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ABSTRACT

Chile's rate of road fatalities and pedestrian deaths has remained a global outlier, even as comparable states have reduced occurrences. Santiago, Chile's capital and one of the most urbanized cities in Latin America, serves as a unique product of competing urban design ideologies put forth by democratic and authoritarian governments throughout the 20th century; and the social and economic stratification created has continued to present challenges for solving urban planning issues in modern Santiago. Recent adjustments in traffic laws have begun a reduction in road fatalities, but they still do not account for the discrepancy between Chile and other states. This is due to the failure to address the underlying problem of urban design solely shaped to create profit, which has ignored lower-income sectors of the population who rely heavily on walkability in urban areas.

Introduction: Pedestrian Deaths in Perspective

Out of all the members of the Organization for Economic Co-operation and Development (OECD), Chile has led in most road fatalities since 1998 per 10,000 vehicles, with more than five fatalities per registered 10,000 vehicles, compared to the OECD average of less than one. Furthermore, in recent years, as safety issues have become more widely addressed, other states have made significant progress in reducing their rates. Between 2001 and 2013, Germany lessened road fatalities by 50% and Spain by 70%, as Chile reduced by 10% (OECD, 2021). The long-term trend for road deaths points to stagnation in Chile. Between 2000 and 2019, the number of annual road fatalities fluctuated at around 2,000 deaths per year. In 2019, Chile registered 1,973 road deaths – a 0.9% increase from 2018. Even besides fatalities per vehicle, Chile experienced 10.5 traffic deaths per 100,000 inhabitants. The average in the European Union in 2019 was 5.1 deaths per 100,000 inhabitants (International Transport Forum, 2019). These staggering statistics show Chile to be an outlier in traffic fatalities and lead us to question the causes and policies that have created this phenomenon and how it plays out in the daily lives of Chileans.

Traffic accidents will become the fifth main cause of death by the year 2030, according to the World Health Organization (WHO) (2015). However, traffic crashes are accepted for the most part to be caused by known and preventable causes, such as speeding, distracted driving or driving under the influence, non-use of seat belts, and lack of respect for vulnerable road users such as cyclists and pedestrians (UNECE, 2009). If the correlation between these factors and traffic accidents and fatalities is agreed upon, then why has the problem stagnated in places with high levels of traffic fatalities such as Chile?

As is in many situations in both life and policy, there is a gap between knowing and doing, especially when these traffic fatalities disproportionately impact lower-class citizens who have less access to and influence in the policy-making process. Some of the most socially vulnerable individuals in traffic accidents are pedestrians, who account for a third of Chilean road deaths (International Transport Forum, 2019), as well as one-quarter of global road traffic deaths (WHO, 2013a). Though pedestrians with physical disabilities are not a high portion of the pedestrian population, they are at a particularly high risk of injury and death in traffic collisions. The pedestrian population remains vulnerable both to factors in the built environment as well as the demographic characteristics of pedestrians at-risk (Stoker et al., 2015). Some of the only research on this topic in this area has been conducted to prevent pedestrian specific traffic fatalities around bus stops and schools in Santiago, but that is because child deaths are sympathetic to the public, though the 0-14 age group is the least at risk of traffic fatalities (International Transport Forum, 2019). Outside of involving children, pedestrian deaths are primarily seen as the result of carelessness on the part of pedestrians instead of drivers. Children are absolved of the responsibility to obey street signs and only cross the street on sidewalks, but for all others, they must be obeyed without question.

In an ideal world, this mentality would be understandable, but when cities are designed to prioritize the efficiency of car travel over the needs of the pedestrian and land usage regulations allow for massive highways near businesses that are frequented by pedestrians, a disregard for street guidelines will occur. Since the early 2000s, the National Road Safety Commission *(Comisión Nacional de Seguridad de Tránsito, or CONASET)* has both proposed and implemented many policies to lessen traffic fatalities by regulating the behavior of cars, such as harsher restrictions on inappropriate speed and alcohol use, but they have not concretely addressed the underlying issues that cause pedestrian deaths in the first place. The built environment should be designed to protect and provide security for pedestrians, but that is not always the expressed intention or focus. Pedestrians face risk from a variety of factors, including urban development patterns and land usage, difficulties related to pedestrian walkability, such as poor lighting and a lack of

crosswalks, and risky car behavior. Incident-inducing characteristics of the built environment are not solely dependent on the actions of individuals, both pedestrians and vehicles, but the infrastructure can inform those actions, visibility, traffic volume, and speed. This work examines how policy designs have influenced the frequency of pedestrian deaths in Chile's capital city, Santiago, one of the most urbanized cities in Latin America. My initial research question asks why Chile has such a high level of pedestrian deaths and whether pedestrian deaths are due to poor policy decisions.

Literature Review

Urban Development Priorities: Frei Administration to Pinochet Military Junta

Santiago has undergone various eras of urban development with contradictory goals being pushed by different government administrations, creating a unique history of urbanization that provides important context to understanding its modern issues. Though the city has grown since 1541 after being founded by a group of Spanish conquistadors, the story of modern Santiago begins with the dictatorship of Augusto Pinochet in 1974, whose economic reforms led by neoliberalism were a sharp departure from the state owned industries and centrally-planned economic programs previously championed by Salvador Allende's Marxist government.

Influenced by the "Chicago Boys," a group of primarily United States-educated economists who advocated for libertarian economic policies such as privatization and widespread deregulation, urban design practitioners began to focus specifically on crafting policies that prioritized profit above all social considerations to fit within the neoliberal framework. Professor Francisco Vergara Perucich from Universidad de Las Américas states that this is a phenomenon within metropolises of the Global South, "an area where neoliberalism has reshaped cities for the sake of increasing capital, thereby fostering a sense that the development of a city is a financial investment rather than a social project" (Perucich, 2019, p. 3). This intense focus on profit margin has reduced urban development in Chile to define economic gross as the main goal of human activities and disregards the role of urban design to "involve cohesive socio-cultural values that shaped cities and maintain equilibrium based on human values" (Golany, 1995), and serve as "the discipline through which social aspirations can be realized physically" (Canniffe, 2006, p. 1).

The institution of a military dictatorship makes it obvious that an open and free state would not be entirely aligned with the administration's goals, but acknowledging the intense and expressed focus of urban design solely for economic benefit is important to note when understanding the history of urban design in Chile in the 1970s, exposing the true character of what the regime held to be the conception of socioeconomic development. This shift in the institutional framework led to a change from *Diseño Urbano Social* (Social-Oriented Urban Design) to *Diseño Urbano de Mercado* (Market-Oriented Urban Design). While practitioners under *Diseño Urbano Social* produced urbanism aiming to contest capitalist ideals and advance social justice, under the framework constraints of Diseño Urbano de Mercado, attention was focused on supply and demand and the needs of real estate investors (Perucich, 2019). In the administration of Jorge Alessandri (1958-1964), the policies in place were within the framework of the market economy but held a certain degree of protection for the country's business sector. They also modeled tax exemptions laws for builders off policies in the United States, creating the *Sistema Nacional de Ahorro y Préstamos* (National Savings and Loan System [SINAP]). These policies put pressure on the state from the public to assist low-income sectors, as they favored the middle and upper-income levels. Development continued but was still seen as insufficient with the overhanging accumulated deficit. The policies, however, did further the creation of *callampas*, the illegal construction of dwellings, and the occupation of periphery urban lands, which planted the seed for spatial segregation (Perucich, 2019). The Frei administration created the

Ministerio de Vivienda y Urbanismo (Ministry of Housing and Urban Affairs), whose objective was to curtail the housing shortage by encouraging the production of housing with a policy of popular participation and income redistribution that would also stimulate the internal market. Frei's programs showed ambition and a desire to reform the liberalism shown in the previous administration with which the business class had grown dissatisfied. While they were fairly successful in construction, the response was not the enthusiastic social mobilization to support the administration's policies that they had hoped for, and the allocation of resources had not appropriately considered inflation (Boano & Vergara-Perucich, 2017).

