Were COVID Pedestrian Streets Good for Business? Interviews and Surveys Reveal a Recipe for Success

By

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Abstract

During the COVID pandemic, at least 97 cities closed downtown streets to vehicles, implementing commercial pedestrian streets to encourage active travel and economic activity at a safe social distance. This study seeks to answer two research questions: “How did a pedestrian street program impact a business’s revenue and attitude toward commercial street closures, as compared to other businesses in the area, whose streets did not close?” and “If located on a pedestrian street, what factors influenced a business’s experience with the program?”. I created a geographic database of these pedestrian streets and identified and collected contact information for over 20,000 businesses within close proximity to them. I interviewed a diverse sample of 38 businesses on pedestrian streets to understand the impacts of the program on their business, which informed a survey which was distributed to a large sample of identified businesses. The interviews and survey results highlighted issues surrounding parking, access for the elderly and disabled, safety, shifts in client base, deliveries, winter conditions, general atmosphere, and city involvement. I also tested the effect of pedestrian street intervention on business revenue by surveying a large sample of businesses near, but not located on, a pedestrian street (pseudo-control businesses). I found the effect of pedestrian streets on revenues to be uncertain but on average negligible. I conclude with actions that cities can take to maximize the benefit of pedestrian streets to local businesses.

Introduction

To encourage outdoor activity, dining, and shopping in safe and socially-distanced environments during the COVID-19 pandemic, many US cities closed selected commercial streets to vehicles, creating pop-up downtown pedestrian streets. In a matter of weeks, mass pandemic shutdowns created tremendous demand for open, walkable space in US cities. In a survey conducted by Gehl, an international planning firm, 66% of respondents reported walking more often due to the pandemic, with 65% reporting having spent time in public spaces (O'Connor, 2020). With more than a third of Americans living further than a 10-minute walk from a park (Kane & Tomer, 2019), cities closed down streets to cars to accommodate people who wanted to spend time outside at a social distance.

The pedestrian streets were also motivated by a desire to help businesses. Downtown restaurants and retailers suffered when they were forced to close or operate at limited capacity. Would-be shoppers and diners were generally instructed to stay home as much as possible, to leave home only for essential purposes. As a direct consequence, local businesses struggled. US restaurants reported losses of $240 billion during 2020, with 110,000 food and drink establishments closing for business (National Restaurant Association, 2021). US retail foot traffic dropped by 97% in response to the shock of the pandemic in April 2020, and later stabilized to 30% below regular levels for the rest of the year (RetailNext, 2021).

Judging by the nation-wide popularity of "open streets" programs (Project Open Streets, 2021), taking cars from the road encourages pedestrian activity. However, the notion that removing automobile access to forward-facing businesses could actually improve business performance was much less of a given. The closure of commercial streets could be a stimulant for some businesses, but a deterrent to the customers of others. While pedestrian streets offer restaurants and retailers additional space for seating and merchandise display, business owners may worry about potential customers that might struggle to arrive at store fronts that lack automobile access. Indeed, prior research shows that business owners perceive sufficient on-site parking to be a very valuable asset (Von Schneidemesser & Betzien, 2021).

Pedestrianizing commercial streets has significant potential to benefit local businesses and increase foot traffic in commercial areas. The substantial number of pop-up pedestrian streets that appeared during the year 2020 provides the basis for an unprecedented natural experiment to test their effectiveness in doing so. In this thesis I explore the impacts of COVID pedestrian streets on abutting businesses. I created a geographic database of these pedestrian streets and identified and collected contact information for over 30,000 businesses within close proximity to them. I interviewed a diverse sample of 38 businesses on pedestrian streets to understand the impacts of the program on their business, which informed a survey which was distributed to a large sample of identified businesses. The interviews and survey results highlighted issues surrounding parking, access for the elderly and disabled, safety, shifts in client base, deliveries, winter conditions, general atmosphere, and city involvement. I also tested the effect of pedestrian street intervention on business revenue by surveying a large sample of businesses near, but not located on, a pedestrian street (pseudo-control businesses). I found pedestrian streets to have no significant effect on revenue as compared to nearby businesses. I conclude with actions that cities can take to maximize the benefit of pedestrian streets to local businesses.

Background

While the business benefits of active transportation infrastructure are well documented (Volker & Handy, 2021), evidence regarding the advantages of the complete closure of streets to cars is much murkier, especially in the US. As the literature in this section shows, pedestrian streets in downtown areas of US cities in the latter half of the last century had very limited success, but temporary closures for special events have become more popular and evidence suggests that they are a net positive for businesses.

Pedestrian Street Failure in the US

In response to the rapid suburbanization and urban decay of the mid-20th century, over 200 permanent pedestrian streets were installed during the 1960's and 1970's to lure shoppers back to downtowns and older commercial districts (Judge, 2015). The pedestrian streets were meant to compete with the recently popular suburban shopping malls of the time and initially were met with great fanfare and optimism, with businesses willing to pay higher rent along the newly pedestrianized streets (Pojani, 2008). Initial successes led planners to believe that pedestrian street interventions boosted economies and impeded urban decay (Ibid.).

By the 1980s, however, the anticipated benefits of most pedestrian streets had not materialized. Visitors that showed up for the street's opening celebrations never returned to shop. Rents along the streets were lower, and vacancies higher than before. By the mid 1990s, 100 of the original pedestrian streets had been ripped out and replaced with streets for cars (Ibid.). Today, only 11% of all installed pedestrian streets in the US are deemed successful (Judge, 2015). Matuke, et al. (2020) found that these streets were most likely to succeed in areas with higher population density, lower median age, higher percentage of white residents, closer proximity to a beach, higher levels of tourism, and a warmer climate; streets that were shorter in length were also more likely to be successful (Matuke et al., 2020).

Economic Impacts of Open Streets

Open streets (i.e. Ciclovia, slow streets, streets alive, etc.) are temporary (partial day) street closures to cars for multi-block stretches. Some open streets are one-time events, while others occur regularly on weekly to annual bases. Open streets initiatives have often been motivated by public health concerns for lack of safe public space in cities for social interaction and physical activity. With over 100 such programs implemented in North America in the last two decades (Project Open Streets, 2021), the programs' popularity among users is clear. Evidence regarding the impact of open streets on abutting businesses is limited to a few case studies.

Chaudhuri & Zieff (2015) collected data from 317 businesses located along the route of San Francisco's 2012 weekly Sunday Streets program using before, during, and after surveys. Forty-four percent of surveyed businesses reported that the event had a positive impact, with 21% reporting a negative impact. Restaurants experienced a decrease in business activity, while retailers saw an increase (Chaudhuri & Zieff, 2015). Engelberg et al. (2014) gathered data from 713 participants and 26 businesses during San Diego's 2013 CicloSDias event. Eighty-one percent of participants bought food or drink, and 51% made at least one retail purchase. Higher income people were more likely to spend more money. Half of businesses responded that the event had a positive or neutral effect, with restaurants reporting the highest rates and grocery stores reporting the lowest (Engelberg et al., 2014). Hipp et al. (2013) surveyed 82 participants during two St. Louis open streets events in 2010, asking questions about user activity and motivations. They found that 82% of respondents made at least one purchase during the event, with 56% of them becoming aware of a new business along the route (Hipp et al., 2013). Based on qualitative interviews with businesses that they performed during a 2018 San Jose open streets event, Douglas et al. (2019) concluded that most businesses were against the program, with the exception of restaurants (Douglas et al., 2019).

Though similar in some regards, the open streets programs described above and the pedestrian streets that this study focuses on are different interventions with distinct goals. Open streets programs are meant to benefit users directly with exercise and social interaction on longer stretches of car-free streets, often deliberately choosing routes through non-commercial areas (Project Open Streets, 2021). While pedestrian streets do indeed provide space for physical activity, they are primarily focused on benefiting local businesses by attracting increased foot traffic.

Impact of the Retail Environment on Consumer Choice

Pedestrian streets have the potential to influence consumer behavior by substantially changing commercial environments. In the field of environmental psychology, the most common model utilized to evaluate the effect of retail environments on consumer choices is the PAD model (Bohl, 2009), first

introduced by Mehrabian & Russell in 1974. The PAD model posits that Pleasure (feelings of contentedness, satisfaction, etc), Arousal (feelings of excitement, frenzy, etc), and Dominance (feelings of control vs. being controlled) are three key indicators in measuring consumers' emotional response to their environment (Mehrabian & Russell, 1974). According to the model, this emotional response influences consumers to either approach or avoid retail interactions.

Pedestrian streets can influence the PAD model metrics to increase the frequency of retail interactions. The absence of automobile traffic in commercial areas can engender a more peaceful and pleasing environment, increasing consumers' feelings of pleasure. Additionally, by converting street spaces into pedestrian walkways, users are given more personal space and may feel less crowded, which can lead to a greater feeling of dominance, as exhibited in several studies which have found that overcrowded environments can decrease consumers' feelings of dominance (Bohl, 2009).

Methods

Using existing datasets and results from my own preliminary investigations, I created a large database of COVID-related pedestrian streets along with their dates of operation. Using this database, I identified pedestrian street abutting businesses, interviewed a diverse sample of them regarding their experiences with pedestrian streets, and distributed a survey to a much larger sample of impacted businesses, along with a sample of pseudo-control businesses.

