

The Problems with Gridlock and Benefits of Reducing Traffic Through Mass Transit in Austin

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Executive Summary

Cities can be amazing, exciting and dynamic places to live, especially when they are in a period of rapid population and economic growth. However, all this growth and excitement can also come with drawbacks, most notably traffic congestion. Today, Austin finds itself in one of those dynamic growth periods, so much so that it was recently rated America's fastest growing city. As a result, Austin now has the 14th most congested roadways in the nation. We have all become familiar with the feelings of aggravation and frustration when planning for trips in the highly congested areas of town. That frustration was felt, when in 2020, people from all over Austin voted in favor of Project Connect. An ambitious proposal, Project Connect is aimed at relieving traffic by enhancing public transit in the Austin region. With this as a backdrop, it is important to examine what the negative effects of traffic are and how rail can help elevate these issues.

Austin's Current Traffic Issues

Due to the tremendous growth Austin has been experiencing, the traffic situation has quickly deteriorated over the last decade. As Magazine 'Urban Matter' states, "Austin is the 14th most congested city in the nation, ranking behind places like Dallas, San Diego, and Portland. Commuters are spending an average of 66 hours a year stuck in traffic, which exacts a heavy toll". The following findings show how this situation directly affects Austinites in their day to day lives.

Key Findings

Mental Health: Traffic congestion has negative effects on the mental health of commuters. It has been found to cause a 0.8% increase of depression in commuters. Another study found that traffic congestion was linked to an 9% increase in cases of Domestic Violence in the Los Angeles area.

Physical Health: In addition to mental health issues, traffic causes large amounts of physical trauma.

- a) Car crashes: With 1.2 million deaths a year and another estimated 50 million non- fatal injuries a year, crashes caused by traffic congestion remain a global source of unnecessary injury and death.
- b) Weight gain: A recent Chinese study found a correlation between the increase in obesity rates and the increase in car ownership in the Beijing metro area.

Economic Damage: In the United States, costs associated with traffic congestion rose to as much as much as US \$160 billion in 2015 due to time and fuel wasted. Europeans experience similar conditions, with an estimated €200 Billion wasted in 2016, which was equivalent to 1.4% of the region's GDP.

Rail As A Solution

According to research, it would seem that large investments in public transit do indeed help with mitigating traffic congestion. In 2019, The Rapid Transit District (Denver Colorado's public transit agency) conducted a study showing building new rail lines increases ridership and reduces overall Vehicle Miles Traveled (or VMT). Additional studies in Denver showed that commuters were 20% more likely to commute on the system if their work was a half mile or 15 minute walk to a rail station. A study conducted by the University of Minnesota, on the traffic impacts of a newly constructed light rail line show promising results. The founding showed that in its first two years of operation that, the Green Line, a light rail line running through downtown Minneapolis, reduced traffic on nearby roads by 22 percent.

Ways To Study Success of the New Infrastructure

CapMetro, the agency in charge of transportation for Travis county, has numerous transportation agencies it can look to for inspiration on how to conduct studies that can measure the performance of the new rail and bus infrastructure. Such measurements are important because if successful, they can help boost public support for CapMetro which can translate into more funding for public transit. Possible study methodologies discussed will include studies

conducted by Denver's RTD. Additionally, a study conducted by the Minnesota department of transportation on traffic impacts of the newly build green line can will also be discussed.

The Negative Externalities of Traffic congestion

Generally speaking, an externality is defined as an indirect impact of an action or lack thereof. As it relates to traffic congestion, its existence causes many negative externalities. Usually consisting of wasted time, money and freedom, traffic's negative externalities are a constant issue for major cities globally. Economists have measured traffic congestions cost in the United States at a staggering US \$160 billion dollars a year.¹ As a result, informing Austin of these negative externalities is vital to Project Connect's goal of making sure that Austin as a city take the steps necessary to avoid them. This paper analyses a variety of studies which show that traffic congestion causes more accidents, billions of dollars of economic damage, and extreme psychological harm.

Mental Health

New research being conducted on the negative psychological effects of traffic congestion is beginning to show just how much mental anguish is caused by constant exposure to traffic congestion. A study by Wang et al. found that just ten additional minutes of commuting time due to congestion is associated with a 0.8% higher chance of suffering from depression.² Additionally, traffic, and the stress caused by having to deal with it on a daily basis, has been associated with poorer well-being of urban populations. A 2004 multilevel analysis published in the journal *Social Science and Medicine* found populations living in areas with high traffic reported more depressive symptoms, which arose out of the unpredictability of traffic and the feeling of helplessness it invoked. Research by the University of the West of England found long

¹ Understanding the Effect of Traffic Congestion on Accidents Using Big Data González et all. pg 1). Sánchez González, Santiago, Felipe Bedoya-Maya, and Agustina Calatayud. "Understanding the Effect of Traffic Congestion on Accidents Using Big Data." *Sustainability* (Basel, Switzerland) 13.13 (2021): 7500–. Web.