Allende's socialist faction gained popularity as people began to search for more extreme solutions, as the shantytown *callampas* and *conventillos* (deteriorated rental housing or tenements in the central areas of Santiago) grew by 300,000 inhabitants. Allende's administration was the best equipped of the administrations so far to deal with the housing crisis, and the ideological changes that came with his administration shifted institutional priority to that of *Diseño Urbano Social* (Social-Oriented Urban Design). However, at a certain point, the intense growing need for housing that led some to critique the administration was absorbed with the critiques of those who had political opposition to the administration due to its Marxist and socialist identity. The obfuscation of the need for resources into a mechanism to achieve political upheaval was a factor leading to the September 1973 military coup of the Allende government. Though there was significant government-led housing development, an average of 40,000 houses per year under Frei and 52,000 per year under Allende, this period revealed the capability of overcoming inherent obstacles of the urban environment, but it was jettisoned by the incoming military junta for its incompatibility with the prevailing ideology (Perucich, 2019).

The urban policies instituted under Pinochet's regime exemplified "an obsessive faith in the liberating forces of the marketplace as the motor for national growth" (Kusnetzoff, 1987, pg. 8). *Política Nacional de Desarrollo Urbano*, published in 1979, stated that urban planning development "will be aimed at making the process of urban development compatible with the global model of the country's development, creating the conditions most convenient for facilitating the operation of the urban land market" (MINVU, 1979). This negatively impacted access to housing and urban services, especially for the poorest of the poor, and made clear that the administration's chief priority was profit, not people. In 1985, the government developed a new national policy to deal with the effects of the acceleration of the informal settlements that increased due to the 1979 policy, reaching close to a million households by 1989. The 1985 modified policy was organized as a public-private agreement between state and free market agents– the *política adjusada* (adjusted policy) designed a necessity of creating planning instruments at a municipal level coordinated by local authorities. While this was seen as an improvement, the policy retained the guiding principle of urban development led by free-market rules and a set of permissive ad hoc regulations that were designed to extricate as much profit as possible from urban development projects. While this began a public-private partnership with the Chilean government, leading to urban growth seen as exemplary by those who value profitability, the uneven development of the city has created decades-long problems for modern practitioners to solve (Boano & Vergara-Perucich, 2017). The focus on market-based strategies above all planning priorities during the Pinochet dictatorship has been described by modern scholars as an "ideological black box" that worked to idealize the free market and install profit as the primary goal for not just infrastructure, but also education, health, and a variety of public sectors. This neoliberal model through policy strongly encouraged Chileans to become more consumption-oriented and to foster the idea of the entrepreneurial spirit as a way to encourage a shift away from more traditional and collective values.

Social Segmentation and Sprawl: Historical to Modern

Policies put in place in the Pinochet dictatorship encouraged a great deal of real-estate speculation that led to the middle and upper-income sectors gaining privileged locations within metropolitan Santiago, especially in the *communes* of the Oriente area, leading housing construction to reach an estimated 58% of the total urban land supply being inhabited by only 12% of the population of Santiago (Sabatini, 2000). Only a few years later, the *Ministerio de Vivienda y Urbanismo* loosened control over urban land by abolishing the urban limits of Santiago. This act, established by Decree No. 420, added 64,000 hectares to the existing 36,000 hectares which tripled the potential land market (Hechos Urbanos). This also signaled a shift in attitude that urban land is not scarce but can be expanded as much as the market desires. While this was designed to increase the supply of land to broaden accessibility to marginalized populations because of high prices, it actually drastically increased prices of this previously fringe land as well as prices for the urban interior. Arnold Harberger, an economic advisor to Pinochet, had believed that the limitation of the urban area by artificial regulatory instruments was the cause of the unbalanced differences in land values between urban land and surrounding rural land (Sabatini, 2000). The drastic expansion of urban boundaries encouraged the development of residential segregation. This sprawl of urban areas and spatial fragmentation due to social and economic stratification has persisted in modern Santiago and presents challenges for practitioners today to work to impact change and solve issues within certain sectors that reflect onto the whole city.

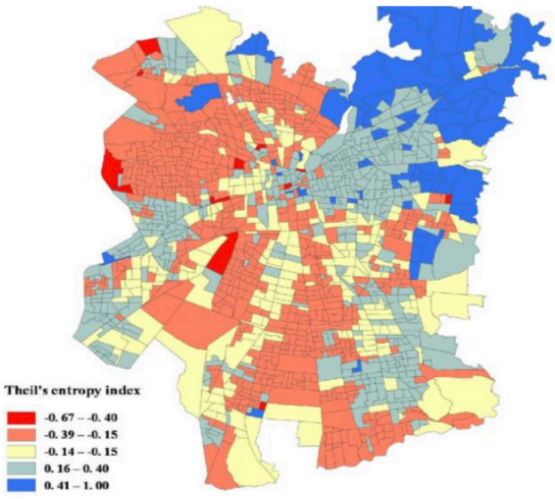
Urban Policy Today

In 1990 Chile began the transition back to a democracy, and in that period, Santiago underwent a series of transformations, including the changing lifestyles of inhabitants and the emergence of new social systems, but also a reckoning with what would be the extent of the dominance of market-oriented policies in deciding the future of urban areas and the level of flexibility available in the urban development process. The speed and shift to try to move away from repressive Pinochet policies led Santiago to become even more fragmented and uneven. Like in the transition between previous administrations, the primary strategy in Chile for responding and adjusting to changes was through urban development projects, which in this context can be interpreted as specific urban interventions that aim to resolve or relieve gaps or urban issues by working to provide a better public good (Perucich, 2019). The idea that the city's design has led to uneven development and the creation of housing without ensuring access to public goods per area has been recognized, and attempts at adjustment have been made by politicians in the 2000s. In 2012, President Sebastián Piñera gathered a board of specialists to redesign the National Policy for Urban Development, which had a greater amount of input from a variety of actors than the previous two revisions. Specifically focused on spatial segregation, this policy attempted to lessen the blatant division of economic growth in the city, which is the most segregated among OECD countries (OECD, 2013). The spatial segregation can be observed in Chart 1, from the article "Space and Social Capital: Social Contacts in a Segregated City" by Otero et al. (2022).

While spatial segregation describes the makeup of the people living in different areas, segmentation is a business term that refers to a strategy for allocating resources. Therefore, segmentation is a conscious action that divides a community into markets depending on their demands, interests, and especially their purchasing capacity. This process is inherent to the idea of a city design governed by the principles of neoliberalism, creating space for the rich and the poor, which also leads to social segregation by class, but also frequently ethnicity, race, language, etc.