Indexing Pedestrian Streets

Digitizing Pedestrian Street Geographies

I built a comprehensive database of pedestrian streets by querying the University of North Carolina's "Shifting Streets" mobility database, which contains 1,300 unique public responses to COVID-related changes to demand for transportation and public space such as street closures, road diets,

bikeshare subsidies, speed limit reductions, etc (Combs et al., 2021). I created a subset of this dataset that contains only complete street closures in commercial areas in the United States, yielding 48 pedestrian street programs. Independent of this dataset, I conducted a manual internet search of the 500 most populous cities in the US, finding an additional 48 pedestrian street programs. The Shifting Streets database along with my independent search yielded a total of 96 US pedestrian street programs on commercial streets, each observation in the database containing at least the location of the pedestrian street and a link to a news media article describing the program. As a part of the database, I digitized the geographic boundaries of each pedestrian street. This was accomplished by skimming a news media article related to each program to find the street that was closed, as well as the closure endpoints. The accuracy and precision of my geographic data was as reliable as the local news reports that I utilized. When news articles reported unclear pedestrian street boundaries, I did my best to check multiple sources and call local businesses to verify boundaries. Nonetheless, due to the flexible and changing nature of some programs, unknown geographic errors in the dataset may have persisted.

Once their geographies were digitized, it became apparent that pedestrian street programs during the COVID-19 pandemic were fairly ubiquitous across the United States, appearing in every region except for parts of the Midwestern and Southern regions. Figure 1 shows a map of pedestrian streets that were implemented in the US during COVID-19, while Table 1 contains summary statistics by region. The summary statistics illustrate the typical context of the pedestrian streets in this study. Most pedestrian streets were established along a few blocks of the densest areas of mid-sized cities, often in historic districts. The median population of these cities was 97,700. The median population density in pedestrian street areas was 29,100 people/mi^2, similar in density to downtown Rockford, IL. Nationally, those living near these pedestrian streets make 12% less than their respective county average, suggesting that COVID-related pedestrian streets were more directly accessible for people from lower income households. Whether people from lower income households benefited from these COVID-related pedestrian streets is likely to be highly context specific and deserves future study.

As part of this analysis, it was important to determine the overall walkability of pedestrian street areas. The National Walkability Index is a nationwide scoring of census blocks according to their walkability, published by the United States EPA (National Walkability Index, 2021). The score is out of twenty, and is evaluated based on a set of key indicators: commercial-residential mix, diversity of employment types, street intersection density, among others. The median score of pedestrian street areas was 16.2 (Table 1), which according to the EPA falls in the highest bracket of scores, “most walkable”. This suggests the COVID-related pedestrian streets were placed in already walkable neighborhoods which likely boosted many programs’ success at attracting pedestrians.

A large portion of pedestrian street programs took place in the West, which also had by far the highest population density in pedestrian street areas (Table 1). Pedestrian street programs were implemented in the larger cities of the South and Midwest, and smaller cities of the West and the Northeast (Table 1). Households in the Northeastern and Midwestern pedestrian street areas had incomes that were 25-26% less than the county average, while those in the South had slightly above average incomes suggesting potentially large regional variation in the programs equity benefits (Table 1).

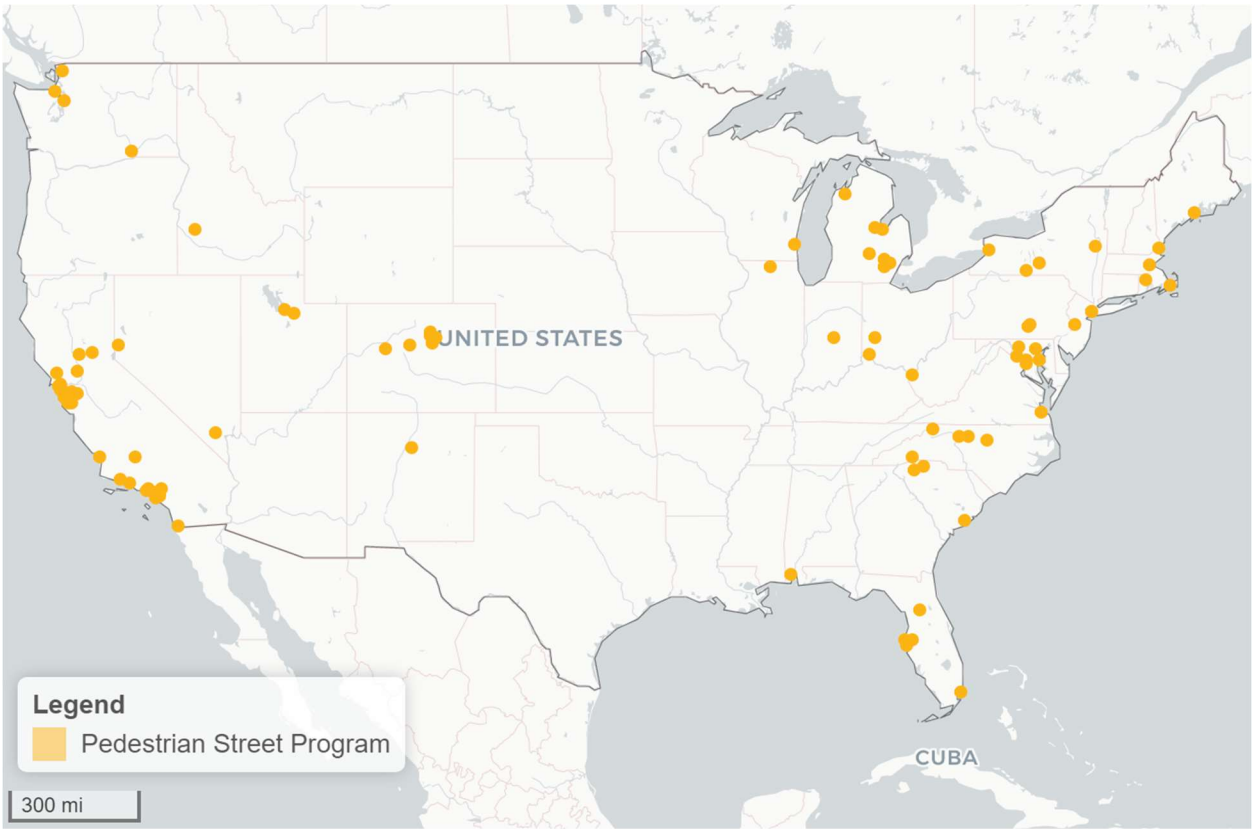

Figure 1: Map of COVID pedestrian street programs in the US.

Table 1: Pedestrian street summary statistics by region.

	West	Midwest	Northeast	South	**Nation**
Total Pedestrian Street Programs	49	13	15	21	**98**
Median length of all pedestrian streets per city [ft]	1,320	1,720	2,000	1,450	**1,460 (~¼ mi)**
Median population of cities with pedestrian streets [residents] (American Community Survey, 2019)	90,400	147,000	55,100	156,800	**97,700**
Median population density of pedestrian street areas [people/mi2] (Ibid.)	50,320	10,700	24,800	8,000	**29,100**
Percent difference between income of pedestrian street areas and county average (Ibid.)	-13%	-25%	-26%	0%	**-12%**
Median National Walkability Index score of pedestrian street areas [out of 20] (National Walkability Index, 2021)	17.2	12.7	15.8	15.2	**16.2**

Pseudo-Control Street Selection

To form a pseudo-control group of study businesses, I identified and digitized pseudo-control streets.These streets were generally located in nearby commercial districts, between ¼ to ½ mile away from a pedestrian street program. They were close enough to pedestrian streets to experience the same city-wide economic conditions, but far enough away to not be directly affected by a pedestrian street program. To ensure an appropriately sized pseudo-control group sample size, I digitized approximately five pseudo-control street segments for every one pedestrian street program line segment.

Pedestrian Street Program Dates

The experimental design required knowledge of the start and end dates (if the program had ended) of each pedestrian street program in the study. While most news media articles revealed the start date of programs, very few reported any end date. To catalog the end dates of the programs, I contacted

municipal planning and economic development departments at each study city. In several cases, it was necessary to contact local businesses to verify this information.

The average pedestrian street program lasted 8 months; 52% closed the street 24/7, 41% were only in effect on weekends, while 7% were special event closures for a single weekend. Of the 97 total programs identified, 28 pedestrian street programs remain in effect as of October 2021. Figure 2 exhibits the number of active pedestrian street levels during each month of 2020 and 2021 in the US. Pedestrian streets were most popular during the summer of 2020, tapered off during the subsequent winter, and regained popularity in the summer of 2021.

