One of the things that was significantly different during the first two months, and that might have 'spoiled' the homeowners in the inner city was the soundscape. Suddenly birdsong was what was flowing in through the open windows instead of the noise from traffic. The city was slowed-down. This was a quite different experience since movement and motility had become part of the urban script and soundscapes. Since the early 1930s Le Corbusier has wanted the city to be a space where the automobile cuts through like a bullet, a projectile. In fact, we have the cities the modernist planners have always wanted and designed. As Lübbe (1995) put it, modern societies were just not able to anticipate and envision the unintended consequences of transforming the urban space of exchange and interaction into transit spaces. Not even the planners in Munich in the 1950s and '60s were able to imagine that the monocentric development of the city and the building of ring roads and an S-train network right through the city center would attract more than 90,000 workplaces in the old town, with only 9,000 people living there. Quite obviously, societies' capacities to predict and anticipate future situations and developments are limited. COVID-19 has functioned as a strong reminder of this. Suddenly, all the things that cities also are other than speed and acceleration were brought to the surface, not least through smell, noise, and the embodiment of the urban became different.

This raises the question of whether cities, regions, and whole nation states can stay on a linear track of increasing their ecologies of speed and acceleration. Can we continue to think of cities as hypermobile spaces of global connectivity and transfer points, interfaces on global markets, supply- and value chains? Mobility is a general principle of modernity. But what exactly is mobility, and does it have to prioritize physical movement in the way as it has been the case so far? This might sound naïve against the backdrop of a globally connected economy where every high-tech product from a mobile phone to the laptop, the car and any light rail or scooter on the streets is dependent on highly complex and globally interdependent transport logistics, supply chains, and globally distributed labor. But it nevertheless raises the question if the experience of a slowed-down and quietened city can provide a learning opportunity that makes us reconsider acceleration once the fear wears off. But so far, fear is still a strong control mechanism. In the"opening up" phase of COVID-19, fears were even more strongly imposed with 'social distancing' as a global signifier. This created a fear of physical presence, making the individual car the 'safest' mode of transport and public transport an 'incubator' of fear. It stalls the work on the transformation of the 'system of automobility' (Urry 2004) into a system of multiple mobilities, when suddenly the concept of multiple mobilities comes to imply enormous risks for individuals, governance, and the economy. Physical distancing has nonetheless also meant a new wave of promoting cycling as the sustainable and healthy alternative. So, the interesting question is what the future of sustainable mobilities looks like or if there is any lesson to be learnt from the raging standstill of cities.

Mobility–COVID-19–sustainability

To date, modernity treated mobility primarily as a positive element of life and a business catalyst. Companies, markets, and even national and transnational organizations institutionalized mobility as an imperative in their daily routines (see Kesselring 2006; Salt 2010). In other words, more mobility meant more socio-cultural competence attributed to an individual. And on a different scale, more mobility, interaction, exchange and (global) division of labor meant the expectation of more social and economic benefits. The social and cultural meaning of mobility is already in a process of discursive transformation due to the focus on climate change toward being a man-made, a second-order risk, to the world, cities, and the wealth of nations. Mobility and transport have been climate policy's biggest headache to date (Canzler and Knie 2016).

The immobility imposed by the COVID-19 pandemic has, as something of an unintended side-effect, highlighted the climate change agenda. Satellite photos from NASA have shown significant atmospheric changes due to closed cities and factories. A bird's-eye view on Wuhan (the Chinese metropolitan epicenter of the December 2019 COVID-19 outbreak, home to 11 million) taken before

and during the crisis drastically illustrates what the current carbon-based system of mobility does to a city and its people. Of course, China and its carbon footprint constitute an extreme example; but nevertheless, cities such as Munich, Stuttgart, Milan, or Stockholm are under massive pressure to meet the European and national threshold values, even if their CO_2 emissions are far from those of Chinese cities. The European New Green Deal and the EU strategy for mobility and transport turn out to be more than just hot air, made visible by the COVID-19 pandemic.

