Transportation and environmental justice: History and emerging practice

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INTRODUCTION
Transportation systems are fundamental to participation in modern societies. We need effective transportation systems to connect us to opportunities that are distributed throughout space. Access to work, healthy food, medical care, education, recreation, and social interaction are all facilitated by highways, public transit lines, and non-motorized facilities. But this access is not shared equitably across space or demographic groups (Bullard et al. 2004; Ihlanfeldt & Sjoquist 1998; Lucas 2004; Taylor & Ong 1995). Historical and ongoing planning practices and investment decisions have tended to disadvantage those who live near to transportation infrastructure and who choose to or cannot afford to drive (Avila 2014; Golub et al. 2013; Henderson 2006; Mohl 2002). Most often those populations are low-income people and people of color. In the United States (US), this disconnect runs counter to federal and state law and the stated goals of regional transportation and public transit planners. Similar disparities have been reported in the European and Global South contexts (e.g., Lucas 2012).

This chapter provides an overview of the academic and applied understandings of how justice might best be achieved in the domain of transportation. The emphasis is on the US experience because of its fraught transportation policy and planning history, the subsequent creation of federal laws and regulations focused on public involvement and justice, and the emergence of advocacy and philanthropic organizations aimed at meaningful legal and regulatory enforcement.

We begin by outlining the academic evidence on environmental injustice in transportation related to three dimensions: (1) inequitable access to participation in the planning process, (2) inequitable exposure to localized environmental burdens, and (3) inequitable distribution of the benefits of transportation investments and systems. We also address how justice or fairness should be conceptualized along each dimension. Although our examples are drawn largely from the US, similar injustices can be identified across the globe. We then turn to the legal and policy framework for achieving (environmental) justice in the US and briefly discuss how transportation planning agencies address environmental justice in their practices. Finally, we turn to the role of civil society. Because of the tenacity of these injustices, communities, non-profit organizations, and public interest attorneys have begun to create their own frameworks geared towards the achievement of justice. The chapter concludes by synthesizing best practices from the academic literature, agency practice, and community activism to chart a path towards and develop an analytical framework to advance an equitable and just transportation system for the US and beyond.

ENVIRONMENTAL JUSTICE AND TRANSPORTATION

Participation and transportation infrastructure siting
The issue of participation in decision making has been subject of extensive study and theorizing and its scope reaches well beyond the environmental justice or transportation literature (e.g., Arnstein 1969; Chess & Purcell 1999; Innes & Booher 2010). Two dimensions of fairness can be distinguished with respect to this area. The first concerns the level of participation: the extent to which citizens should be involved in public decision making. There is widespread agreement that more meaningful forms of public involvement are required, but opinions diverge about what level of participation is morally required and what is practically feasible. The second dimension relates to the question of who should able to participate in decision-making. One key issue here is that the delineation of some level of participation does not automatically imply that all citizens have a comparable power to affect outcomes. Some forms of participation may formally be open to all, but still tend to exclude some groups from meaningful involvement, amongst others.
because of the skills and resources required for participation (language, technical expertise, public speaking ability, time, etc.) or the need to organize. Thus, merely extending the possibilities for citizen participation without affirmative policies or actions to involve those traditionally excluded does not necessarily move the decision-making process towards justice, as particular groups may benefit much more from increased opportunities for involvement than others. Likewise, limiting involvement may do little to create a level playing field, as some actors have easy access to decision-makers irrespective of formal avenues for participation.

Public participation efforts in transportation have evolved from an early period of stark injustice to include some contemporary efforts with promising outcomes aimed at inclusivity and impact. The profound shortcomings of the early efforts were clearly on display during the construction of the interstate highway system, which began in earnest following the passage of the 1956 Federal-Aid Highway Act. Requirements for public participation at that time were virtually non-existent and limited to a single hearing at which representatives of the state department of transportation would announce that a particular highway had been sited and construction was planned. After widespread negative reactions to this policy, the requirements were increased to two hearings by 1969 (Weiner 2008, pp.59–60). But the toll on low-income and communities of color had already been taken. As summarized by Mohl (2002), entire African American business districts were decimated (pp. 30-38). In some cities, tens of thousands of black, mostly low-income residents were displaced by freeway construction. This type of community destruction was not limited to highways. In the San Francisco Bay Area, construction of the Bay Area Rapid Transit (BART) system wiped out a thriving black business district in West Oakland (Self 2005).