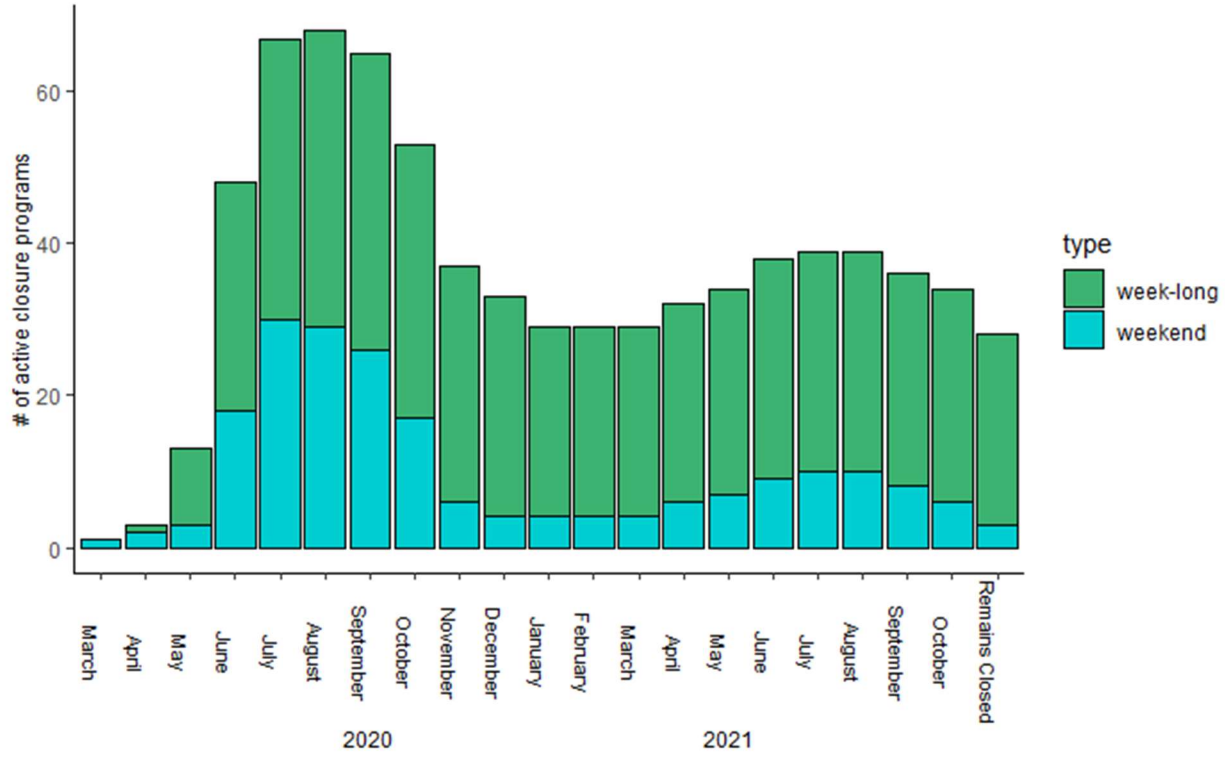

Figure 2: Number of active pedestrian street levels during each month of 2020 and 2021 in the US

Indexing Abbutting Businesses

Using the geographic boundaries of the pedestrian streets, I used the Google Places API to join business locations that were within 130 ft of each pedestrian street, as shown in Figure 3. The Google Places API pulls data from Google Maps, by far the most popular and comprehensive business search tool

(Panko, 2018). The attributes of the business included business name, type, phone number, website, hours of operation, number of patron ratings, lat/long coordinates, and physical address.

Figure 3: Google Places API business search sample street.

More than 20,000 businesses were identified along pedestrian streets, with food and drink businesses (restaurants, cafes, bakeries, bars, etc.) being most popular, followed closely by professional service providers (any business providing a service instead of a good), as shown in Figure 4. This shows that while pedestrian streets were placed in areas with a high density of restaurants, many other business types were impacted as well. Abbutting businesses were also identified along each pseudo-control street, with over 58,000 businesses identified.

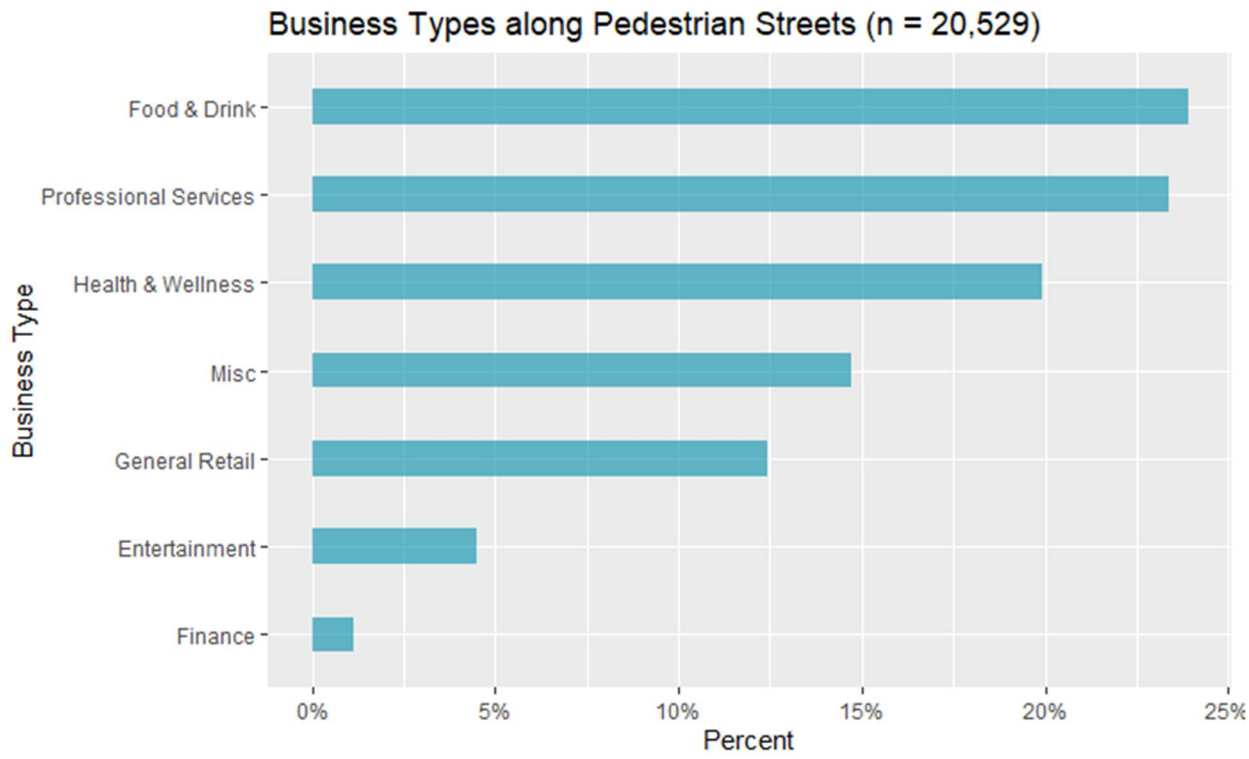

Figure 4: Businesses along pedestrian streets by type.

Interviews

To understand the experiences of businesses whose streets were pedestrianized, I performed 38 interviews with business owners and managers. To pick cities in which to interview, I stratified across the following subsets of the database: geographic region, duration of street closure intervention (ranging from a few weeks to over a year), population of city (ranging from 6,000 to 3.6 million), and winter climate (ranging from the Great Lakes to Southern California). After this stratification, I identified as candidate cities those whose closures attracted the most media coverage. With the candidate cities picked, I stratified pedestrian street businesses by business type. I picked interview candidates by randomly sampling across the stratification, oversampling retail (by 3 to 1) because of their potential vulnerability to street closures. Nine interviewees were referred to me by others that I interviewed (snowball sampled). By picking candidates from these different groups, I gained qualitative data regarding the attitudes and

perceptions of business owners who experienced a wide variety of circumstances during the COVID pandemic. Overall, I identified and attempted to contact (by email, phone and in person) 120 candidate businesses, successfully interviewing 38 of them. I spoke with owners and managers from 23 retailers, 8 service providers, and 7 restaurants. By region, I interviewed 9 businesses from the San Francisco Bay Area, 2 from Southern California, 15 from the Mountain West, 8 from the Great Lakes, and 4 from the Middle Atlantic.

To recruit candidates, I started with a small email campaign targeting the identified candidate businesses along each pedestrian street, offering a small gift card incentive to schedule an interview. The majority of candidates, however, were recruited with "cold calls" during the slow business hours of the morning. In July 2021, I performed a field visit to a mid-sized city in the Mountain West, during which I spent a morning visiting as many businesses as possible and performing short informal interviews with managers and staff.

The interview questions that I prepared were open ended, encouraging interviewees to recount their experiences and opinions. The questions focussed on business operation adaptations, overall impacts on business performance, changes in customer base, parking, deliveries, and potential future street closures. The following is a sample of interview questions:

- What was your initial reaction to the news of the pedestrian street program?
- How did you adapt your business due to the pedestrian street?
- How do you feel like your business performance was affected due to the street closure?
- What opinions did patrons express of the pedestrian street program?
- Would you be in favor of a more frequent or permanent street closure?

Twenty-six interviews took place over the phone, and 12 were done in-person. Most interviews were less than ten minutes long, focussing on the issues that were most important to the interviewee. Several interviews lasted longer when candidates felt more willing to discuss finer details. When practical, interviews were recorded and transcribed. When participants wished to not be recorded, or when recording was not practical, a short summary of the conversation was recorded after the interview

was over. Once interviews were completed, eleven overarching themes were established, representing the most prevalent topics discussed. All interviews were coded and sorted into at least one of the eleven themes.

Survey Data Collection

Survey Development

I wrote the survey in two parts, seeking to answer two primary research questions:

If located on a pedestrian street, what factors influenced a business's experience with the program?

Many factors contributed to a business's overall experience with their pedestrian street program. These included parking, safety, access, city involvement, among others. Informed by my interviews, I developed additional survey questions specifically for businesses that operated on pedestrian streets in order to dive deeper into these issues and gain quantitative insights regarding these factors which shaped a business's experience.

How did a pedestrian street program impact a business's revenue and attitude toward commercial street closures, as compared to other businesses in the area, whose streets did not close?

In order to compare business performance between pedestrian street abutting businesses (treatment group) and other businesses in the area whose streets did not close (pseudo-control group), I asked both groups to report the percent change in revenue that they experienced in a fiscal quarter during which a pedestrian street program was in effect using the following question:

> "By your best estimate, how did your revenue change during [study quarter], as compared to the same period in 2019?"