Urban sprawl is associated with the fatality of pedestrian collisions, as a 2003 study found a connection where each 1 percent decrease in sprawl resulted in a 1.49 percent de-

Chart I: Spatial segregation based on quantified socioeconomic status (SES) using an adjusted Theil's entropy index.



crease in traffic-related fatalities overall, as well as between 1.47 and 3.56 percent decrease specifically in pedestrian fatality rates (Ewing, Schweiber, & Zegeer, 2003). Urban sprawl can be defined by four characteristics: "1. a widely dispersed population and low-density development; 2. the rigid separation of residential, commercial, industrial, and office uses; 3. poorly-defined activity centers; and 4. a road network typified by large blocks and poor connectivity" (Ewing, Pendall, & Chen, 2003). A 2011 study found that denser street networks with a higher number of intersections (which is the opposite of urban sprawl) had fewer crashes across all levels of severity. Vehicle-pedestrian collisions that occur in areas near schools and neighborhoods with mixed land use also had a lower rate of injury and death when compared to collisions with other development styles. Another study found that the presence of strip malls and big-box retail stores along with the high mileage of arterial roadways (another factor common in urban sprawl) are determinants of traffic injury rates (Dumbaugh & Li, 2011).

Walkability: The Culture of Transportation

To the U.S. reader, the idea of walkability may produce a variety of images based on lived experiences and perceptions of the level of "accepted" walkability in U.S. cities, and the lack of walkability supported by infrastructure in suburban and rural areas. It is important to note the cultural differences between the United States and the culture of transportation in Latin American communities.

Definitions of walkability are wide-ranging; some refer to the physical infrastructure and urban characteristics that create walkable places or the social and health-related effects that come from walkable environments, but other times it is used as a proxy term for better design in urban planning to mean increased levels of accessibility, safety, feasibility, comfort, or pleasurability (Forsyth, 2015). The majority of studies on walkability come from Europe or North America, where cars are relied on most for transportation, while many countries in the Global South, like Chile, have high levels of walking, even as cars have become more prevalent. Some believe this gap is partially due to the limited access to cars for a majority of the population, as only 40% of households in Santiago have cars (Sagaris et al., 2017). Sagaris's (2017) analysis of Santiago's 34 urban *comunas* (municipal planning areas) shows that car ownership (as well as wealth) is concentrated in only four to six *comunas*, those that are located on the city's eastern edge rising into the Andean foothills. Despite industrial pressures, economic changes, and a push for cultural changes (stretching back to the Pinochet era), walking has remained the main transport mode. Urban policies since the 1980s up until very recently have reflected the global focus on "automobility," the idea that cars are a vehicle (pun intended) of freedom, economic development, and social progress, and communities should be designed with their needs prioritized, which has led to their domination (Beckmann, 2001; Sheller & Urry, 2000).

Following the Pinchot dictatorship, Chile's subsequent period of economic growth included the development of urban highways within the country but especially in Santiago, and these were planned by the government under neoliberal policies, but constructed by private companies under Build, Operate, and Transfer (BOT) concessions. These contracts guaranteed revenues of up to 75% of the initial investments, controversial when considering that urban highway concessions from these toll-highways were $215 million in 2017, and from 2004 to 2015

seven major urban highways were built totaling 200km. These have stretched into surrounding areas and communities, creating gated communities without walkable infrastructure as well as isolating large sections of the city, particularly low-income communities that cannot afford to use them (Figueroa, Greene, & Mora, 2018; Sagaris & Landon, 2017). This car-centric attitude can be seen plainly in the distribution of investments in the built environment of Santiago between 2010 and 2016, when 30% of spending for transport projects was subsidized for urban highways and 7.7% for improvements and repairs on existing roadways, with just 2.8% investment in that period toward walking (*Coalición por un Transporte Justo*, 2016; Sagaris & Tiznado-Aitken, 2020). Thirty-two percent of sidewalks in Chile's main cities are in poor condition, according to a 2014 report (*Cámara Chilena de la Construcción*, 2014). The General Ordinance of Urbanism and Construction (*Ordenanza General de Urbanismo y Construcciones*) defines the street as a "vehicular road of any type that communicates with other roads and that includes both roads and sidewalks," the language of which makes motorized vehicles the priority and purpose of all streets, ignoring their role as public spaces for pedestrians and cyclists as well (*Ministerio de Vivienda y Urbanismo,* 2010, Article 1.1.2).

As continuous economic growth has continued into the 2000s and 2010s, car ownership has become more accessible for low-income groups, but in the same period walking trips have only decreased slightly, and not at the same level as the rise in cars, showing a persistence in walkability as a mode of transportation instead of simply a lesser alternative when cars are not available. From 2001 to 2012, the number of vehicles per household in the lower-income group rose from 0.13 to 0.17 and 1.5 to 1.65 vehicles per household for higher-income groups, a 31% growth in the lower-income group and 17% in the higher-income group (Herrera & Razmilic, 2016). The overall number of walking trips in Santiago among lower and middle-income groups at this time only decreased slightly from 36.7% to 34.5% (Herrera & Razmilic, 2016).

This persistence shows walking to be more than a transport of convenience or due to low income, but is a social and cultural part of the city and urban life. Besides the cultural reasons and economic accessibility of walking as transit, many have come to recognize the benefits of walking as a method of sustainable development. Data on the purpose of walking trips suggests that the frequency may reflect the traditional organization of urban life with high density and mixed land use (outside of segmented high income suburbs), where grocery stores are located walkable distances from residential communities (Herrmann-Lunecke, Geraldine, Mora, & Sagaris, 2020). Another factor could be the usage of public space in Latin American cultures, through events like street fairs, street festivals, and street markets; historically the street in Chile has been called "the living room of the people." The layout of Chilean streets may also be a factor in encouraging walking, as they were developed as orthogonal grids (*damero español*), which favor pedestrian movement and allow for mixed-use urban development (Herrmann Lunecke, Geraldine, Mora, & Sagaris, 2020). These cultural elements strengthen the argument that walking as transportation is more than just economics.

Despite the positives of walkability as a public health, economic, and sustainability measure, the current status of walkability in cities still presents many challenges for pedestrians, and since pedestrians tend to be women, the elderly, and low-income individuals, these challenges are disproportionately affecting these already marginalized identities. Walking comprises more than half of daily trips in Santiago's poorest *comunas*. Women account for a high percentage of walkers (56% to 77%) (Sectra, 2012), and walking has been associated with care-tasks, such as shopping, dropping off or picking others up, and health visits, accounting for 47% of daily trips and 64% of weekend trips, more than work (38%), education (10%), and recreation (6%) (Sagaris & Tiznado-Aitken, 2020). Aside from the frequency of these trips on infrastructure not always catered to pedestrians, women are particularly vulnerable due to conditions that can leave them exposed to sexual harassment, crime, or violence that would be less prevalent in vehicles (Seedat, MacKenzie, & Mohad, 2006, p. 150). While the idea of the "average com-

muter" suggests a trip straight from home to work and back, women also more frequently have multiple stops within a single trip, stopping for groceries, picking up children from school, etc.