The situation today has some similarities with the 2010 ash cloud situation when Icelandic volcano Eyjafjallajökull erupted and airlines needed to shut down transatlantic flight routes (see special issue in Mobilities vol. 6, 2011). COVID-19 reveals the fragility and dependence of modern economies and living arrangements, and the vulnerability of global supply chains from functioning travel connections, the freedom of mobility, and the capacities of individuals, companies, political organizations, and so forth to move freely, ideally seamlessly, reliably, and on time. Stock exchanges draw parallels to the 1929 'Black Friday' experience, and it becomes obvious that welfare states and the global economy will suffer for years from the consequences of enforced immobility. With mobilities we have created a model which creates this wealth, which we consider as normal, even if we are aware of 'living well at the expense of others' (Lessenich 2019):

> (…) eating an exotic fruit for breakfast, working for an international company during the day, skyping with friends on the other side of the globe in the evening. And then, as in the Marxist utopia, to 'criticize after dinner, just as I have a mind'–and to think about where to go for my next holiday, a city break or cruise, the Northern Lights or glacier calving in Patagonia (Lessenich 2019, 93).

In the climate change debate 'flight shame' (Swedish *flygskam*) emerged as a new discursive framing of aeromobilities when environmental activist Greta Thunberg entered the global stage in 2018. The COVID-19 pandemic added to the concept of flight shame when suddenly flying to a holiday destination is not only about the global environment but also about entering into a risk situation, and not least, infusing risk and fears in everyday environments upon return. The summer of 2020 became the (first) year where flying to a vacation destination is no longer a symbol of wealth and excess, but rather something loaded with fear and the need for justification. The term "staycation" as a signifier for the responsible and morally right way to spend holidays at home has become part of everyday vocabulary (Figure 2).

This opens up a new way of rethinking, reconceptualizing, and repoliticizing mobility in relation to European policies. COVID-19 puts 'virtual travel,' for example, in a completely new way on the agenda. In fact, it raises the questions of whether European mobility culture can still be mainly

Figure 2. Photo © tanaonte / stock.adobe.com

oriented toward the corporeal travel of people and the physical movement of objects, and how much imaginative, virtual, and communicative travel there will be.

Against the backdrop of digitalization, AI, advanced production systems and the omnipresence of multiple mobilities–physical, digital, virtual, communicative, imaginative etc.–we are getting into a social situation and formation which seems to be significantly different from earlier days. Voices can be heard, still carefully but with an increasingly louder tone, speaking of a third modernity, a digital age, or the age of simultaneity and acceleration (Wessels 2018; Lash 1999). A glimpse of this third modernity can be seen in Johannes Weyer's book *Die Echtzeitgesellschaft* (Realtime Society), which shows how the social foundations of a software-based, 'smart' society are changing, transforming the social DNA of modern societies into a digital DNA. In this line of thought almost everything seems possible. Elliott (2018) calls it a 'technological tsunami,' an unstoppable wave of artificial intelligence which will be soon part of our lives when cooking, using diverse medias and information, moving around in public transport and automated vehicles. But at the same time, against the *zeitgeist* of technological feasibility and techno-optimism, (global) social inequalities and the negative side-effects and counterproductive impacts of linear modernization strategies become more and more present in scientific and public arenas (Lessenich 2019; Urry 2014, 2013). Protesting young people can no longer simply be belittled and marginalized. Public figures such as Greta Thunberg initiating Fridays for Future stand for a highly competent, scientifically skilled mature new type of political activists and confident young citizens fighting for a sustainable future. Politicians find themselves under siege and confronted with high expectations to make sustainable development goals happen and go beyond gentle and disguising rhetoric. And even if right now COVID-19 is overshadowing almost everything, public discourse on sustainable development has gained power since the ratification of the 2016 UN treaties on sustainable development in Paris. In Germany, the green party has realistic chances to be part of the next national government. Natural scientists have left their comfort zone to choose a new, rather drastic language to make unmistakably clear that the Paris Agreement of keeping global warming below 1.5 degrees faces a serious risk of failure (Lenton et al. 2019; Stern 2007).