It is difficult to imagine that robust public involvement campaigns would have mitigated the worst of these excesses, but they certainly would have made these issues salient prior to, rather than after, construction. According to Schlosberg (2004), procedural justice – access to the process and an opportunity to have your voice heard – is a key element in achieving a just distribution of outcomes. The oft-cited EJ mantra “We speak for ourselves” embodies a similar sentiment (Cole & Foster 2001). Despite increased emphasis on and development of methods for conducting robust public engagement efforts in the wake of the 1991 Intermodal Surface Transportation Equity Act (ISTEA), problems remain. Aimen and Morris (2012, pp.1–17) helpfully make a distinction between mere “public involvement” and “meaningful involvement.” While the former emphasizes a one way flow of information from agencies to the public and seeks to manage interactions with the public, meaningful involvement seeks to provide the opportunity for individuals to change the outcome of a particular course of events or a particular project.

There have been promising practices in meaningful involvement, subsequent to the end of major interstate construction in the late 1970s. Although these facilities continue to act as dividing lines in many communities, there are examples where freeway teardowns or reconstructions have resulted in mitigation of early injustices (Mohl 2012). These usually involve robust public engagement efforts. In Oakland, California, the Loma Prieta earthquake destroyed part of Cypress Freeway. Constructed in 1957, the highway divided the vibrant black community of West Oakland. Despite the high costs of construction and right-of-way acquisition, the new alignment avoided the community, reconnecting what had previously been separated (FHWA 2000). Part of the justification for the Atlanta Streetcar project in 2014 was to provide a link for the black community in Downtown Atlanta that had been separated by interstate construction (Ball 2014). Yet despite these successes, projects and plans strongly opposed by advocates and
community members, and which tend to benefit wealthier, whiter transportation system users continue to be pursued. In the San Francisco Bay Area, a rail connection to Oakland International Airport opened in 2015 to much fanfare, but the project was earlier found to run afoul of civil rights laws and was opposed by transit equity advocates who argued that the funding could be better spent to meet the needs of transit dependent populations in the region. Clearly, historical patterns of transportation decision making continue to shape contemporary space, especially for disadvantaged populations in the US (Golub et al. 2013).

**Environmental burdens**

Transportation systems produce environmental burdens including air, soil, and noise pollution, related health impacts, and traffic safety risks for users as well as non-users. Furthermore, as noted above, transportation infrastructure physically alters urban space, creating barriers between places that were previously connected, or, when placed in dense urban environments, razing entire neighborhoods (Bullard et al. 2004; Mohl 2012; Schweitzer & Valenzuela 2004). More specifically, burdens should be distributed so that each group’s share is roughly comparable to its size, with deviations from the ideal of perfect equality between population groups acceptable as long as they remain within reasonable boundaries. While intuitively attractive, the proportionality principle is difficult to apply to transport systems in practice for a number of reasons. First, by their very nature interventions in the transportation system have disparate impacts over space. It may therefore be practically infeasible to avoid disproportional impacts (whether in favor or not of disadvantaged groups). Second, the proportionality standard largely ignores processes of residential mobility. As long as residential location patterns are largely the result of market factors, it may be expected that higher income groups will disproportionately reside in neighborhoods with low levels of traffic-related pollution and a high quality of life. As long as race, ethnicity and gender are strongly correlated with income levels, it may be expected that these groups will thus carry a disproportionate share of the burdens generated by transportation systems, even if transportation interventions live up to the proportionality standard. The proportionality standard is thus by no means beyond scrutiny.