A Review of Transportation Policy Developments and Change in Santiago

The National Road Safety Commission (*Comisiòn Nacional de Seguridad de Tránsito* or CONASET) was created on December 27, 1993, as a presidential advisory committee through Supreme Decree 223. Using the "2011 Simplified Methodology for Estimating the Social Benefits of Reducing Accidents in Interurban Road Projects" from the Road and Urban Transport Programme of the Ministry of Transport and Telecommunications and the Ministry of Social Development, CONASET determined that the estimated cost of traffic crashes in 2019 was USD 5.4 billion, equivalent to approximately 2.2% of Chile's GDP. I will be focusing on major changes implemented by CONASET between 20013 and 2019, as fatalities fluctuate with no clear trend of lessening fatalities emerging.

In 2017, Chile updated its National Road Safety Policy which serves as the general strategic guide that had originally been written in 1993. Similar to the 2012 redesign of the National Policy for Urban Development, this policy was created through a participatory process that included involvement from a variety of stakeholders, experts on road safety, citizens' groups, public and private entities, and road traffic victims associations. This rework created an updated strategic framework that would lead to a concrete action plan focused on the five strategic pillars of the United Nations' Decade of Action for Road Safety, road safety management, safer vehicles, safer road users, post-crash response, and safer driving environments. Chile's National Accord for Road Safety in 2018 created priority action items which were then used to develop the framework of the National Road Safety Strategy 2021-2030. This strategy's expressed goal contained a new target to reduce road fatalities by 30% by the year 2030 in comparison to the average number of fatalities in the period 2011-19 (International Transport Forum, 2019).

Recent changes have been focused on policing driver behaviors, specifically inappropriate speed and alcohol usage. In 2018, the Chilean Congress approved a bill to reduce the urban speed limit from 60 to 50 km/h. This initiative had been a priority of the Ministry of Transport and Telecommunications for years. This modest change in speed is significant, as when struck by a vehicle traveling 64.4 km/h (40 mph) a pedestrian has an 85 percent chance of death, but fatality does drop to 45% at 48.2 km/h (30 mph) (UK Department of Transport, 1997). However, the single most consequential intervention in reducing pedestrian fatality rates and injuries is roadway treatments such as the installation of frequent stop signs and narrowing roadways (Stoker et al., 2015). The Ministry of Transport and Telecommunications has begun to aim for Congress to allow automated speed management, but it is still in very early stages (International Transport Forum, 2019).

Drunk driving has been the topic of various pieces of legislation in the 2010s. In 2012, a new law was introduced to show a zero-tolerance policy. This set the maximum permissible blood alcohol content (BAC) at 0.3 g/l. The law defines driving under the influence of alcohol as driving with a BAC between 0.8 g/l and 0.3 g/l, while much tougher sanctions are implemented for driving while intoxicated, which is defined as driving with a BAC over 0.8 g/l. Sanctions include license suspension or annulment. Fatalities due to drunk driving declined almost 30% after the introduction of this law, from 267 in 2011 to 192 in 2012. Since the number of alcohol-related fatalities has remained around 10% of total fatalities, in 2019 9.6% of total road deaths (190) were related to alcohol. Beyond just laws related to drunk driving, a particularly high-profile law that more severely punishes drunk drivers responsible for serious injuries or fatal crashes was passed in 2014 called Emilia's Law. Exacerbating the sanctions of the 2012 zero tolerance law, a driver is subjected to at least one year of imprisonment and potentially

disqualified to drive for life. It also criminalized fleeing the scene or refusing an alcohol test.

The Chilean government has begun extremely recently showing an acknowledgment of pedestrian safety and pedestrian fatalities, but these policies have not been established and implemented long enough to determine a change, especially with the drastic change in transportation rates since the onset of the COVID-19 virus in early 2020. In 2020, The National Day of Remembrance for Road Traffic Victims was established as the third Sunday of November. CONASET and the Ministry for Transport and Telecommunications also in 2020 published a guide as a way of technical support for implementing tactical bike lanes, sidewalk extensions for walking and queuing, public transportation sanitization, and physical distancing for passengers, as a response to COVID-19, but it actually contained many of progressive planning measures that were being advocated for before the pandemic. Decree no. 71/2019, published in 2020, modified the standard road-traffic sign manual to incorporate the new design of information signs related to road traffic co-existence. This was the result of the collaboration of the advocacy working groups that came from the road coexistence law, including participation from the Ministry of Public Works, Ministry of Transport, and CONASET.

CONASET Data Analysis

I intend my research to be a successor to an article published in late 2019 by Martínez and Contreras entitled "The Effects of Chile's 2005 Traffic Law Reform and In-Country Socioeconomic Differences on Road Traffic Deaths among Children Aged 0-14 Years," which looked at those effects up until 2013. The 2005 reform introduced child restraint systems (CRS) for children under four years old, mandated seat belt use for all vehicle occupants, prohibited the use of cellphones while driving, and increased penalties for drunk driving, among others. The conclusion of the report saw a decrease in road traffic crashes during the 2002–2013 period and a significant reduction in the trends of road traffic collisions for children, but more significantly for child passengers rather than child pedestrians. During the 2002–2013 period, 34,492 road traffic collisions (RTCs) involved passengers aged 0–14 years, causing 510 deaths among that age group, while there were 21,675 road traffic collisions (RTCs) that involved pedestrians aged 0–14 years, resulting in the death of 535 people from this age group. This article also found that road traffic deaths (RTDs) of pedestrians and passengers in this age group fell during the 2002-2013 period, from 2.48 and 1.71 deaths for every 100,000 vehicles in 2002 to 0.63 and 0.89 for every 100,000 vehicles in 2013, respectively. However, as discussed in my introduction, children are not the only vulnerable population group of pedestrians; all pedestrians are vulnerable, which is why my analysis looks at changes in the overall traffic fatality rate and the pedestrian fatality rate. My analysis follows the period examined (2002-2013) to analyze the changes after the major updates of the 2010s: the reduction in speed legislation from 2018, the 2012 and 2014 (Emilia's Law) reforms related to alcohol use, and the overall updates in the National Road Safety Policy from 2017. I utilize CONASET data to determine if there is a significant change in the overall number of traffic fatalities. Though it may be too recent to examine these impacts fully, the changes from the 2005 period of reforms have stagnated which needs to be addressed. It may be too short of a time period to adequately assess the impact of these laws, but the global rate of traffic fatalities and pedestrian deaths has fallen dramatically in 2020 and 2021 due to changes in transportation rates due to COVID-19, which has made the 2020 and 2021 data outliers and not reliable enough to be considered an extension of a trend. In 2020, in Santiago the number of vehicles in traffic decreased by 65% due to changes in lifestyle and public accessibility during the pandemic (Road Safety Annual Report Chile, 2019).

In 2013, the number of traffic fatalities was 1,632. In 2019, the number of traffic fatalities was 1,617. By calculating (% increase = 100 x (final - initial)/initial), this change is only a .9%

decrease in the rate of traffic fatalities, which is not a significant change.[1] In the brief aftermath of the 2005 traffic reforms, the number of traffic fatalities fell from 1,626 to 1,652 in 2006, to 1,645 in 2007, and an almost record high of 1,782 (not reached since 1998), showing the trend to reduction as irregular then as well. The lack of significant change in Chile's overall rate of traffic fatalities between 2013 and 2019 suggests that the traffic reform policies of the 2010s have not made a meaningful impact on the rate of traffic fatalities.