But still, high hopes lie in the technological feasibility of sustainable solutions for the modern society and for the mobility of people, industries, everyday life, businesses etc. For some, Elon Musk and other entrepreneurs represent a new type of disruptive innovator/business activist who might bring the necessary new technologies to the fore that can solve mobility and the GHG problems of modern capitalist societies. Efficiency and acceleration still seem to be the new and the old credo able to change development paths in a world where speed, comfort, and playfulness – the gamification factor – have become key selling arguments. But in the light of COVID-19, the quiet and slow city, the immobility, allows speculation as to whether this might entail opportunities for learning and listening to other alternatives where cultural change is a pathway toward sustainable mobility.

Mobilities–futures–mobility cultures

What is at stake due to the COVID −19 situation are new entry points into the discussion on how to achieve sustainable mobilities. As an example we will briefly introduce an example of a sustainable mobility discussion that took place before the global pandemic. In 2017, the German member organization of Friends of the Earth (BUND) initiated a study entitled 'Mobile Baden-Wuerttemberg. Transformative Pathways toward Sustainable Mobility' (Baden-Württemberg 2017). With eleven million inhabitants, Baden-Württemberg is Germany's third-largest federal state, with Stuttgart as its regional capital. This area is the cradle of the modern automobile with a wide range of small- and medium scale manufacturing industries keeping the worldwide 'system of automobility' (Urry 2004) up and running. When the report came out there was a limited optimistic perspective that it could influence a political agenda and helps broach the question: Can we rethink mobilities in, and the mobility cultures of, cities and regions? Or more precisely: How do we take into account how

people live, how they organize their everyday and working lives, and what constitutes their routines, their beliefs, and the socio-cultural foundations of what they consider to be normal, necessary, convenient, and comfortable? The report presents three scenarios:

(1) *New individual mobility*: the car remains the dominant mode of transport, electric mobility contributes to cleaner air, automation increases comfort and convenience in transport, also through individually owned automated cars. Freight transport and air traffic are increasing.
(2) *New mobility services*: new innovative mobility concepts, new business models, and vehicle sharing, a diversified supply of access and intermodality between public and private forms of mobility. Private car fleets are decreasing and public transport and bicycles increase, automated vehicles become the standard. Overall growth in freight transport and air traffic slows down.
(3) *New mobility culture*: people travel significantly shorter distances and use highly flexible public transport systems. Public transport comprehensively provides ride sharing services with different vehicle sizes, many of them automated; individual (automated) car transport and ownership play a minor role; road and parking spaces become public spaces and can be used for cultural and social activities and for non-motorized transport. Neighborhoods become almost completely free of cars and people use all sorts of non-motorized and low-energy modes of transport. The demand for regional and long-lasting products increases and it comes to a trend reversal in the growth of freight and air traffic.

Scenarios 1 and 2 refer to the predominant discursive storylines on the future of mobility: technological transformations will resolve the issues of climate change. Both conceive the changes in mobility systems mainly as a project of technological modernization and increased efficiency. This discussion has a longstanding tradition in sustainability studies as well as in engineering disciplines. It is still key to all sorts of ecological modernization policies aiming at increasing the sustainability of energy-based systems (von Weizsäcker and Wijkman 2018; von Weizsäcker, Lovins, and Lovins 1997). But the third scenario in the report clearly breaks with technological efficiency as the major discursive frame and instead emphasizes the need for a radical change in mobility cultures. It puts another topic on the agenda that shows significant similarities with the 'local sustainability scenario' developed by (Dennis and Urry 2009). The table below is taken from the report. Color-coded like a traffic light, it shows the sustainability impacts of all three scenarios and their potentials to meet the sustainable development goals of the United Nations to keep global warming below 2 degrees (Figure 1).