Respondents used a slider to report the percent change on a scale from -100 to 200%. The study quarter was determined prior to the survey distribution by identifying a fiscal quarter in each city during which a pedestrian street program was in effect. The beginning and end dates of pedestrian street programs were determined, as mentioned before, by contacting local municipalities.

To better understand each business's experience during the designated fiscal quarter, I also asked both groups several other questions about parking, deliveries, and perceived pedestrian volumes. The exact same questions were asked of both groups, with no explicit mention being made of the treatment group's pedestrian street program.

Survey Distribution

When I indexed pedestrian street abutting businesses using the Google Maps API, I also received the website URL for the majority of identified businesses. Through these URLs, I was able to extract contact emails for many businesses using a web scraping R script. I then distributed the survey to the business contact emails by sending an initial invitation email, followed by two reminder emails in the subsequent weeks. Respondents were incentivized to take the survey by being entered into a raffle for one of ten $100 Amazon gift cards. I received a total of 598 responses, with a response rate of about 7%. Figure 5 shows the complete workflow by which survey data were obtained.

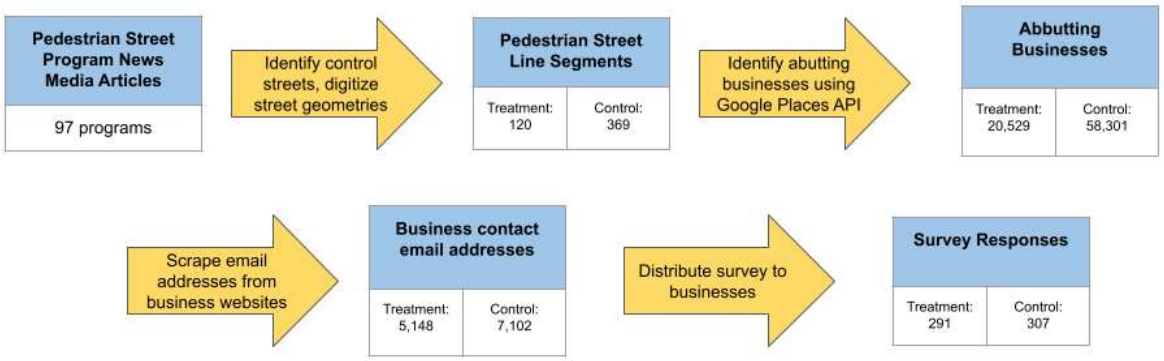

Figure 5: Survey Data collection workflow

Survey Data Analysis

To predict the effects of a pedestrian street intervention on change in business revenue, I utilized multiple linear regression. Table 2 shows the variables used in the model.

Table 2: Model variables

	Description	**Mean (SD) or Percent**	**Range**
% Change in Revenue (dependent variable)	The % change in revenue that a business reported for a fiscal quarter during which a pedestrian street was in effect.	-13.23 (56.61)	-100 to 200
Pedestrian street treatment	A dummy variable indicating if a pedestrian street intervention was implemented or not on the business's street. 1 = pedestrian street intervention 0 = no intervention	1: 50.6% 0: 49.4%	0 to 1
Restaurant/Entertainment Venue	A dummy variable indicating if the study business was a restaurant or entertainment venue. Preliminary analysis revealed a significant difference in survey responses between restaurants/entertainment	1: 30.6% 0: 69.4%	0 to 1

	venues and other business types. 1 = restaurant or entertainment venue 0 = other business type		
Attitude toward Pedestrian Streets	A 5-point likert variable indicating a business operator's agreement or disagreement with the statement "Closing commercial streets to cars can be good for businesses". This variable was included because a business operator's attitude toward pedestrian street programs could have an effect on their reporting of business revenue. 1 = Strongly Disagree 2 = Slightly Disagree 3 = Neither agree nor disagree 4 = Slightly Agree 5 = Strongly Agree	1: 10.9% 2: 15.0% 3: 18.6% 4: 26.5% 5: 28.9%	1 to 5
Business Role	A dummy variable indicating if the survey respondent was the business owner, or if they filled a different role (manager, employee, etc.) 1 = owner 0 = other role	1: 65.8% 0: 34.2%	0 to 1
Walk Score	A numeric index of a business location's walkability, as described in the methodology section.	15.15 (3.46)	6.5 to 20
Population Density (people/mi^2)	Number of residents per square mile in a business's city	3129.65 (3,391)	164 to 16,268
City Population	Total population of a business's city	1,070,509 (2,452,020)	1,315 to 8,804,190

In addition to the model, I prepared bivariate summaries of many survey questions, exhibiting how survey responses differed by business type. I prepared univariate summaries when survey responses did not differ considerably by business type.

Results and Discussion

This section contains analysis and discussion regarding the major themes that emerged from interviews and surveys, as well as a description of the model used to measure the relationship between pedestrian street programs and business revenue. It is worth mentioning that while COVID pedestrian streets provided the grounds for a unique natural experiment, the pandemic itself introduced a myriad of confounding factors that make it difficult to isolate the introduction of a pedestrian street as an independent variable. Although businesses may have struggled to separate the effects of the pedestrian street from those of COVID in general, the interviews and survey responses ascertained their general feelings about the intervention.

Of the 598 survey responses, approximately half were from businesses located on pedestrian streets, with the other half coming from businesses whose street did not close. About one third of all respondents were restaurants or entertainment venues. The survey was distributed in 97 cities, and responses were received from 77 of them.

Interview and Survey Results from Pedestrian Street Businesses

This section contains data from 38 interviews and 291 survey responses collected from businesses located on COVID pedestrian streets, which reveal valuable insights regarding business' experiences with these programs. Interviewees and survey respondents both expressed strong opinions both for and against their pedestrian street programs, with 39% of survey respondents answering at least one optional free-response question regarding the program. While every business faced a unique set of experiences, the themes in this section capture the most important issues that emerged.

Businesses Were Split Regarding Overall Effects, But Most Are in Favor of Future Pedestrian Streets

When asked about the overall effect of pedestrian street programs (see Figure 6), businesses were split almost exactly evenly in their responses between “negative” (32%), “no effect” (34%), and “positive” (34%). This demonstrates that while these programs evoked both positive and negative opinions, there were also a large portion of businesses that were apathetic or unsure about the removal of vehicles from the street. It is clear that pedestrian street programs affected businesses in a wide variety of ways, but also had little effect on many.

When asked “Would you be in favor of a more permanent or frequent street closure program?”, businesses were far less indifferent, with 58% of respondents answering “yes”, 35% answering “no”, and only 6% answering “no opinion”. Half of the respondents who reported that the street closure had “No Effect” on their business also indicated that they would be in favor of a more permanent or frequent street closure program. This shows that business owners who did not have much of an economic stake in the closure programs were still in favor of the programs for other reasons, a sentiment that came up several times in interviews with business operators who enjoyed the improved public space on their street.

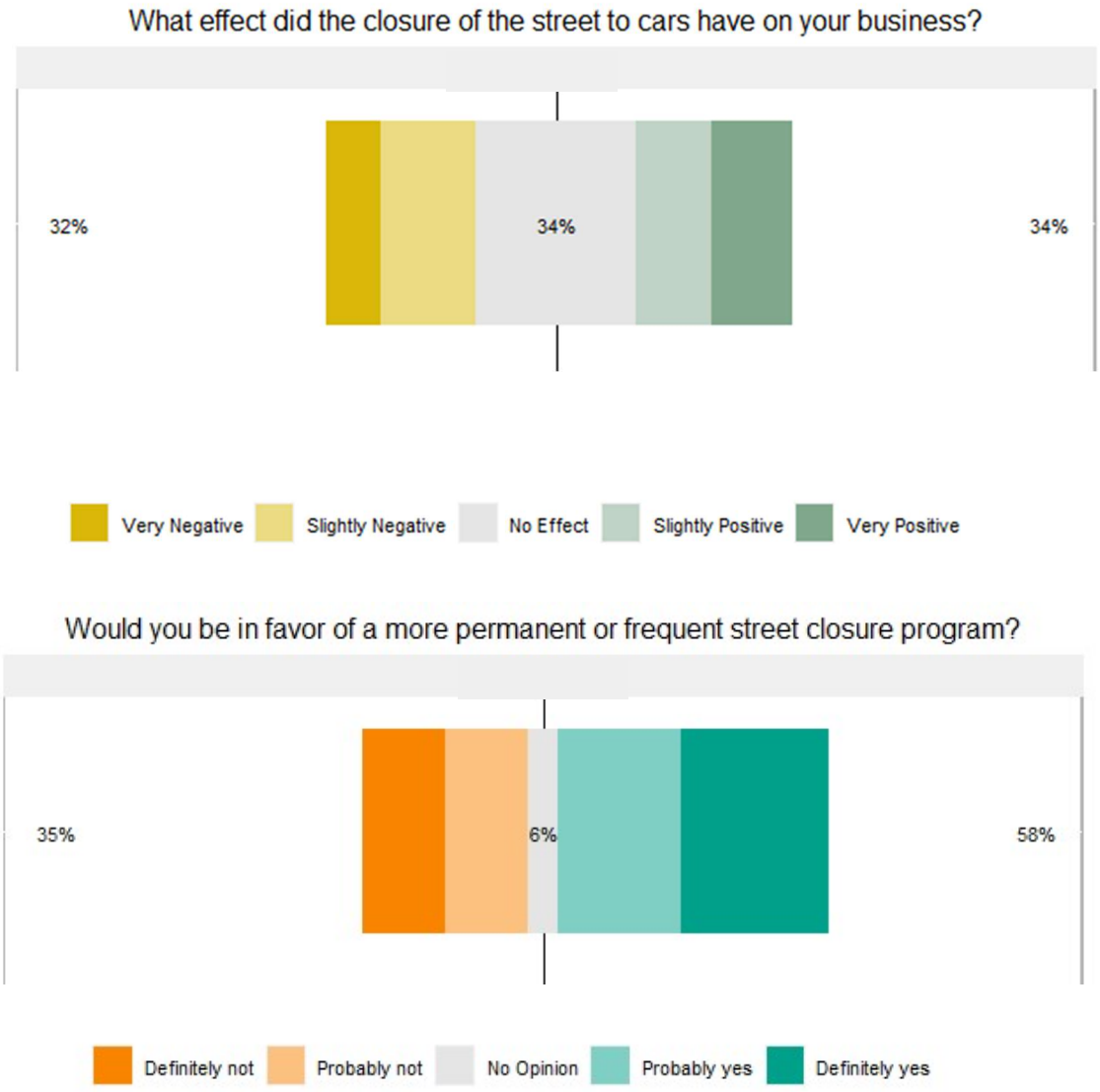

Figure 6: Responses to questions regarding overall program effects and opinions regarding future programs