² Understanding the Effect of Traffic Congestion on Accidents Using Big Data González et all. pg 1.

commutes to and from work, often as a result of urban traffic jams, reduce job and life satisfaction, which further worsens mental health.³ Finally, a 2018 study conducted in Los Angeles found that the psychological stress caused by extreme traffic translated to a 9% increase in domestic violence.”⁴ In the context of Austin, the city experiences 9,613 cases of reported domestic violence per year.⁵ A nine percent reduction in Austin’s domestic violence cases would mean 865 less abused spouses and family members. Taken as a whole, it is clear from these studies that traffic congestion has serious mental health side effects on a city’s population and as a result, steps should be taken to mitigate it as much as possible.

Physical Harm and Social Issues

Physical harm is also a well-documented and tragic externality of traffic congestion. Incidence of this nature include increased road accidents, weight gain, and other negative physical effects on the human body. Data shows that globally 1.2 million people a year are killed in car accidents linked to traffic congestion, and an estimated 50 million receive non- fatal injuries.⁶ Additionally studies have found a symbiotic connection between accidents and traffic where each of these factors feed off each other, thus causing the likelihood of both to increase. Thus, as traffic means more people on the road at the same time, the chance for accidents drastically increases. This correlation is so pronounced that a recent Study of South American cities found that, “that a 10% reduction in traffic delay would reduce accidents by 3.4%, equivalent to over 72 thousand traffic accidents”.⁷ What’s more, aside from the direct physical trauma of car crashes, car crashes themselves also have profound negative socio-economic consequences.

A 2023 nation-wide study conducted by the National Highway Traffic Safety Administration attempted to measure the societal costs of auto accidents by measuring factors

³ <https://www.telegraph.co.uk/news/2017/10/23/20-minute-increase-commute-time-bad-taking-pay-cut-study-finds/>

⁴ Louis-Philippe Beland, Daniel A. Brent, Traffic and crime, Journal of Public Economics, Volume 160, 2018, Pages 96-116,

⁵ [https://www.safeaustin.org/about-us/newsroom/media-kit/#:~:text=Domestic violence,-Over 195,000 incidents&text=In 2019, the Austin Police, of 9,613 family violence cases.](https://www.safeaustin.org/about-us/newsroom/media-kit/#:~:text=Domestic%20violence,-Over%20195,000%20incidents&text=In%202019,%20the%20Austin%20Police,%20of%209,613%20family%20violence%20cases.)

⁶ [Revisiting car dependency: A worldwide analysis of car travel in global metropolitan areas](#)

⁷ [Understanding the Effect of Traffic Congestion on Accidents Using Big Data](#) González et al.

such as medical care, lost productivity, legal costs, insurance costs, workplace costs congestion impacts and property damage associated with auto wrecks. The study found that in 2019, the total economic costs of car accidents totaled to \$339.8 Billion, or \$1,035 per person living in the United States and 1.6 Percent of the US Gross Domestic Product.⁸ Additionally, critically injured survivors of crashes cost an average of \$6 million in medical costs and lost quality of life.⁹ In terms of property damage, total damages for all crash types, both fatal and non-fatal totaled \$115.3 billion in 2019. As far as the costs that crashes pose to public coffers, the study found that 9 percent of all motor vehicle crash costs are paid with public revenues. As mentioned, since accidents also cause traffic congestion and delays, the study found that congestion costs associated with accidents cost an estimated \$36 Billion, which is approximately 10.6 percent of the total economic costs associated with accidents. As this study shows, accidents are not bad for just those involved, but for society as a whole. By working to mitigate traffic congestion, we can also reduce accidents and the negative societal consequences they cause.

Aside from the previously mentioned social ills, Traffic congestion can also harm commuters in the form of weight gain. A recent Chinese study found a correlation between the increase in obesity rates and the increase in car ownership in the Beijing metro area.¹⁰ Due to people sitting in their cars for extended periods of time, and the stress that traffic causes on the body, commuters often come home hungry and tired, thus it is easy to see how traffic congestion can lead to less physical activity and coping mechanisms like stress eating.¹¹

As Project Connect continues to progress, Austin has a once-in-a-life-time opportunity to reduce all of these costs caused by the traffic-accident negative feedback loop. In the context of Austin, in 2022, Austin experienced 125 traffic deaths and 12,974 crashes last year (the highest on record).¹² This translated into 31,295 Ausinites having directly been involved with the crashes. If project connect can achieve at least a 10 percent reduction in traffic, as the South American study showed, this would mean 5 less deaths and 441 less accidents. Thus, if Project Connect is successful in reducing traffic, thousands of lives could be saved in the long run,

⁸ [The Economic and Societal Impact of Motor Vehicle Crashes, 2019 Pg 2](#)

⁹ [The Economic and Societal Impact of Motor Vehicle Crashes, 2019 Pg 4](#)

¹⁰ <https://nature.berkeley.edu/news/2019/12/researchers-link-weight-gain-inactivity-vehicle-ownership-beijing>

¹¹ See <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3987609/>

¹² <https://www.danqlawgroup.com/blog/2022/10/austin-car-accident-statistics-2020/>

billions of dollars in social costs can be spared and commuters can have a healthier way to commute.