Academic research has shown that people of color and low-income populations indeed carry a disproportionate share of transport-related burdens. The most blatant injustice has already been discussed above: the displacement of entire neighborhoods housing mostly poor people of color to clear the way for massive highway building schemes. These deliberate forms of injustice may largely be a thing of the past, but more subtle forms of injustice are very much present in all major cities in the US. For instance, Rowangould (2013) found that, while almost 20% of the US population lives within 500 m of a road carrying a volume of 25,000 average annual daily vehicle-trips, approximately 24% of the black population and 30% of the Latino population live within that same buffer. Air pollution concentrations are known to be elevated within these short distances from roads, yet regional monitoring stations are not sited to capture near-roadway conditions (Karner et al. 2010). This proximity translates directly into health outcomes including increased risk of cardiovascular and respiratory illness and cancer (Chakraborty 2009; Gauderman et al. 2007). While these patterns may partly be the result of market-driven processes
of residential competition and selection, they are a main concern for the environmental justice
movement, not in the least because in neighborhoods with high concentrations of people of color,
air pollution concentrations routinely exceed regional averages and other traffic-related impacts
including noise, vibration, and safety, can be severe (Morello-Frosch et al. 2001; Karner et al.
2009; Rowangould 2015; see also Martens 2011).

Higher use of non-motorized modes, lower likelihood of automobile ownership, and roadway
proximity also combine to create safety risks for low-income and minority populations.
Specifically, the risk of injury or death from motor vehicles is higher for people of color than the
population as a whole in the US. Daniels et al. (2002) reported that, overall, blacks account for
approximately 40% of all traffic-related injuries in the country, compared to their 13%
population share. Walking is particularly dangerous for black Americans. Using data from the
Fatality Analysis Reporting System, Hilton (2006) demonstrated that a disproportionate number
of non-occupant children killed by motor vehicles are black. Increased risk of death as a
pedestrian also extends over the lifetime and affects other people of color as well. Campos-
Outcalt et al. (2003), reporting results from Arizona, found that Latino and black males were
1.33 and 1.75 times more likely to be killed as a pedestrians than non-Hispanic whites,
respectively.

Benefits of transportation infrastructure: Accessibility
Clearly, transportation generates not only (environmental) burdens, but also benefits, and
accessibility has been proposed as the fundamental benefit conferred by transportation (Grengs
2015a; Martens 2006; Martens 2012). Accordingly, analyses of social equity in transportation
systems often emphasize accessibility metrics both in practice and in the academic literature
(e.g., Golub & Martens 2014; Páez et al. 2010). In a transportation context, accessibility refers to
the ability to reach desired destinations which are separated in space (Geurs & Van Wee 2004;
Handy & Niemeier 1997). Greater accessibility is associated with shorter travel times, lower
costs, as well as closer proximity to activity locations.

Some authors have sought to establish criteria by which a particular distribution of accessibility
could be judged to be equitable or which could be used to guide planning efforts (e.g., Golub &
Martens 2014; Grengs 2015b; Lucas et al. 2015; Martens et al. 2012), but there is little
agreement in the literature or in practice about what constitutes a just or fair distribution of
accessibility benefits. While academic studies into the patterns of accessibility abound, few are
informed by a well-defined justice standard for accessibility. Philosophies of justice been
invoked to develop explicit justice standards in transport (e.g., Beyazit 2011; Mullen et al. 2014;
van Wee 2011) drawing on prior work that made initial steps in a similar direction (Bullard &
Johnson 1997; Rosenbloom & Altshuler 1977; Schaeffer & Sclar 1980). Golub and Martens
(2014) calculate the ratio between automobile and public transit accessibility for a particular area
and argue that below a particular threshold an area would experience “access poverty” and
transportation disadvantage. Martens et al. (2012) describe how a maximax principle can be used
to guide transportation planning, whereby the average accessibility of a population is maximized
subject to the constraint that the gap between the least and most accessible groups is held below
a maximum acceptable value. More recently, drawing heavily on the contract theory of social
justice, Martens (2016) has proposed a sufficiency standard for accessibility, arguing that a
transportation system is fair if, and only if, it provides every person with a sufficient level of
accessibility. The latter approach resonates clearly in the more qualitative social exclusion
literature, which defines transport-related social exclusion as the “process by which people are
prevented from participating in the economic, political and social life of the community because of reduced accessibility to opportunities, services and social networks, due in whole or in part to insufficient mobility” (Kenyon et al. 2002, p.148, emphasis added). This broad definition is, again, intuitively appealing. But while the literature provides some direction on how to define a sufficiency standard, establishing such a standard would be contentious in practice, regardless of its exact form. Thus, while substantial progress has been made exploring possible principles for the distribution of the benefits of transportation, agreement about the most appropriate standard is still far away.