Restaurants and Entertainment Venues Report Most Positive Effects

Through both interviews and surveys, restaurants and entertainment venues (mostly art galleries and museums) reported the most positive effects and highest rates of approval of pedestrian street programs. During interviews, nearly every restaurant that I spoke with was in favor of their pedestrian street, telling me that it had provided a substantial boost to business. They valued the additional seating,

improved atmosphere, and increased foot traffic that the intervention provided. Prior to the pedestrian street, one restaurant owner had started the process of bankruptcy after suffering months of pandemic-related losses. She credits the pedestrian street program with saving her business by allowing her to install outdoor seating which facilitated on-site dining and in turn increased revenues (Restaurant 5). To an extent, the survey results agree with the interviews, with 44% of restaurants reporting that closing the street to cars had a positive effect, much higher than average (see Figure 7).

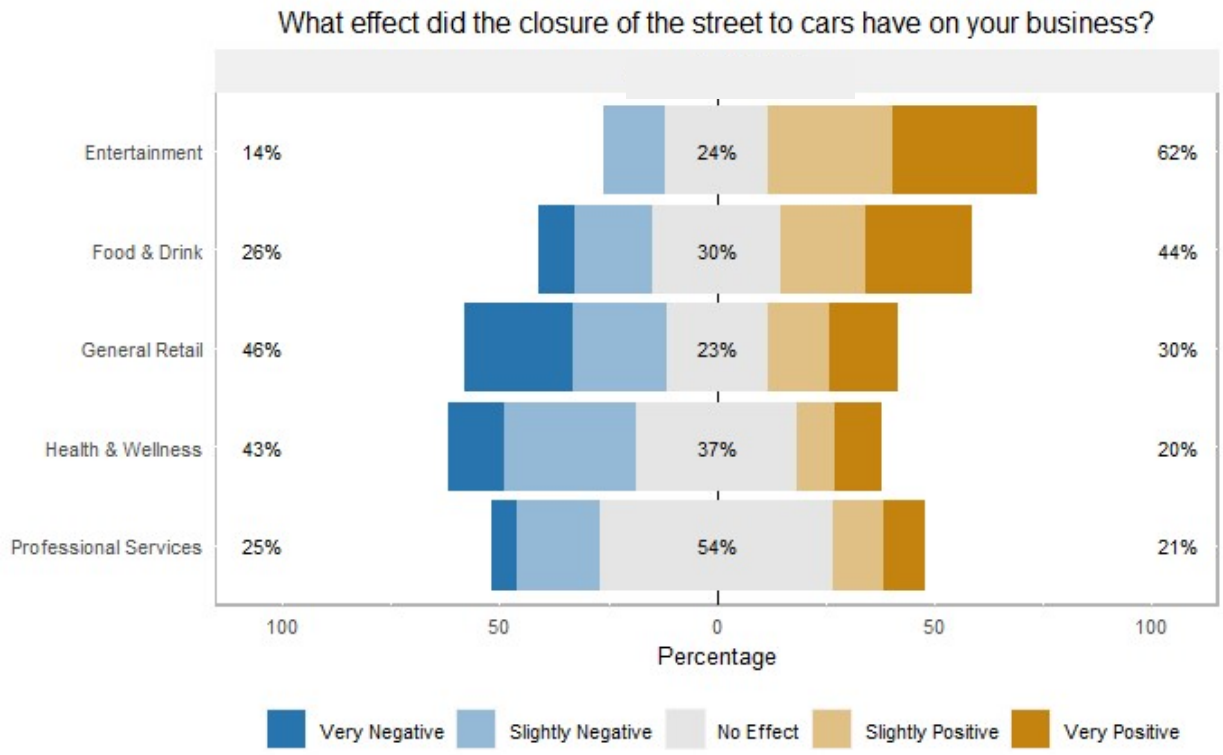

Figure 7: Effect of pedestrian street, by business type

Additional survey questions aid in revealing the reason for which restaurants and entertainment venues reported such positive effects, as shown in Figure 8. The majority of restaurants and entertainment venues agreed with the statement that “I valued the extra street space outside my business for additional seating/merchandise placement”, while the plurality of other business types neither agreed nor disagreed. The same applies to the statements “I saw an increase in new customers" and “Allowing people to consume alcohol in open street areas is a good idea”, indicating that restaurants and entertainment venues

took advantage of the newly available street space to seat more customers, sell more alcohol, and in turn brought in new customers.

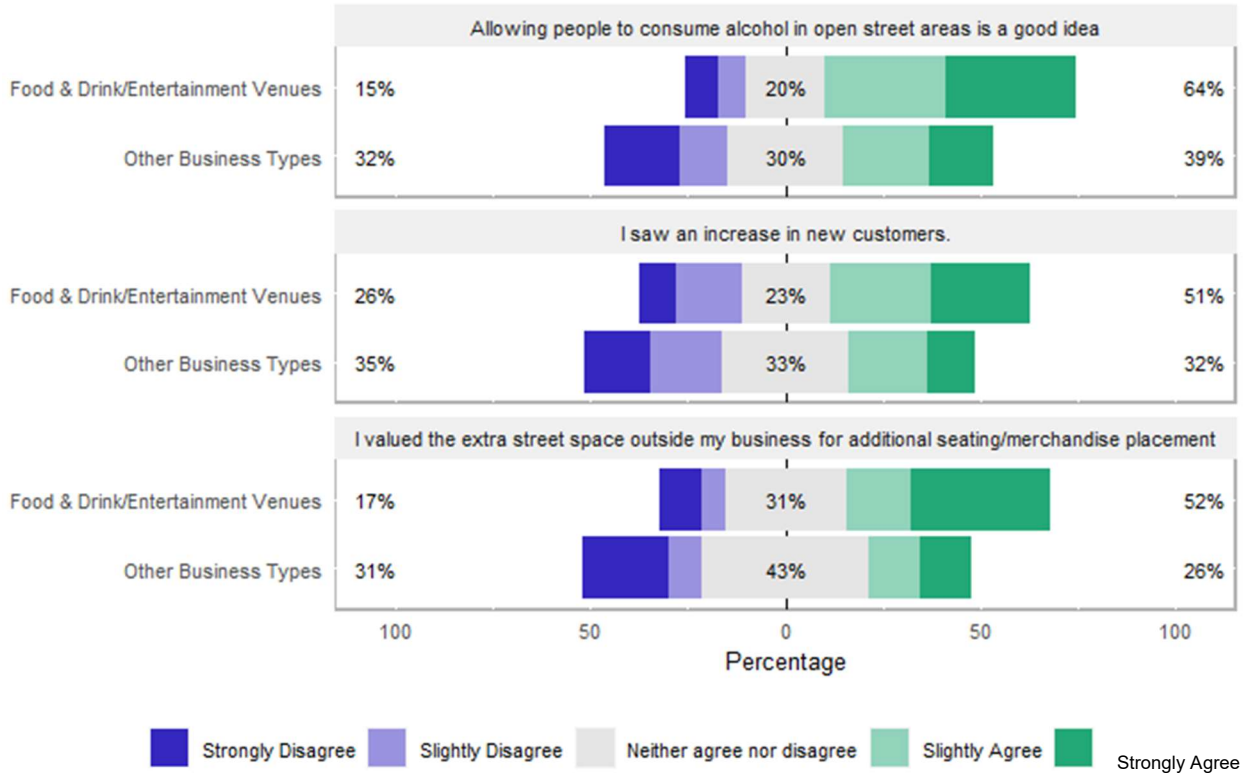

Figure 8: Response to the other statements, broken down by restaurants/entertainment venues vs. other business types

Pedestrian street programs were not as popular with other business types. In the first few months of pedestrian street interventions, many retailers and service providers saw their street's closure as a necessary sacrifice that needed to be made to save their local restaurants by allowing them to operate outdoors, an opportunity to "be a good neighbor," as an auto mechanic put it (Service 5). As the months dragged on and the street remained closed to cars, these businesses began to perceive unfair advantages that the program awarded restaurants. Several explained that the pedestrianized areas only filled up at night with diners, rendering their street a "ghost town" (Retail 12) during the day. While the pedestrian street allowed restaurants to sometimes double their seating capacity, other business types didn't see the same benefits, with one jeweler complaining that the tables and chairs blocked people's view of his

window displays (Retail 15). While retailers were also allowed to utilize the street space in front of their stores to sell merchandise, it was rarely practical. “I couldn't just put 200-year-old diamonds in and out of the street every day,” said an antiques dealer (Retail 4). Many survey free-response comments told the same story. Responses included:

> “A few businesses benefited (those that sell alcohol). Everyone else suffered.”
>
> “The street closures were good for restaurants. I am not aware of any other business that is happy with them.”
>
> “...the increased foot traffic only slightly increased our sales. Lots of lookers but not so many buyers”.