However, regardless of the weak decrease in traffic fatalities, the rate of change in pedestrian fatalities between 2013-2019 was more meaningful. The rate of change in pedestrian deaths from 2013 to 2019 was 18.3%, a major difference, surprising when looking at the fairly stagnant rate of change in road fatalities. In this analysis, I have discovered that Chile's high rate of pedestrian deaths has been somewhat exaggerated due to the high rate of traffic fatalities, and though Chile still has the highest rate of pedestrian deaths among OECD countries at 3.551 per hundred thousand population, it has experienced a noteworthy reduction percentagewise. I had not foreseen this, as the high overall rates disguised the change over time in this exact period. However, with the lack of accessible multivariate data that includes the location of collisions as well as the type of road user, we are unable to ascribe whether these pedestrian deaths were due to changes in infrastructure at certain locations, which has been attributed to be a major component of lessening pedestrian deaths in other studies (Rothman et al., 2019; Schmitt, 2020).

As discussed in many sources, a more thorough evaluation and understanding of the impact of these policies will come with time, but the breadth of policy regulations shows an exciting amount of interest in road safety issues. Though there has been a decrease in pedestrian deaths, 665 in 2019 is still exorbitantly high in my opinion, especially when as we have discussed heavily, so many are preventable. Pedestrians continue to be the group the most affected by road crashes, in 2019 accounting for the largest share of road deaths, with 34% of the total, and occupants of passenger cars lagging behind at 29% (Road Safety Annual Report Chile, 2019). This problem is affecting the whole population; the 2019 article also suggested that regional socioeconomic differences are associated with higher road traffic death rates in the 0-14 age group, as well as that deaths due to road traffic collisions among children are not distributed randomly among the population. There is a clear link between these deaths and other factors of disadvantaged individuals, such as socioeconomic level, class, neighborhood, gender, and race. While these laws passed in the 2010s show the beginnings of an awareness of a problem needing to be fixed, are they getting to the root of the problem? When examining these policies, the decrease in pedestrian deaths seems to be more incidental following a less-

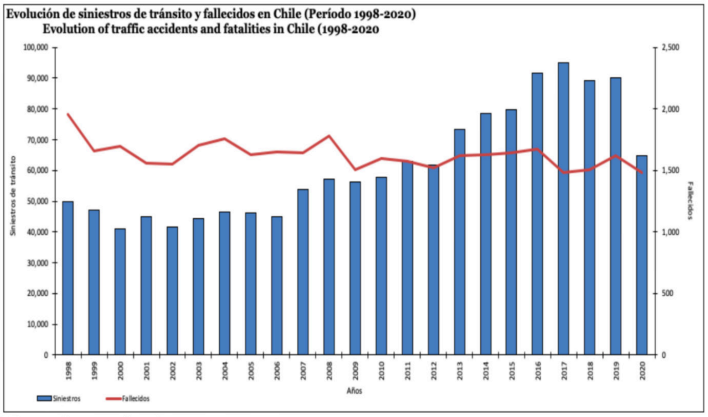


Chart II: Dataset: by age and road user

1 From 2013 to 2019 Santiago experienced a fairly consistent growth rate of between 0.66% and 0.80% each year (OECD 2021).

ening of the overall rate of road traffic fatalities, not the object of the policy reforms itself. The CONASET website includes geospatial information, using a thematic map viewer of geocoded layers of traffic accidents, which I originally thought would be helpful in understanding the prime locations of consistent pedestrian fatalities, but when we examine it further, it only has maps and filters specific to accidents involving bicycles, motorcycles, hit and runs, and critical points of traffic accidents. The data on pedestrian deaths should be just as available, but time and attention have not been given to fully understand the connections between these incidents as they are still largely seen as senseless tragedies, not the conclusion to a series of policies and apathy towards those within the pedestrian class. As mentioned before, the National Road Safety Strategy 2021-30 set a goal to decrease the number of annual road fatalities by the year 2023 to 30% of the average for 2011-2019. The average was 1,586, meaning a 30% decrease would be 1,110 deaths. And while the 2020 and 2021 statistics are lower (mostly due to COVID), I am doubtful that with the current policies in place the rate will maintain a lessening rate over time consistently enough to achieve that goal by 2030.

Aside from Chile's unique political history regarding extremely different political ideologies back to back, the implementation of active modes of transportation within Chile is different than many other nations. While more active modes of transportation were initially promoted by academics within the medical sphere and then adopted into national policy in the United States, the United Kingdom, or Australia, Chile has widely ignored the role of the physical environment when building health policy or seeing the physical environment as a potential factor in individuals' health (Ibarra & Mora, 2011; Mora, Greene & Corado, 2018). The current National Health Objectives de Chile 2012-2020 only contains two paragraphs about the role of cities and how urban planning can make people more active in a document of over 350 pages, while 87.8% of Chileans live in cities (INE, 2018).

When looking at this difference in top-down approaches, it is important to note that the Chilean institutional structure divides the national territory into regions and municipalities. The Metropolitan Area of Santiago de Chile (MAS) covers 34 municipalities, each managed at the local level of administration. There is no administrative level that functions over the entire MAS, and the 34 municipalities have 34 individual governing mayors but do not have a uniform institution or planning authority (Banzhaf et al., 2013). Therefore, developments in modernizing urban planning as well as walking persisting as a form of transit have come not from a top-down, ministry-driven initiative, but because of more people-driven behavior, bottom-up through cultural practices. Some coordination instances between the municipalities have occurred but are voluntary and depend on the political willingness of the participants, and they are not adequate to develop long-term policies. Many local initiatives that have promoted pedestrian interests have been pioneered by *comunas*, and though the 2014 Chilean National Urban Development Policy named walking a priority to meet sustainable development goals, the majority of initiatives have come from communities and citizens; and the development policy is not really in the mandate for any particular government agency, whether that be local, regional, or national. A recent example of a locally pioneered planning policy is Santiago's city center mobility plan (*Plan Centro*), which is a comprehensive policy to improve infrastructure in Santiago's original town center. It seeks to promote non-motorized mobility, by improving the walkability of a heavily used, central part of the city, where government, major retail, heritage, and other economic and cultural interests have a stake in development (de Santiago, 2015). This expanding pedestrianization covers 3.9 km of streets, complemented by a network of more than seventy pedestrian "galleries," interior walkways within usually commercial buildings. This interconnected pedestrian network has contributed significantly to making Santiago's historic center a very diverse and socially mixed quarter within a segregated city (Herrmann & Mora, 2018).

The *Plan Centro* was the first in Chile to give pedestrians and cyclists explicit priority

over private cars. On-street parking was eliminated, and car lanes were replaced by significant improvements to sidewalks, bus stops, and cycleways. Sixty percent of eight major roads were allocated for public transportation and strictly prohibited for cars during the weekday. Though there was some initial resistance, the project, which began in 2015 on Merced Street, has expanded to San Antonio Street and Santo Domingo Street and has received numerous prestigious awards, including the Sustainable Transport Award in 2017, which has gone to New York, Paris, and London among others. Though these policies are extremely successful, they are occurring in small sectors of a massive city, and the lack of an overarching administration makes the development of these projects difficult.

