration of traffic reductions, shared streets and human mobility. It has demonstrated that we should not have an objective to just get back to where we once were in terms of sustainable mobility, but we can and should exceed it.” – Pittsburgh Streets & Mobility Task Force (May 2020).

“Crisis can create not only severe devastation, but a unique opportunity for systemic change and fundamental re-invention. In normal times, such fundamental change would require long-term strategic efforts as well as major investments of time and resources without guaranteed success. Crises, however, disrupt the status quo in basic ways allowing for new assumptions, methods and organizational values to emerge.” – Seeger et al. (2005) p. 92.

Seminal research on disaster and crises recovery in urban settings has drawn attention to these events as peculiar periods of time; not only causing devastation, crises expose existing system vulnerabilities that are often exacerbated by the pressure and urgency of emergency...
situations (Berke et al., 1993; Nakagawa and Shaw, 2004; Seeger et al., 2005; Smith and Wenger, 2007). As Seeger et al. (2005) and others point out above, the process of recovery cultivates “re-invention” of assumptions, methods, and values. Scholars have compared this period to a “window of opportunity”, where separate streams of policies, problems, and politics favorably come together and, as the above example from Pittsburgh can attest, create unprecedented space for reassessment, realignment and restructuring of priorities. The “window of opportunity” is not only to rebuild, but, in a normative understanding, to eclipse the status quo – to trigger systemic change.

The questions guiding this paper are therefore highly relevant: can emergency response measures in city streets be relied on to transform – or at least transition – urban mobility? Our findings highlight several salient governance conditions that in such urgent situations may compel capacity and willingness to innovate that otherwise may not be present.

9.1. Leveraging existing capacity and cultivating political support

An organization’s capacity to learn and innovate depends on contextual factors such as level of staffing, leadership support, active relationships, and an organizational culture supportive of new ideas (Argyris and Schon, 1978; Glaser et al., 2019). Given expectations of new programs within their Vision Zero efforts. Mayoral support in 2018 (City of Seattle). Many cities situate their programs reducing or discontinuing after 6 months, evidence suggests that measurable program objectives, or descriptions of pathways leading to sustainable governance conditions that in such urgent situations may compel capacity and willingness to innovate that otherwise may not be present. If not, how can the initiative work in the medium to long term?

9.2. Steering through learning?

Our results point to initiatives that change the character of streets as highly mobile policies, capable of accelerating the typical slow pace of public administrations. In a short time period (approximately three months), staff from 30 U.S. municipalities learned, gained support of and translated a concept to their own unique urban context, suggesting successful “policy transfer” – a process where ideas from one community are borrowed and applied in another (Dolowitz and Marsh, 2000). Evidence suggests that cities did not follow the traditional approach of policy transfer or policy learning: they did not gain “first-hand experience” of the policy (Rose, 1993), for example by traveling to a city with a successful program, a common practice among transport professionals (Glaser et al., 2020). They likely did not spend weeks vetting its applicability. It appears these initiatives advanced to the top ranks of “best practice” – even without validation of monitoring results, theorized to support policy learning processes (Blake et al., in press; Stead, 2016).

Therefore, we surmise that various policy learning processes, i.e., collective deliberation (Hall, 1993), quickly took shape and, contrary to empirics, indeed resulted in a policy outcome – a street experiment. Recognizing the binding time constraints and pressures that come with implementing emergency measures, an important finding stems from the limited evidence to more deeply embed these experiments into long-term learning and policy development. In the low-scoring “strategic” dimension, we rarely encountered evidence of evaluation plans, measurable program objectives, or descriptions of pathways leading to permanent, city-wide change. Echoing eminent urban planning scholars, transitions literature express the importance of widespread consensus for building a long-term vision coupled with short-term objectives (Healey, 1998; Innes, 1996; Loorbach, 2010). In this regard, the experiments seem to be left very open, rather than embedded in a broader transition strategy. This line of thought would ask planners and officials involved, what can the initiatives learn in terms of structural change and how can the initiative work in the medium to long term?

These results leave room for further understanding. What underlying conditions, beyond the urgency of COVID, allowed for such a rapid acceleration of the typically lengthy public policy process? What processes were perhaps prioritized over others? Were these measures used as strategic opportunities to foster new partnerships with stakeholders or decision makers? Did perhaps some cities benefit from entrepreneurial employees, also called “inside activists” (Olsson and Hysing, 2012) or other “policy entrepreneurs” (Kindgon, 1995), working within the context of municipalities to advance new rules, protocol and expectations to guide how street space is used? Understanding answers to such questions could illuminate patterns of critical actors, networks, or collaborations that expedited capacity-building processes that may propel change beyond the pandemic.

10 For example, empirics on sustainability highlight the collaborative governance structures cities such as Seattle (Mercier et al., 2016) and the existing efforts of cities like Portland and New York to build cycling infrastructure (Pucher and Buehler, 2016).
10. Concluding remarks

Viewing the context surrounding COVID as one rich for experimental opportunity, this research inventories emergency response street changes from the 55 largest U.S. cities and analyzes their nature. We therefore interrogated how emergency response actions could be leaned on as guideposts to transition to an alternative type of street and therefore, possibly an alternative transport future. Drawing from theories of sustainability transitions, we developed and applied a novel rubric methodology.

By looking at the response measures, we observe that “innovator” cities excelled in their efforts by combining feasible, challenge-driven, and communicative and mobilizing dimensions. The vulnerabilities of the initiatives showed that cities, across all groups, demonstrate limited efforts in evaluation and long-term policy development (the strategic dimension). Cities that scored higher may have profited from planning frameworks already in place, or under development prior to the emergency. After 6 months, and despite acknowledged public enthusiasm, half of the programs have been discontinued or reduced, likely arising from limited staff resources.

We see notable progress toward a broad recognition that the current character of streets considerably impedes transport by human-scaled means (e.g., bicycles). Many of these efforts called into question the purpose(s) of city streets in terms of health and economic activity and recovery. Some response measures drew attention to the scale that is needed—spatially, in terms of creating new street networks—and the equitable distribution of where change would most benefit those without access to cars, transit, public and green space. On varying scales and with different approaches to implementation, it is clear that municipal actions can accelerate the adaptation of urban street space, and, in this case, a health crisis serves as a stimulus to a more radical and challenge-driven renewal.

To the extent that these experiments continue to evolve or become permanent, the conditions we document provide baseline data for future investigations. For example, what is the role of previous experience with crises or experimentation? What was learned from the experiments and what becomes of their successes or failures? What kind of experimentation, over the long-term, generates regime change? We see some of the response measures as experiments that, with further testing, could seed components for a revolution in how city streets are used and designed. But attempts to transition “streets for traffic” to “streets for people” face considerable obstacles. Planners, elected officials and researchers have a responsibility to accelerate aggressive reform by focusing efforts on human-scaled transport networks in cities—and, quite possibly, to seize a new “window of opportunity” (King and Krizek, 2020). One challenge is to explore how existing, auto-oriented street planning regimes can gracefully age and be replaced with minimal social and environmental impact, all while maintaining or increasing the reliability of the services that streets provide.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this viewpoint.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.tranpol.2021.01.015.

Author statement

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