Only the dimensions with light grey buttons approximately meet the sustainability goals while the dark black ones do not meet them at all. Scenario 1 (mainly technological efficiency) and 2 (technological and organizational efficiency) show that technology and the reorganization of mobility and transport based on new services and artificial intelligence/smart digital technologies are not sufficient. Scenario 3, where a new mobility culture is at center, is the only scenario able to meet the UN goals. This scenario presents a significantly different societal and economic relationship and definition of growth and wealth – and a social life based on significantly less distance traveled.

This study clearly highlights how technological fixes are not a pathway towards meeting the threats from climate change and the sustainable development goals. Not in the narrow sense of CO_2 emissions, and surely not in the wider sense of global justice, social integration, participation, gender equality, and the like. New technological solutions like electrification, hydrogenization, fuel cells, and the automation of mobility etc. will not meet the goals formulated in the Paris treaties Table 1.

Thus, the mobility transition has to be much more than just the transition from one predominant drivetrain system to another. In particular, if the main orientation–as the case of Elon Musk shows–remains the same: speed, comfort, convenience, and the playfulness of technologies. In other words, as long as the main concept of the automobile society rests on the 'Rennreiselimousine' (Canzler and

Table 1. Baden-Württemberg Stiftung (2017: 239).

	Indicator	New individual mobility (NIM)	New services (NDL)	New mobility culture (NMK)
Environmental	GHG emission	●	●	●
	Energy consumption	●	●	●
	Consumption of electricity	●	●	●
	Consumption of non-energetic resources	●	●	●
	Land use	●	●	●
	Emissions of air pollutants	●	●	●
	Noise emissions	●	●	●
Economic	Traffic performance (public transport)	●	●	●
	Modal split in freight transport	●	●	●
	Employment rate mobility industry	●	●	●
	Turnover mobility industry	●	●	●
	Mobility costs	●	●	●
Social	Movement/active mobility	●	●	●
	Mix of different utilizations	●	●	●
	Accessibility	●	●	●
	Quality of lingering in public space	●	●	●

Knie 1994), a machine able to run 1,000 km and more in one day, the sustainability of the 'system of automobility' cannot be reached. Instead, it is the cultures surrounding mobilities and shaping the practices of mobilities that need to change. In many ways, the COVID-19 pandemic has been a 'trial case' for some of the changes that need to happen in scenario three and to meet the Paris Agreement. It was, maybe only for a short while in the period of the total lock down, enforcing new mobility cultures, where we tried out a modern everyday life where speed and mobilities was not at center. Even if automobility is now picking up again, COVID-19 created an unforeseen tipping point, a reflexive element in mobility politics. The current strategy of control through fear is not so promising in terms of reaching a tipping point in automobilities when it becomes the transfer point between immobility and mobility in the mobile risk society under COVID-19. And currently many people might be dissuaded from ride sharing, but on the optimistic side the experienced deceleration might push toward a future where the car is not as much in the center of the new system as it was in the past.

At least what we have seen is that the third scenario that before COVID-19 seemed unthinkable has gained plausibility and might show a possible option for modern lives. In both Denmark and Germany stories in the media about everyday life under COVID-19 were full of frustrations but also full of a rediscovered life quality with less mobility and more time for family life. We do not know yet, and we have serious problems imagining what exactly will be the impacts of these temporary COVID-19 transformations for cities and regions. But this much can be said with certainty: the future of mobilities has never before been as open as it is now and we have to try out the unthinkable third scenario. And with this openness of mobility systems comes a window of opportunity to redesign cities and flows. So far, what we have seen in several cities are parking spaces having been taken over by restaurants in order to meet the rules of physical distancing. This has been an ongoing discussion

Figure 3. Photo: © by the authors

in relation to the use of urban space and the right to the city that is now suddenly possible. The picture below shows how four parking spaces in Munich now facilitate outdoor dining Figure 3.