One change in the built landscape that could be put in place across the board would be investments in enhancing infrastructure for walkers, as currently only 2.78% of public investment in roads is directed to improving walking (Iglesias, Giraldez, Tiznado-Aitken, & Muñoz, 2019). To implement this, coordination among different sectoral planning departments (transport, urban planning, etc.), and between the national, regional, and local governments is urgently needed. Current planning regulations consistently promote and ensure the mobility of motorized traffic at all scales, so a revision of the Chilean national standards for streets and sidewalks would also be massively beneficial, as sidewalks are currently undersized by law. These regulations set rigid standards for the minimum and maximum width of vehicular lanes and sidewalks, which have made roads wide and sidewalks narrow (Herrmann, 2016). For example, two-lane roads must be 7 m wide, regardless of the speed limit, or if it is a local or trunk road (Ministerio de Vivienda y Urbanismo, 2010). In contrast, the minimum width for sidewalks is just 1.2 m for residential areas and 2 m for commercial areas. Finally, new policies at the regional level are needed to promote walking developed through close collaborations between municipal government staff and community organizations. Single *comunas* are unable to allocate the appropriate and necessary resources to undertake expansive projects, especially in deprived neighborhoods where walkable environments and public spaces have been neglected for a long period of time. Reimagining our idea of transportation infrastructure and seeing city streets as multifunctional public spaces that should be equally available to cyclists and pedestrians for social, civic, and cultural activities would have a major effect policy-wise. Redefining the street as a shared, multifunctional, and democratic space for all transport modes would create policies that give all citizens regardless of their mode of transportation a greater sense of dignity and ownership of their community.

Conclusion: The Implications of the Santiago Case

The case of Santiago and its consequences is not only relevant to Chile but is part of a larger movement to resolve the issues of how and for whom our cities globally are designed. Though Chile remains an outlier within the OECD, it ranks above numerous countries in Africa, Asia, and South America in traffic fatalities (Global Health Repository - WHO, 2021). Approximately 96% of children killed worldwide due to road traffic injuries are in low and middle-income countries and nearly all countries with the highest absolute numbers and rates of pedestrian fatalities are developing countries (Peden et al., 2004; Toroyan, 2009). Chile is the most developed nation in South America when considering its GDP, quality of life, infant mortality rate, life expectancy, and HDI in comparison to neighboring states, but it only joined the OECD in 2010. I believe that these policy alternatives are useful not only for Chile but just as much for other nations struggling with high rates of pedestrian deaths and traffic fatalities.

Latin American cities are much more similar architecturally to European cities than American ones and have a higher population density, making it possible that the Vision Zero policies may be more effective in preventing pedestrian deaths there. Chile has undergone such a significant transformation in the past three decades especially, in not only urbanization

but GDP and population growth as well. However, the state is still lower than many other OECD member countries in a number of urban-related factors related to the quality of life, such as the environment, housing, jobs, and income. Traditionally, Chile's metropolitan and urban development has been driven by sector, especially due to the structure of local and regional governments, but there is a strong need for an integrated approach to urbanism. One policy in the Netherlands is known as *woonerf*, which treats the street as a "living yard" by promoting sharing the street between all forms of transportation, but giving priority to pedestrians and cyclists over motorists. This policy is not completely out of the realm of possibility as one might think, since Sunday open street initiatives have begun gaining popularity in Latin American communities. Colombia's "*Ciclovía*" program, which closes more than 70 miles of roads for vehicular traffic in Bogotá, has been occurring since 1976, where nearly two million people participate in walking, cycling, dancing, and socializing in city streets. Santiago began a smaller version of the program called *CicloRecreoVía* which is practiced in 33 countries, involving more than 1.5 million people every week (Torres, Sarmiento, Stauber, & Zarama, 2013). The city has also provided opportunities to reduce the social segregation of the city by offering public space for recreation and community engagement (Mora, Greene, & Corado, 2018).

Other locally-grown programs like "I Love my Neighborhood" (Quiero mi Barrio), which invests in local plazas, parks, and sidewalk improvements to increase social capital in low-income neighborhoods in Santiago, and the *Programa de Barrios Comerciales*, which worked to improve high streets and made them more appealing and safe for female pedestrians, are beneficial tools for changing a community's culture surrounding walkability (Figueroa & Waintraub, 2015).

While pedestrian deaths and the other negative consequences of cities planned with a cars-firstmentality have a universal impact, they also significantly impact developing nations. The World Health Organization reports that people in developing nations account for just 1% of the world's cars, but 13% of the world's 1.3 million annual fatalities. The stratification of transportation modes by class in developing countries has prevented poorer nations from gaining stability and wealth in many instances. The World Bank estimated in 2017 that Tanzania could increase its GDP by 32% if it were able to reduce traffic injuries by 50% over a 24-year period (Schmitt, 2020). The growth of car ownership that occurs as some countries gain economic development is also cause for concern, however. Mexico has experienced a 4.2% increase in car ownership per year. Only about 15% of the trips made in Mexico are made in cars, but the cities' built infrastructure is geared towards accommodating the privileged minority that is able to affordthe social status symbol that cars represent in many developing countries (Schmitt, 2020). The problem of pedestrian deaths in Santiago, and globally, will not be solved without a recognition that there is a problem. Beginning to look at traffic fatalities and pedestrian deaths not just as random injustices but as the consequences of policy failures is so crucial to advocating for policy changes, whether they are structural improvements like narrowing streets, including more crosswalks, or more comprehensive policy plans like expanding public transportation and mixed land-use zoning.

Understanding a nation's history regarding urbanization and the varying political ideologies that formed a city's built infrastructure gives crucial context to why unequitable policies have persisted. Santiago is just one example of a city that has been designed for a minority, but by challenging the current state of affairs there is the potential to lessen the concerning rate of traffic fatalities and pedestrian deaths, not only in Chile but in other Latin American cities and those around the world.

References

Banzhaf, E., Reyes-Paecke, S., Müller, A., and Kindler, A. (2013). Do demographic and land-use changes contrast urban and suburban dynamics? A sophisticated reflection on Santiago De Chile. *Habitat International, 39*, 179-191. https://doi.org/10.1016/j.habitatint.2012.11.005

Beckmann, J. (2001). Automobility—A social problem and a theoretical concept. *Environment and Planning D: Society and Space, 19,* 593–607.

Blazquez, C. A., and Celis, M. S. (2013). A spatial and temporal analysis of child pedestrian crashes in Santiago, Chile. *Accident Analysis and Prevention, 50,* 304-311. https://doi.org/10.1016/j.aap.2012.05.001

Boano, C., and Vergara-Perucich, F. (2017). *Neoliberalism and urban development in Latin America: Thecase of Santiago. R*outledge.

Canniffe, E. 2006. *Urban Ethic: Design in the contemporary city.* Routledge.