In the survey, 46% of retailers reported negative effects, the lowest among all business types. Health and wellness businesses also reported mostly negative effects, perhaps in part due to the fact that their clientele is more likely to be elderly or disabled, and may have struggled to access their business without on-site parking. Professional service businesses (any business that provides services instead of goods) indicated that the pedestrian street had ‘No Effect’, more than any other business type, likely due to the fact that these businesses may not directly benefit from increased pedestrian volumes.

There were, however, many businesses that enjoyed a more synergistic relationship with busy neighboring restaurants. Open-air dining brought more people to the area, who in turn visited and supported other businesses. “It keeps people downtown longer,” pointed out a Great Lakes retailer (Retail 19), increasing the likelihood of new customers and increased sales. Survey free-responses included

> “The restaurant and cafe seating on the street has resulted in more people noticing the shop and coming in to explore what we have”
>
> “In general, I support the street closure if they benefit my restaurant and brewery neighbors and it increases the customer population in our area”

Parking Was a Key Issue for Many Businesses

Parking can be an emotional subject for business owners, as it was for an art gallery owner who teared up while telling stories of customers calling to say that they wouldn't be visiting the business

because of the parking situation (Retail 23). A shoe store owner only needed one word to describe her reaction to the loss of parking: “dread.” She went on to talk about the customers that she was losing: those from other cities who drive long distances to her store and expect an on-site parking space. “People from out of town don’t think this is cute,” she said, describing the pedestrian street program (Retail 21). Survey respondents agreed with these concerns when they were asked if they agreed or disagreed with the statement “Adequate parking was provided”, with 47% of businesses disagreeing, and only 32% agreeing.

While public parking lots were generally available within walking distance of most pedestrian streets, several businesses expressed the same grievance of losing customers who were unwilling to change their driving route and park farther away. Many navigation systems depend on user input to reroute drivers around closures and may have not have done so during flexible and intermittent pedestrian street programs. Even some of the most enthusiastic supporters of their pedestrian street admitted that issues with parking were a (often only) downside of the program.

On the other hand, several interviewees pointed out that even before the pedestrian street intervention, their street offered very limited on-street parking. When survey respondents were asked about their available parking supply both before and during the period in which the pedestrian street was implemented, only 34% reported losing the on-street parking available to their business, with 8% losing their off-street parking. This may indicate that the perception of lost parking may have been greater than the actual loss.

Additionally, businesses often explained in interviews that anyone who visited on a regular basis (employees, repeat customers, etc) quickly adapted and found a place to park if needed. Above all, a key determinant of parking satisfaction was the existence of large public parking facilities within close proximity to the pedestrian street.

Nearly All Businesses Retained Their Existing Customer Base

The businesses in this study depended on both new customers and long-term clients. On one hand, pedestrian streets represented an opportunity to attract new customers from the increased pedestrian

traffic on the street. On the other, street closures presented another hurdle that prevented long-term clients from supporting struggling businesses. The majority of business owners interviewed said that most regular customers were determined and emboldened to make their way to the store and support the business. A large majority of survey respondents (79%) agreed with the statement that "My existing customer base continued to support my business", indicating that the pedestrian street program, for the most part, did not hinder businesses' existing customers from reaching their stores.

Pedestrian Street Programs Transformed the Overall Atmosphere of Commercial Areas

Many businesses were proud of their updated streetscapes, increased pedestrian volumes, open air dining, intimate storefronts, and overall atmosphere. Survey free-response comments included:

> "The open streets program allowed space for those children to safely play and gave peace of mind to the parents"
>
> "it's a blessing that we are able to breathe clean air on the weekends [with less] traffic noise"
>
> "...the street closures provided a vibrancy and energy to downtown that I have not seen before…"
>
> "The quiet atmosphere of the closed street is very favorable to the ambiance of an art gallery. A major selling point for us is the peace engendered by the space"

These responses in favor of pedestrian streets are evidence that, as mentioned earlier, pedestrian street interventions influence the metrics of the PAD (Pleasure, Arousal, and Dominance) consumer choice model. Peaceful car-free streets made for a more pleasurable environment, and expanded pedestrian spaces increased feelings of dominance.

There were instances, as some told us, when the physical design of the street space conflicted did not feel like an aesthetic improvement. For example, it was common for cities to block off pedestrian

streets with large “road closed” signs, orange barrels, and concrete barricades. As one put it, “When people see a barricade, they see it as a reason to stay out,” suggesting that the barriers might keep even pedestrians away (Service 8). Survey free-response comments included:

> “...the temporary barriers in place look pretty sketchy”
>
> “It looks so tacky…”
>
> “The barriers used by the city made the area look like a construction site”

Some businesses did their best to enliven the atmosphere themselves by inviting local artists to set up booths in the sidewalk, putting out sampling stations, and organizing community events (Retail 10, Retail 14, Retail 4). These responses make it clear that businesses saw themselves as stakeholders in the attractiveness of their pedestrian streets.

Many Businesses were Concerned with the Access of the Elderly and Disabled

Access for patrons with limited mobility was a concern for a good share of the businesses that I interviewed. In interviews, jewelers and hobby-specific shops expressed the most apprehension towards their store’s loss of automobile access, citing the fact that their long-term client base tended to be more elderly. “...a lot of times they’re carrying something, and a lot of times they’re older,” was a music store owner’s description of his clients who had to park farther away from his business (Retail 1). One Great Lakes restaurant even tried to shuttle older patrons from the parking lot and back with a golf cart before the city disallowed it (Restaurant 6).

In the survey, many businesses did agree with the statement “I was concerned about eldery or disabled people’s access to my business”, but it did not represent a prevalent issue for most. As exhibited in Figure 9, health & wellness businesses were most concerned with the access of the elderly and disabled, while entertainment venues were the least. Comments in the survey included:

"It created a hardship for my elderly and disabled clients"

"As someone who has a large elderly clientele, it was very awkward to have them visit"

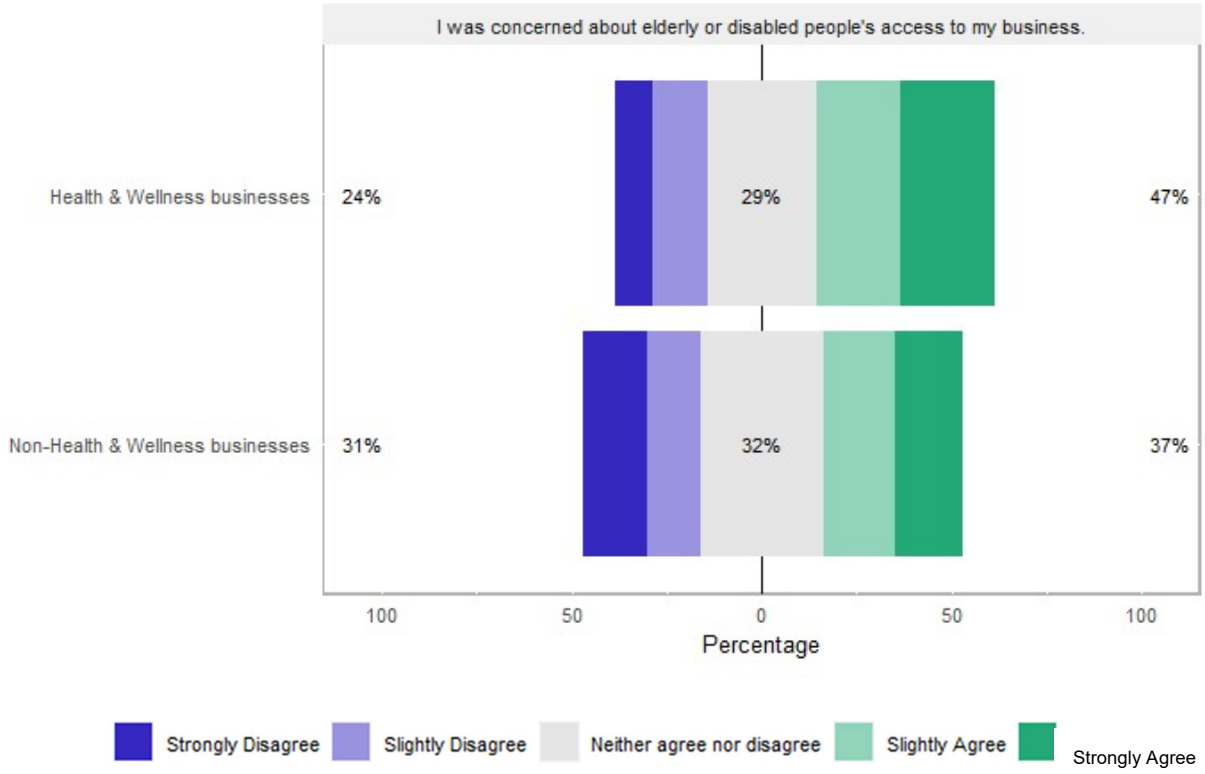

Figure 9: Response to the statement "I was concerned about eldery or disabled people's access to my businesses"

Most Businesses Did Not Have Delivery-Related Issues

Several businesses portrayed challenges related to deliveries, but most did not. A restaurant supply store who received shipments from multiple international agencies had a particularly difficult experience (Retail 13). Outbound deliveries posed their own challenges. "Why were we encouraged to do curbside ordering," wondered one retailer, "when our customers had no access to the curb?" (Retail 2). For several businesses, especially home goods stores, having a back alley for customers to drive up and collect larger items was essential (Retail 3, Retail 7). In the survey, most businesses did not have issues

with deliveries, with 59% indicating no change in their level of inbound delivery convenience, as shown above in Figure 12. Thirty-three percent, however, did report a decrease in delivery convenience.