An increase in cycling during COVID-19 has been reported in cities around the world. Maybe the post-fossil and sustainable city might have gotten a push from an unexpected and unforeseeable side. In many ways COVID-19 plays into a tactical urbanism at work (Freudendal-Pedersen 2020; Lydon, Garcia, and Duany 2015) where urban space beyond COVID-19 gets reclaimed and sometimes even reconquered.

Concluding remarks

From the organization of everyday life and daily commuting to business travel and maintenance of social relationships, traveling and being connected to others across time, space, and (often large) distances have become a modern 'normality' (Jensen, Kesselring, and Sheller 2019; Sheller and Urry 2016; Urry 2007; Rosa 2003). COVID-19 threatens the modern societies right at the core where they are the most vulnerable. The fragility and disruption of modern mobility systems has become obvious in a way never seen before. COVID-19 forces European societies (and beyond) to rethink their fundamental concepts, routines, and procedures of interaction, business, and logistics primarily grounded in physical travel and transport.

Modern lives, economy, and culture are grounded in mobility, in an increasingly holistic understanding of different mobilities from physical to social, communicative, digital, and imaginative travel. The portfolio of a modern human being implies many different capacities, competences, and skills; mobility and the capacity to navigate movements between different contexts, value systems,

and expectations has become increasingly the key as a signifier of competence, expertise, and qualification (Kesselring 2015; Millar and Salt 2008; Boltanski and Chiapello 2005). Modernity, intercultural competence, and a cosmopolitan mindset are often seen – e.g. in human resource management – in close relation to the mobility biography of an individual. When people apply for jobs, their CVs often show specific itineraries from and to educational places, locations, and cities. The modern mobility imperative has become embedded in modernity from literature and arts to institutional routines and practices, to the modern mindset of an individualized person and to urban planning and the design of technologies and infrastructures. The COVID-19 pandemic has seriously questioned this mobility imperative.

It has shown how the livable and human-scale city is far from the technocratic planning ideas of speed, efficiency, and accessibility. It has shown that a mobility culture is possible that does not solely fetishize speed and time efficiency. In other words, what we can learn from COVID-19 is how to structure existing and future cities, and the *scapes* of cities. This is also a question of how to 'design' the social layout of human interactions. In 'reopening' public spaces, new strategies suddenly had gained societal and political acceptance and legitimacy of the measures required. Further investigation of urban projects will very likely reveal modifications in social configurations within neighborhoods and everyday life due to COVID-19 and provide data that do not show up in common data sets, models, or simulations often used when planning urban mobilities. This lack of data when planning cities was already highlighted by Jan Gehl in 1966 (2011 in the English version) in his book *Life Between Buildings*. Gehl addressed the importance of a holistic (sustainable) planning for urban life. The culture of everyday life, slow time, and rhythms are rarely consciously reflected or addressed. As such, we all know they are difficult to grasp in models and handle at the planning stage (Lyubomirsky, Sheldon, and Schkade 2005; Amin and Thrift 2002). The organization of urban space and access to it has changed during COVID-19, and so has the soundscape of the urban. This learning might present opportunities to start a change in the relationships between people and mobility artifacts. Instead of being stuck in the modern quest for the optimum, the one-best-way-solution, COVID-19 might provide an opening in society to experiment with possible and multiple-best-way-solutions at a time where mobilities and their impact on economies, cultures, and cities have shown their vulnerability. Unfortunately, it seems societies might have much more time for these experiments than expected. As epidemiologists do not get tired to emphasize, COVID-19 might not be a fast disappearing episode but a normality for quite some time. In terms of mobilities research we are right in the middle of the biggest living laboratory ever and so far.

Notes

1. Translation from German by the authors.
2. As noted by many, it is also quite interesting why 'social distancing' and not 'physical distancing' became the wording of choice. Part of the explanation might be found in the need for control mechanisms. The aim is to keep people away from having any wish to socially interact with anyone apart from those they live together with.
3. See: https://www.ted.com/talks/bill_gates_the_next_outbreak_we_re_not_ready?language=da#t-22223

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