While typically not framed using environmental justice discourse, there is a host of literature studying patterns of accessibility and inaccessibility. Much of this literature focuses on accessibility to employment opportunities. These studies typically apply location-based measures of accessibility and compare job accessibility by car and transit (e.g., Blumenberg & Ong 2001; Kawabata & Shen 2006; Shen 1998). Other work exists that measures disparities in access to healthy foods and the locations of food deserts (e.g., Farber et al. 2014; Widener et al. 2013) as well as access to health care services of various types (e.g., Harrison & Wardle 2005; Martin et al. 2008). These literatures vividly illustrate the vast disparities in accessibility between persons with and without access to a car. Certainly in the US context, public transport services tend to provide very low levels of accessibility, severely inhibiting the ability of car-less households to gain access to employment, health care, education or even healthy food.

Not all studies along these lines are sensitive to typical environmental justice concerns. For instance, much of the work assessing job accessibility tends to ignore the suitability of particular workers for particular jobs. This is especially important in light of the typical structure of US cities. Thus, while “measured accessibility” may be quite high for minority populations living close to the central business district, few of these jobs may actually match their skills or expertise. It is precisely this problem that has been highlighted by the extensive spatial mismatch literature. Given the close correlation between education level and minority status, it can be argued that many accessibility studies are ‘color blind’ by failing to take into account the match between workers’ abilities and job requirements (see Hu and Giuliano (In press) and Golub and Martens (2014) for counterexamples). While these accessibility analyses can thus tell us a great deal about the interactions between land use and transportation in a particular region, they tell us relatively little about the conditions faced by a particular person or demographic group.

Importantly, travel behaviors and the use of particular pieces of transportation infrastructure are known to differ between demographic groups. Low-income people and people of color generally own automobiles at lower rates, make shorter trips, and use transit and carpool more readily than higher income, generally whiter populations (Clifton & Lucas 2004; Pucher & Renne 2003). This means that a transportation policy emphasizing highway capacity expansion will tend to disproportionately benefit these non-disadvantaged populations. A historical example is instructive. Part of the outcome of interstate freeway and rapid transit construction in the 1950s and 1960s was to allow relatively wealthy whites to access employment opportunities in central cities while living in suburban locations (Henderson 2006; Pulido 2000). Commonly referred to as “white flight,” the construction of transportation infrastructure has been identified as a causal agent in the depopulation of US central cities as regions continued to grow during the second half of the 20th century (Baum-Snow 2007). This massive investment of public dollars undoubtedly benefitted wealthy white populations while exacting a profound cost on people of color and low-income.
Recognizing the existence of injustice across multiple issue domains, governmental entities in the US have enacted an array of laws and regulations to prevent further disparate impacts. The threat of legal action, administrative censure, and/or loss of funding are thus powerful tools wielded by environmental justice advocates and activists against transportation agencies and decision makers. In the absence of supportive public policies, members of the public seeking justice would have far less recourse in the face of potential disparate impacts.

Federal guidance on environmental justice applies to the transportation sector through various regulations promulgated by the US Department of Transportation and its modal agencies including the Federal Highway Administration and the Federal Transit Administration (e.g., Federal Highway Administration 2012; Federal Transit Administration 2012a; Federal Transit Administration 2012b; US Department of Transportation Office of the Secretary 2012; see also Karner & Niemeier 2013; Golub & Martens 2014). These regulations are influenced by and derived from laws like Title VI of the 1964 Civil Rights Act and executive actions like the 1994 Executive Order 12898 on environmental justice. In general, agencies that receive federal funding must provide for full and fair participation in transportation planning processes, ensure that the impacts of their actions do not disproportionately affect protected populations, and guarantee that those same populations are not denied the timely receipt of benefits from public investments.