Pedestrian Street Programs Had Some Effects on the Street's Perceived Level of Safety

For some businesses, taking cars from the road and replacing them with foot traffic increased the feeling of safety on pedestrian streets. A bank manager in the Mountain West said that she and other bank employees felt much safer from the threat of robbery since vehicles were banned from the street and pedestrian volumes increased. She said that the additional security was well worth the price of minor losses in vehicle access (Service 2).

Several retailers across the country, however, had different opinions. As many restaurants pointed out, one of the main draws of these pedestrian streets was the option to consume alcohol in the common street areas. Multiple retailers felt that the public alcohol consumption threatened the commercial environment, reporting a street brawl in the San Francisco Bay Area and even a fatal shooting in the Mid Atlantic. They decried the "outdoor parties" (Retail 15) and "playgrounds" (Service 8) that had become of the street space. "I don't want drunk people in my shop," said one retailer, "it's a knife shop!" (Retail 13).

The survey, for the most part, did not reflect the safety concerns mentioned above. I asked survey respondents about the perceived feeling of safety on their pedestrian street. Sixty-two percent of respondents agreed with the statement "My street felt safe before the closure", while 64% agreed with "My street felt safe after the closure". This indicates that the pedestrian street program likely did not have a substantial impact on the perceived level of safety on the street. Concerns regarding alcohol consumption in the street were reflected in the survey, with only 26% of non-restaurant/entertainment venue businesses agreeing with the statement "Allowing people to consume alcohol in open street areas is a good idea", as shown in Figure 8 above. Many free-response comments highlighted issues surrounding

loitering in public areas, noisy parties disturbing businesses and residents, lack of sufficient lighting, and the necessity of a police presence during busier times.

Some Business Types Performed Worse During Winter Months

Most pedestrian streets were established in the summer of 2020, when the warm weather coaxed people outside to enjoy dining and retail experiences after months of COVID lockdown. As the pandemic dragged on into the colder winter months, business in harsher climates had mixed feelings about the persistence of their pedestrian streets. To the pleasant surprise of many, propane heaters and outdoor "igloo" structures attracted a fair number of patrons to the street. A bar in the Mountain West recounted fond memories of patrons huddled with their drinks around cozy fires as they took in the evening snowfall (Restaurant 5).

On the other hand, several business owners didn't see the logic of keeping the streets closed through the winter, viewing the pedestrian street intervention as a temporary boost, not a long-term year-round solution. They told me that they didn't see enough patrons on the street to justify the intervention, especially during the daytime.

Survey respondents located along pedestrian street programs that remained in place during December, January, and February were asked how their business performed during the winter months, as compared to summer. The most common response was that there was no change in performance in the winter (39%), with the next most common response being that the business performed somewhat worse (29%). Figure 10 shows the response by business type, with Food & Drink/Entertainment venue businesses reporting the worst effects.

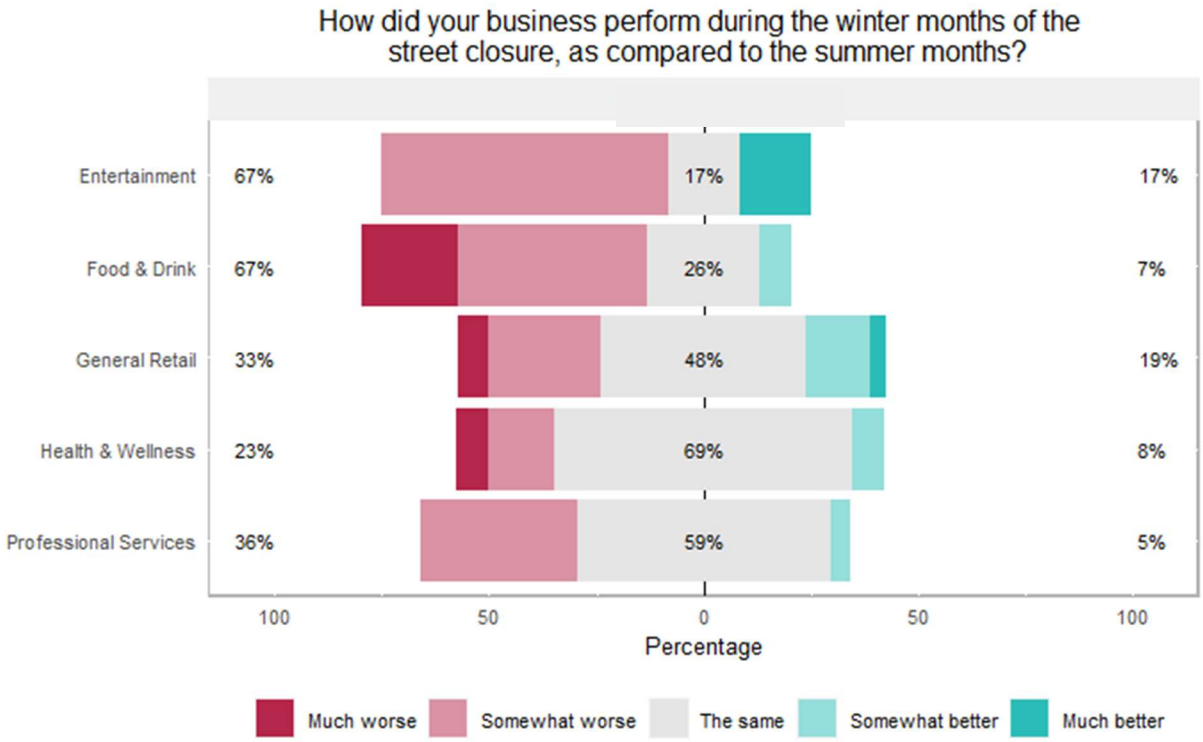

Figure 10: Responses to the statement "How did your business perform during the winter months of the street closure, as compared to the summer months?", by business type

Businesses Report Mixed Opinions of City Involvement

Analysis of interview responses suggested that the more involved a city was in each aspect of the pedestrian street program, the more satisfied businesses were with the process. Interviewees described town hall meetings, opinion polls before and during the programs, and outreach presentations from the city. The decision to close one Great Lakes street was made only after the businesses voted to approve the program (Retail 19). It didn't hurt, as one bookstore owner noted, that city hall was just one block away, and that city staff were regular customers (Retail 20). Many of the businesses that disapproved of their pedestrian street were disappointed in the lack of outreach and communication by city staff regarding the program, with many learning the news of the intervention by word of mouth. For several businesses, this lapse in correspondence established a poor attitude of the program from the beginning that didn't get better over time.

Survey respondents were asked a broad set of questions regarding their city's involvement in their pedestrian street program, shown in Figure 11. Many businesses were critical of their pedestrian street program scheduling, with 44% strongly disagreeing with the statement that "The city adjusted street closure schedules to meet my business's needs", agreeing with a survey respondent who wrote: "During hours when pedestrians are present, the closure is pleasant…but during regular weekdays the closure has the opposite effect. The streetscape is depressing and empty, no longer bustles with traffic activity and consumers aren't present. It is empty and more depressing especially in winter. The ideal of closure could be limited to actual times pedestrians want street access, leaving streets open the rest of the time." Several other respondents also expressed a desire for a more variable closure schedule. However, putting up and taking down barriers and other elements multiple times a week is a burden, and "...temporary closures just mean the set up won't be as nice", as one respondent put it.

Respondents were most split regarding the statement that "The city sought input from businesses on the program", with very few answering "Neither agree or disagree". Many respondents included free-response comments to complain about the lack of input solicitation from businesses. This indicates that gathering input from businesses was an important factor in determining business approval of the program.