Cámara Chilena de la Construcción. (2014). Infrastructura crítica para el Desarrollo: Bases para un Chile integrado: Estimaciones 2014-2018 Y 2014-2023. Retrieved from https://www.cchc.cl/uploads/archivos/archivos/Infraestructura-Critica-para-el-Desarrollo_2014- 2018.pdf

Coalición por un Transporte Justo. (2016). Gasto fiscal en cada modo de transporte. Retrieved from https://coaliciontransportejusto.wikidot.com/printer–friendly//wiki:gasto-fiscal-modos

Dumbaugh, E. and Li, W. (2011). Designing for the safety of pedestrians, cyclists, and motorists in the built environment. *Journal of the American Planning Association, 77*(1), 69–88. https://doi-org.umiss.idm.oclc.org/10.1080/01944363.2011.536101

Ewing, R., and Hamidi, S. (2015). Urban sprawl as a risk factor in motor vehicle occupant and pedestrian fatalities: Update and refinement. T*ransportation Research Record 2513*(1), 40-47. https://doi.org/10.3141/2513-05

Ewing, R., Pendall, R., & Chen, D. (2003). Measuring sprawl and its transportation impacts. *Transportation Research Record, 1831*(1), 175-183. https://doi.org/10.3141/1831-20

Ewing, R., Schweiber, R. A., and Zegeer, C. V.. (2003). Urban sprawl as a risk factor in motor vehicle occupant and pedestrian fatalities. *American Journal of Public Health, 93*(9), 1541–45.

Ewing, R., and Dumbaugh, E. (2009). The built environment and traffic safety: A review of empirical evidence. *Journal of Planning Literature, 23*(4), 347–67.

Fan, Y., and Song, Y. (2009). Is sprawl associated with a widening urban-suburban mortality gap? *Journal of Urban Health, 86*(5), 708-728.

Figueroa, C., Greene, M., and Mora, R. (2018). Impacto de las autopistas en la accesibilidad de los barrios, un análisis desde la sintaxis espacial. *Revista, 180*(42), 14–25. https://doi.org/10.32995/rev180.Num-42.(2018).art-578

Figueroa, C., and Waintraub, N. (2015). Movilidad femenina en Santiago de Chile: Reproducción

de inequidades en la metrópolis, el barrio y el espacio público. *Revista Brasileira de Gestão Urbana,7*(1), 48–61. https://doi.org/10.1590/2175-3369.007.001.AO03

Forsyth, A. (2015). What is a walkable place? The walkability debate in urban design. *Urban Design International, 20*(4), 274–292. https://doi.org/10.1057/udi.2015.22

Galetovic, A., and Jordan, P. (2006). Santiago ¿Dónde estamos y hacia dónde vamos?. *Estudios Publicos, 101.*

Glaeser, E. L., and Meyer, J. R. (2002). *Chile: Political economy of urban development.* Harvard University Press.

Gobierno de Chile. (2014). *Política nacional de desarrollo urbano.* Consejo Nacional de Desarrollo Urbano.

Golany, G. S. (1995). *Ethics and urban design: Culture, form, and environment.* John Wiley and Sons.

Greene, M., Rosas, J., and Valenzuela, L. (2011). *Santiago proyecto urbano.* Ediciones ARQ.

Gross, P. (1991). Santiago de Chile (1925-1990): Planificación urbana y modelos políticos. *Revista EURE-Revista de Estudios Urbano Regionales, 17*(52-53).

Hamidi, S., Ewing, R., Tatalovich, Z., Grace, J. B., and Berrigan, D. (2018). Associations between urban sprawl and life expectancy in the United States. *International Journal of Environmental Research and Public Health, 15*(5), 861.

Hauer, E. (1999). Safety in geometric design standards. Accessed January 11, 2022. https://www.researchgate.net/publication/228903642_Safety_in_geometric_design_standards

Herrmann-Lunecke, M. G., Mora, R., and Sagaris, L. (2020). Persistence of walking in Chile: Lessons for urban sustainability. *Transport Reviews, 40*(2), 135-159. https://doi.org/10.1080/01441647.2020.1712494

Herrmann-Lunecke, M. G. (2016). Instrumentos de planificación y diseño urbano para promover al peatón en las ciudades. Un estudio comparado entre Chile y Alemania. *Urbano, 34,* 48–57. https://doi.org/1022320/07183607.2016.19.34.5

Herrmann-Lunecke, M. G., and Mora, R. (2018). The layered city: Pedestrian networks in downtown Santiago and their impact on urban vitality. *Journal of Urban Design, 23*(3), 336–353. https://doi.org/10.1080/13574809.2017.1369869

Herzog, L. (2014). *Global suburbs: Urban sprawl from the Rio Grande to Rio de Janeiro.* Routledge.

Herrera, A., and Razmilic, S. (2016). Moverse en Santiago hoy: ¿Qué ha cambiado en los últimos años? Retrieved from https://www.cepchile.cl.

Iglesias, V., Giraldez, F., Tiznado-Aitken, I., and Muñoz, J. C. (2019). How uneven is the urban mobility playing field? Inequalities among socioeconomic groups in Santiago De Chile. *Transportation Research Record, 2673*(11), 59-70. https://doi.org/10.1177/0361198119849588.

Instituto Nacional de Estadísticas. (2018). Síntesis de resultados. Censo 2017. *INE*.

International Transport Forum. (2019). *Road safety annual report 2014.* OECD Publishing. Retrieved October 5, 2021, from https://www.itf-oecd.org/sites/default/files/docs/irtad-road-safety-annual-report-2019.pdf.

International Transport Forum. (2019). *Road safety annual report 2019* - United States. Retrieved October 5, 2021, from https://www.itf-oecd.org.

Jacobsen, P. L. (2003). Safety in numbers: More walkers and bicyclists, safer walking and bicycling. *Injury Prevention, 9*(3), 205–9.

Job, R. F. (1998). Pedestrians at traffic light controlled intersections: Crossing behaviour in the elderly and non-elderly. *In Proceedings of the Conference on Pedestrian Safety, 29-30 June*, edited by K. Smith, B. G. Aitken, and R. H. Grzebieta, 3–11. Australian College of Road Safety and Federal Office of Road Safety.

Kerr, J., Rosenberg, D., and Frank, L. (2012). The role of the built environment in healthy aging: Community design, physical activity, and health among older adults. J*ournal of Planning Literature 27*(1), 43–60.

Kusnetzoff, F. (1987). Urban and housing policies under Chile's military dictatorship: 1973-1985. *Latin American Perspectives, 14*(2), 157–86.

LaScala, E. A., Johnson, F. W., and Gruenewald, P. J. (2001). Neighborhood characteristics of alcohol-related pedestrian injury collisions: A geostatistical analysis. *Prevention Science, 2*(2), 123–34.

Langlois, J. A., Keyl, P. M., Guralnik, J. M., Foley, D. J., Marottoli, R. A., and Wallace, R. B. (1997). Characteristics of older pedestrians who have difficulty crossing the street. *American Journal of Public Health, 87(*3), 393–97.

Legg, S., and McFarlane, C. (2008). Ordinary urban spaces: Between postcolonialism and development. *Environment and Planning A, 40*(1), 6–14.

López Morales, E., Luco, C. A., Martínez, P. J., and Díaz, H. E. eds. (2014). C*hile Urbano hacia el siglo XXI. Investigaciones y reflexiones de política urbana desde la Universidad de Chile.* Editorial Universitaria.