Economic Effects

Numerous studies have been conducted on topic of traffic congestion and its impact on economic productivity. The consensus is that traffic congestion does in fact negatively impact the economy. An academic study conducted in the European Union shows that congestion costs in Europe were estimated at over €200 billion in 2016, which was equivalent to 1.4% of the region's GDP.¹³ A similar study in the United States conducted in 2015, showed costs associated with traffic congestion cost as much as US \$160 billion in 2015 due to time and fuel wasted.¹⁴ Worse still, it was expected to grow steadily to US \$186.2 billion by 2030 as the population grows thus boosting traffic congestion.¹⁵

Solutions

As this paper has made clear, traffic congestion has numerous serious negative externalities that can literally stop a city and cause many social issues. For this reason, it is vital that the rail lines envisioned project Connect are completed and even expanded in the future. As further research shows, rail lines have proven an excellent tool for traffic mitigation in other cities, and can reduce some of the problems documented in this paper.

Promising Results

Studies on recently constructed rail systems in other cities across the United States have been showing rail as promising mitigator of traffic congestion. In 2019, The Rapid Transit District (Denver Colorado's public transit agency) conducted a study to see how people were using the nascent transit system. Research shows that building new rail lines increases ridership

¹³ Understanding the Effect of Traffic Congestion on Accidents Using Big Data González et al.

¹⁴ Understanding the Effect of Traffic Congestion on Accidents Using Big Data González et al.

¹⁵ Understanding the Effect of Traffic Congestion on Accidents Using Big Data González et al.

and reduces overall Vehicle Miles Traveled (or VMT) and helped mitigate overall traffic growth in a growing urban region.¹⁶ The study also examined the spatial relationship between commuter's homes and workspaces with rail stations. The study showed that study participants were 20% more likely to commute on the system if their work was a half mile or 15-minute walk distance from a rail station. Even more impressive, the study found that when both home and work were within a 15-minute walk of a rail station, 62 percent of commuters who participated chose to commute by rail.¹⁷ This clearly shows a strong relationship between transit ridership and appropriate zoning and how the two can boost each other.

Finally, another report, this one conducted in the Minneapolis- St Paul region by the University of Minnesota, showed promising results for its recent rail investments. In June 2014, the region's Metro Transit opened the Green Line, an 11-mile light rail line, connecting the downtowns of Minneapolis and Saint Paul, along with the University of Minnesota. This report found that in its first two years of the Green Line's operation, it reduced traffic on nearby roads by 22 percent compared with roads outside its influence area (defined as within a mile from the line). In the next two years, vehicle traffic on nearby roads bounced back by about 6 percentage points; however, this was due to population growth in the area.¹⁸ As shown by this study, and the others compiled for this paper, urban rail networks are a vital tool when it comes reducing traffic congestion by giving commuters new travel options and by creating more capacity in the city's transportation network.

Studies In The Context of Austin

Much like the studies conducted by Denver's RTD, Cap. Metro could conduct surveys of commuters' VMTs and compare them with previous years' VMTs and with population growth. Additionally, this data can also be compared with ridership data on Austin's future rail system to see if in fact the new rail lines are attracting new riders. Also similar to RTD, CapMetro could survey several thousand commuters who live in a mile or so of the new rail stations, and measure how far their work and homes are from a metro stop and if they decided to change modes of

¹⁶ <https://www.sciencedirect.com/science/article/abs/pii/S0966692312000129>

¹⁷ <https://www.sciencedirect.com/science/article/abs/pii/S0966692312000129>

¹⁸ <https://www.hhh.umn.edu/news/researchers-study-impact-transitways-nearby-roads-park-and-ride-choices>

travel due to being in close proximity to new stations. This study can easily be repeated as the rail lines are expanded. Again, the number extrapolated from this study can also be measured against average ridership to see if the number of people commuting by rail and using the system is increasing. Finally, the study conducted by the University of Minnesota on traffic impacts of the newly build green line can also be replicated here in Austin to determine the success of the project. Finally, CapMetro can trace the cellular data of users to see if ridership is increasing and where the most popular travel destinations are, and what the most popular lines are, so service levels can be increased.

Conclusion

As the numerous studies cited by this paper have shown, traffic congestion causes many negative impacts on the metropolitan areas being impacted by it: fatalities from accidents, increases in depression, stress, and domestic violence, weight gain, and economic loss. Addressing these problems through the buildout of increased public transportation has been shown to reduce these issues and raise quality of life for a city's citizens. With Austin expected to continue its rapid growth, Austinites have wisely chosen to invest in their city and avoid these issues by building a public transit system large enough to help mitigate some of negative externalities of traffic congestion. However, in order to fully realize the benefits of growth, continued public support of public transit will be needed to insure future funding. As a result, studies will need to be conducted to show the success of the system. Therefore, the various study methods outlined in this paper can be helpful in proving the worth of a good public transit network and even help to secure more funding for future expansions. As these studies show, by building a system that places most of Austin within a 15 minute or half mile walk of a station will greatly reduce traffic congestion and the negative externalities it causes.