Two types of transportation planning agencies are particularly important for implementing US federal regulations in this area: metropolitan planning organizations (MPOs) and public transit agencies. MPOs are responsible for transportation planning in all urbanized areas that exceed 50,000 in population. Those in larger urban areas have additional authority, with direct control over some funds, and various planning and programming responsibilities. Regions are generally defined by commute patterns and include many different city and county governments. One key mission of an MPO is to address issues that cross the boundary of single jurisdictions. The planning of a commuter rail system, implementing high-occupancy toll lanes, or providing work trip reduction incentives are all activities that an MPO would undertake. In the wake of interstate highway development, regions are also home to cities and counties with widely differing fiscal resources, a phenomenon that has been identified as regional inequity (Orfield 2002; Pastor et al. 2000). Suburban sprawl and gentrification are two other major issues whose mitigation falls outside of the responsibilities of a single jurisdiction.

Public transit agencies manage the day-to-day operations of public transit systems. In the US, although individual routes may cover their costs, in general, agencies require public subsidies. This is because transit agencies seek to provide both revenue generating service as well as service that is more explicitly oriented towards geographic or social equity (Walker 2012). Transit agencies must assess the equity impacts of their fare and service changes, following guidance laid out by the FTA (Karner & Golub 2015).

Both MPOs and transit agencies play key roles in environmental justice analysis and mitigation. MPOs are important because of the regional nature of travel patterns, mobility, and injustice. There are at least two problems with this emphasis. First, such agencies play mostly a coordination and aggregation role, rather than a leadership role in terms of regional project prioritization (Goldman & Deakin 2000). They are often bound by decisions made at both lower and higher levels of government (e.g., Crabbe et al. 2005). Second, their overarching goal appears to be conflict minimization. Because of this, the analyses undertaken by MPOs have
historically not uncovered evidence of injustice either at the project or plan level (Karner 2016; Karner & Niemeier 2013; Sanchez et al. 2003). Transit agencies play a role because transit dependents are a key constituency and they overlap with environmental justice populations. However, these agencies exist in a rather severe fiscal environment; even when new revenues are made available, calls to mitigate congestion often dominate and transit agencies can find themselves left out. Consequently, new funding for transit and new transit projects tend to promote mobility and accessibility for wealthier, whiter transit riders as opposed to transit dependents.

As mentioned above, both agencies assess the equity of their plans and decisions (Karner & Golub 2015; Karner & Niemeier 2013; Martens et al. 2012). Analyses of the patterns of accessibility have become quite common over the past decade. These analyses, however, typically fail to account for the differences in car ownership between various population groups. As a result, they hardly ever result in findings of inequity (Golub & Martens 2014). Moreover, these analyses are typically only weakly linked to decision making (Karner & Niemeier 2013; Rowangould et al. 2016; Sanchez et al. 2003). For example, an analysis demonstrating that accessibility to destinations by automobile is high in central city areas where the low-income population is also high tells us very little given that low-income people own vehicles at low rates. Other analyses have examined the distribution of transit accessibility across the population and have demonstrated that disadvantaged population groups tend to enjoy relatively high rates of (job) accessibility (Al Mamun & Lownes 2011; Currie 2004; Foth et al. 2013). Yet again, these analyses tell us little about the sufficiency of transit service or its performance relative to the car.

COMMUNITY-BASED RESPONSES
It seems clear that the agencies tasked with mitigating environmental injustice often conduct analyses that shed little light on the problem. To communities struggling with environmental burdens and often profound disparities in accessibility, the situation can seem intractable. A promising way forward can be found in emerging community-based responses to environmental injustice that are founded on the principle of achieving meaningful public participation in the transportation planning process, consistent with the evolution of public involvement in transportation planning decisions discussed earlier. Although this type of meaningful participation is not a panacea for all transportation injustice, as we will illustrate below, it has generated promising and concrete wins in several planning processes and related to specific projects. Marcantonio and Tepperman-Gelfant (2015) summarize several successful practices in the realm of public participation, noting three factors that appear to be vitally important for success. These include: 1) establishing a shared agenda for what constitutes “success” across diverse stakeholders, 2) rewiring the process so that the agency is not the only entity defining how and when key decisions will be made, and 3) combining “inside” and “outside” tactics, blending participation in formal structures with traditional community organizing and advocacy approaches. These methods have been applied successfully in several cases as of the mid-2010s. Below, we discuss promising examples of the application of these principles in Los Angeles and the San Francisco Bay Area.