Martínez, P., and Contreras, D. (2020). The effects of Chile's 2005 traffic law reform and in-country socioeconomic differences on road traffic deaths among children aged 0-14 years: A 12-year interrupted time series analysis. *Accident Analysis and Prevention, 136*, 105335-105335. https://doi.org/10.1016/j.aap.2019.105335

Martinez, S., Sanchez, R. and Yañez-Pagans, P. (2019). Road safety: Challenges and opportunities in Latin America and the Caribbean." *Latin American Economic Review, 28*(1), 17. https://doi.org/10.1186/s40503-019-0078-0

Marshall, W. E., and Garrick, N. W. (2011). Does street network design affect traffic safety? *Accident Analysis & Prevention, 43*(3), 769–81.

Mead, J., Zegeer, C., and Bushell, M. Evaluation of pedestrian-related roadway measures: A summary of available research. *P & BI Center. Chapel Hill, NC, UNC Highway safety Research Center, 115.*

Ministerio de Vivienda y Urbanismo (MINVU). (2010). *1979 Política nacional de desarrollo urbano* MINVU.

Ministerio de Vivienda y Urbanismo (MINVU). (2010). *Ordenanza general de urbanismo y construcciones.* MINVU.

Mora, R., Greene, M., and Corado, M. (2018). Implicancias en la actividad física y la salud del programa ciclo recreo vía en Chile. *Revista Médica de Chile, 146*(4), 451–459.

Munizaga, G. (2014). *Diseño urbano. Teoría y método.* Ediciones UC.

Muñoz, J. C., Batarce, M., and Hidalgo, D. (2014). Transantiago, five years after its launch. *Research in Transportation Economics, 48,* 184–193. https://doi.org/10.1016/j.retrec.2014.09.041

Mutangadura, G. B. (2002). *World health report 2002: Reducing risks, promoting healthy life: World Health Organization.* World Health Organization.

Narváez, Y. V., Sierra, V. P., Cárdenas, F. P., Ramos, L. R., González, B. Z., Vargas Martínez, J. I., and Aranda, O. M. (2019). Road risk behaviors: Pedestrian experiences. *Traffic Injury Prevention, 20*(3), 303-307.

OECD. (2013). The Chilean urban system and its challenges. In *OECD Urban Policy Reviews, Chile 2013.* OECD Publishing. https://doi.org/10.1787/9789264191808-4-en

OECD. (2016). *OECD factbook 2015-2016: Economic, environmental and social statistics*. OECD Publishing. https://doi.org/10.1787/factbook-2015-en

OECD. (2021). Road accidents: Transport. *OECDiLibrary*. https://doi.org/10.1787/8dacf707-en

OECD.Stat. (2021). Metropolitan areas. stats.oecd.org/Index.aspx?DataSetCode=CITIES

Perucich, F. V. (2019). *Urban design under neoliberalism: Theorising from Santiago, Chile.* Routledge.

Rivara, F. P., and Barber, M. (1985). Demographic analysis of childhood pedestrian injuries. *Pediatrics, 76*(3), 375–81.

Rodríguez, A., and Sugranyes, A. (2005). *Los con techo: Un desafío para la política de vivienda social.* Ediciones SUR.

Rosenbloom, S., and Plessis-Fraissard, M. (2009). Women's travel in developed and developing countries: Two versions of the same story? Paper presented at the 4th International Conference on Women's Issues in Transportation, Irvine, California. Published in *Transportation Research Board Conference Proceedings, 46,* 63–77.

Rothman, L., Howard, A. W., Camden, A., and Macarthur, C. (2012). *Pedestrian crossing location influences injury severity in urban areas. Injury Prevention, 18*(6), 365–370.

Sabatini, F. (2000). Reforma de los mercados de suelo en Santiago, Chile: Efectos sobre los

precios de la tierra y la segregación residencial. *Revista Latinoamericana de Estudios Urbano Regionales,23*(77), 49–80. https://doi.org/10.4067/S0250-71612000007700003

Sagaris, L., Tiznado-Aitken, I., and Steiniger., S. (2017). Exploring the social and spatial potential of an intermodal approach to transport planning. *International Journal of Sustainable Transportation, 11*(10), 721–736. https://doi.org/10.1080/15568318.2017.1312645

Sagaris, L., and Landon, P. (2017). Autopistas, ciudadanía y democratización: La costanera norte y el acceso sur, Santiago de Chile (1997–2007). *EURE (Santiago), 43*(128), 127–151. http://dx.doi.org/10.4067/S0250-71612017000100006

Sagaris, L., and Tiznado-Aitken, I. (2020). Walking and gender equity: Insights from Santiago, Chile. In *Urban Mobility and Equity in Latin America*, edited by D. O. Hernandez, N. Villamizar-Duarte, and A. A. Pinto. Emerald Books.

Schmitt, A. (2020). *Right of way: Race, class, and the silent epidemic of pedestrian deaths in America.* Island Press.

Schneider, R. J. (2018). "Complete streets" policies and eliminating pedestrian fatalities. *American Journal of Public Health (1971), 108*(4), 431-433.

Seedat, M., MacKenzie, S., and Mohad, D. (2006). The phenomenology of being a female pedestrian in an African and an Asian city: A qualitative investigation." *Transportation Research Part F: Traffic Psychology and Behaviour, 9(*2), 139–53.

Sheller, M., and Urry, J. (2000). The city and the car. *International Journal of Urban and Regional Research, 24*(4), 737-757.

Silva, C. (2020). The rural lands of urban sprawl: Institutional changes and suburban rurality in Santiago De Chile. *Asian Geographer, 37*(2), 117–144.

Stoker, P., Garfinkel-Castro, A., Khayesi, M., Odero, W., Mwangi, M. N., Peden, M., and Ewing, R. (2015). Pedestrian safety and the built environment: A review of the risk factors. *Journal of Planning Literature, 30*(4), 377–392.

Torres, A., Sarmiento, O. L., Stauber, C., and Zarama, R. (2013). The Ciclovia and Cicloruta Programs: Promising interventions to promote physical activity and social capital in Bogotá, Colombia. A*merican Journal of Public Health, 103*(2), 23–30. https://doi.org/10.2105/AJPH.2012.301142

United Kingdom Department of Transportation. (1997). *Killing speed and saving lives.* UK Department of Transport.

UNECE. (December 2009). Improving global road safety: Setting regional and national road traffic casualty reduction targets. United Nations Economic Commission for Europe. Retrieved October 5, 2021, from http://www.unece.org/fileadmin/DAM/trans/roadsafe/docs/Report_2009.pdf.

Watson, V. (2009). Seeing from the South: Refocusing urban planning on the globe's central

urban issues. *Urban Studies (Edinburgh, Scotland), 46*(11), 2259–2275.

Whitelegg, J. (1993). *Transport for a sustainable future: The case for Europe*. Belhaven.

World Health Organization. (2015). *Global status report on road safety.* World Health Organization.

World Health Organization. (2021). Road traffic deaths. Global Health Repository. https://apps.who.int/gho/data/view.main.51310?lang=en.

Zahabi, S. A. H., Strauss, J., Manaugh, K., and Miranda-Moreno, L. F. (2011). Estimated potential effect of speed limits, built environment, and other factors on severity of pedestrian and cyclist injuries in crashes. *Transportation Research Record, 2247, 81–90*. https://doi.org/10.3141/2247-10