In Los Angeles, the expansion of Interstate 710, to accommodate projected growth in truck traffic along a key goods movement route leading north from the ports of Los Angeles and Long Beach, was vehemently opposed by residents proximate to the facility (East Yard Communities for Environmental Justice 2015) They viewed the agency’s plan to expand the capacity outright
as a losing strategy that would only result in induced demand and additional noise and air quality impacts while providing few benefits. Supported by a number of attorneys from the Natural Resources Defense Council and Earthjustice, a coalition of local advocacy organizations developed “Community Alternative 7” proposing no mixed flow capacity expansion, only an increase in capacity along facilities that would be dedicated to heavy vehicle use. Agency analysis demonstrated that the community alternative would meet the stated project needs at lower cost and with fewer environmental and social impacts.

In the San Francisco Bay Area, the Six Wins Coalition united around multiple related, but previously disparate ideas including affordable housing, local transit service, public health, and displacement (Marcantonio & Karner 2014). Again supported by foundation funding and public interest attorneys, the coalition proposed a community-defined alternative – entitled the “Equity, Environment, and Jobs” (EEJ) scenario – after the MPO declined to include it in an earlier round of modeling. The alternative directly spoke to needs that had been identified by community members in advance and was aggressively pursued and advocated for in formal venues like board and advisory committee meetings. Key public meetings where votes on EEJ were held were heavily populated by supporters. In this sense the definition and application of the EEJ can be said to be consistent with the definition of meaningful public involvement. Surprisingly, once the alternative was simulated using standard transportation modeling approaches, it was found to outperform the preferred alternative. By running more frequent local transit service and locating affordable housing near to job centers, the environmental impacts of EEJ were much lower than the alternative plan while key environmental justice goals were met simultaneously.

Both of these cases illustrate that community-led processes can surface alternatives that otherwise would not be considered and which can lead to improved plan and project performance as well as superior distributive outcomes. Yet in both cases, substantial resources were required to develop the alternative plans, especially resources to hire personnel to engage with agencies and to provide technical assistance and advice on plan design. One final emerging best practice for moving towards environmentally just outcomes is thus the provision of funding for groups seeking to engage in planning processes. Such practices are not without precedent. In their 2014 regional transportation plan, the Fresno County Council of Governments provided small grants ($1,000 - $3,000) to community-based organizations to support their engagement with the process.

CONCLUSION AND FUTURE DIRECTIONS

The early history of transportation planning was rife with unjust practices, creating a system in which low-income travelers, people of color, and transit dependent people were substantially disadvantaged relative to whiter, wealthier, riders. Mid-twentieth century legal and regulatory requirements to address environmental injustice in transportation, while leading to incidental success, have not led to fundamental changes in policy and planning actions. Consequently, historical disparities in burdens and benefits persist.

The demographics of the US are changing, and new challenges have presented themselves to transportation planners in terms of evolving passenger travel and goods movement patterns, aging infrastructure, funding constraints, the threat of climate change, and a growing appreciation for the potential environmental, public health and social consequences of transportation systems and services and transportation decisions. Many of these changes offer the promise of advancing environmental justice goals. But in order to deliver results, environmental
justice analyses, of both burdens and benefits, have to become much more rigorous. Since both
the burdens and benefits of transportation investments vary across a variety of social and
geographic dimensions, it is of particular importance they are not only examined in the
aggregate, but also in terms of their incidence upon particular populations or communities.
Furthermore, it is vitally important that environmental justice analyses become a key component
of the transportation planning process and are carried out before policies and plans are created.
There are few signs that this change will happen from the top down, so continuing involvement
and pressure from communities will be required to make the case for rigorous, well-timed
analyses that can inform planning and decision making. Indeed, the most promising opportunities
for achieving just transportation systems appear to be originating from communities themselves
in partnership with skilled attorneys and researchers and with support from philanthropic
foundations. Empowering these types of efforts runs counter to existing practice but may hold
the greatest hope for success in delivering state, regional, and local transportation plans capable
of redressing past injustices.

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