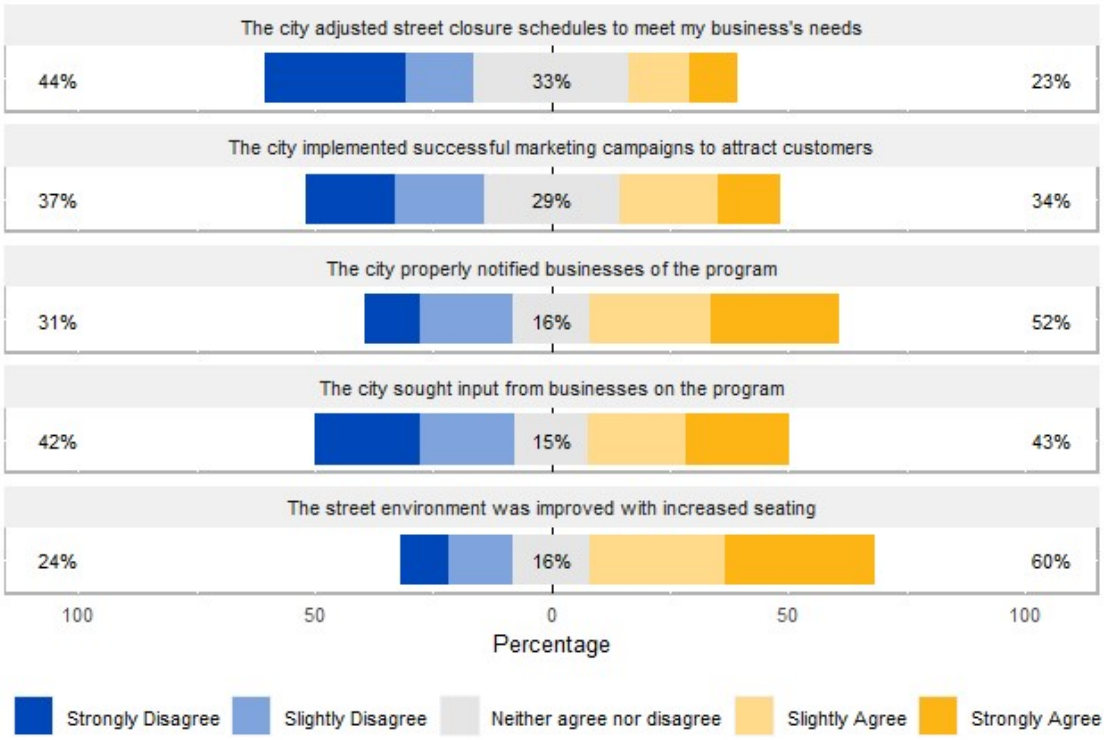

Figure 11: Responses to statements regarding city involvement in pedestrian street programs

Comparing Pedestrian Streets to Pseudo Control Streets

Using the survey data, this section includes a comparison of the responses from 291 businesses which abutted pedestrian streets (treatment businesses) with those of the 307 businesses located on nearby streets which did not close (pseudo-control businesses). All businesses, both treatment and pseudo-control, were asked several questions about the conditions of a specific fiscal quarter during which a pedestrian street program was active. Answering these questions accurately may have been difficult for many businesses, as many survey respondents were asked questions about a fiscal quarter over 1 year in the past.

Changes In Street Conditions

Respondents in both the treatment and pseudo-control groups were asked to indicate how much the following increased or decreased during the specified fiscal quarter: “Convenience of inbound deliveries”, “Number of parking spots available to your customers”, and “Number of people walking on your street”, as shown in Figure 12. Treatment businesses experienced a slight decrease in delivery convenience and, not surprisingly, a considerable decrease in available parking spots. Perhaps most surprising was the fact that most treatment and pseudo-control businesses reported large decreases in pedestrian volumes on their street, indicating that the COVID pandemic may have removed more pedestrians from study streets than pedestrian street programs could attract.

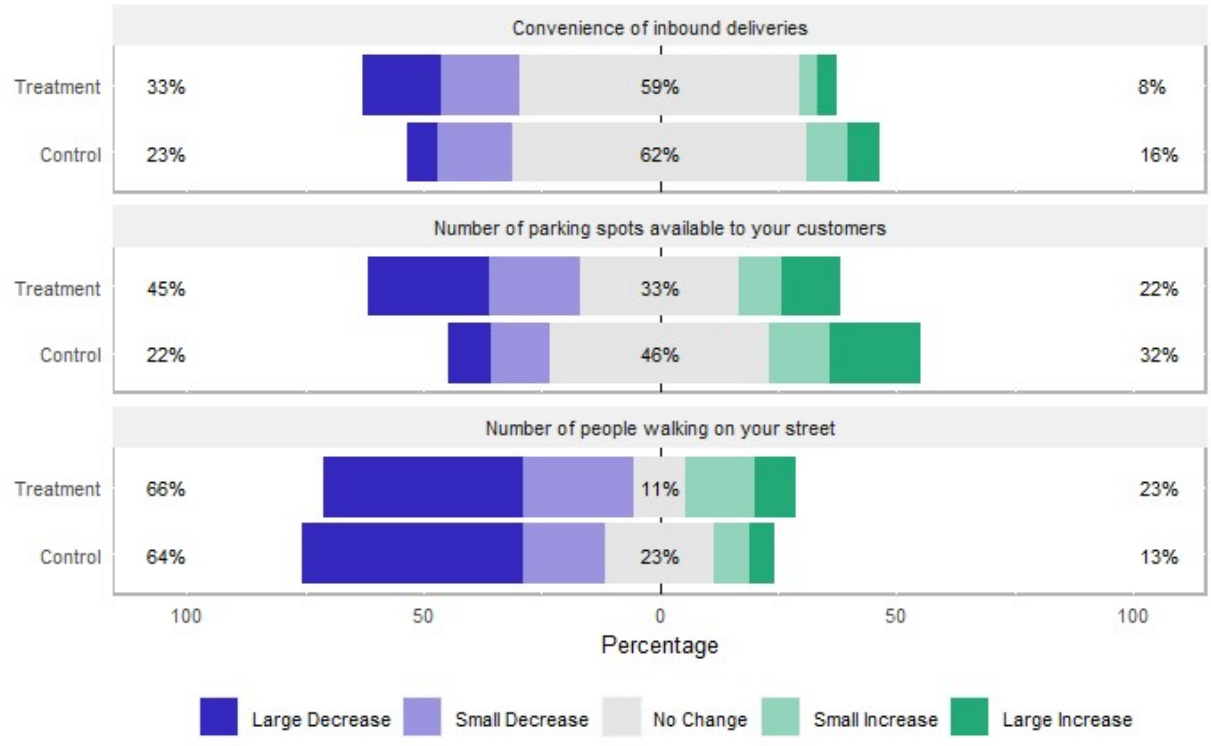

Figure 12: Survey data regarding street conditions during the specified fiscal quarter

Pedestrian Street Programs Did Not Appear to Affect Business Revenue Significantly

I asked businesses to report their approximate change in revenue during a fiscal quarter during which a pedestrian street program was in place. This was done with the intent of quantifying the effect of pedestrian streets on business revenue. Treatment businesses and pseudo-control businesses reported very similar changes in revenue, as shown in Figure 13. The median change in revenue for treatment businesses was -14%, while that of pseudo-control businesses was -12.5%.

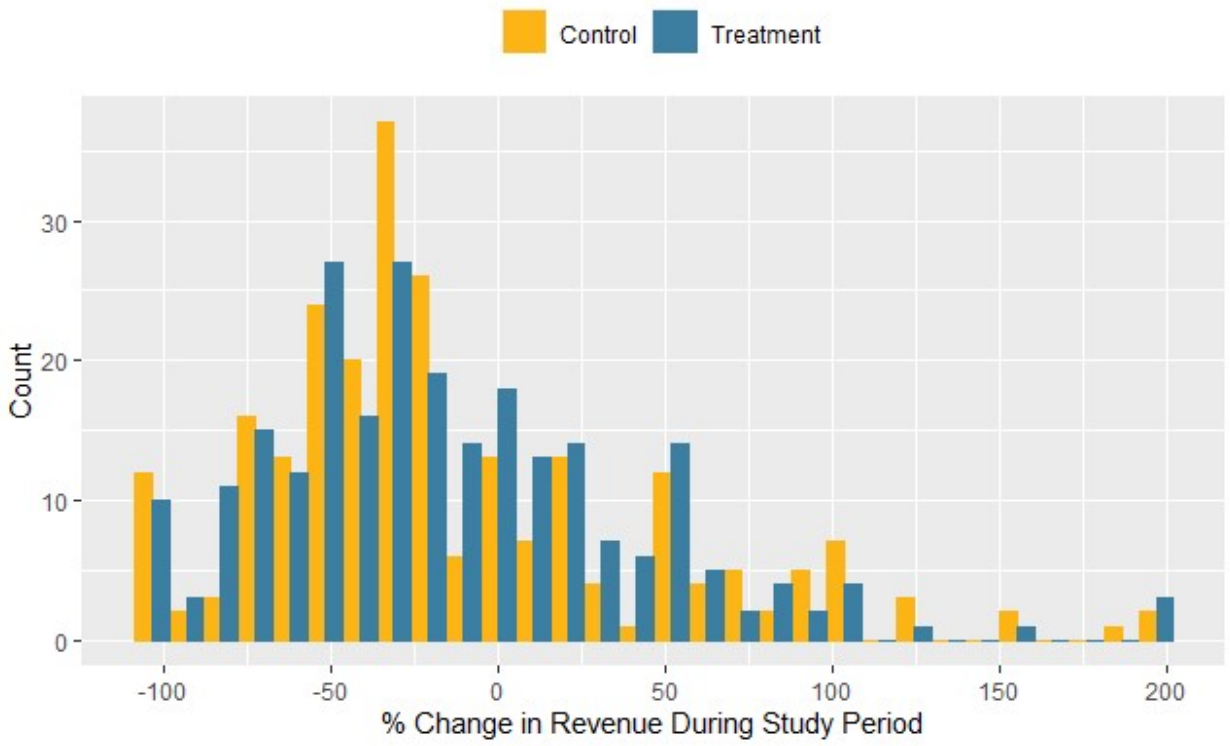

Figure 13: Reported change in revenue during study period by treatment and pseuo-control groups

Table 3 shows the results of the multiple linear regression model that was used to predict percent change in revenue during pedestrian street programs. The model does not report that a pedestrian street treatment had a statistically significant effect on business revenue. While there is evidence that the

implementation of a pedestrian street had a positive effect on an abutting business's revenue, the model's standard error is too large to make any conclusions.

Additionally, because I suspected the effect of a pedestrian street to have a stronger impact on restaurants and entertainment venues than other business types, I tested the interaction effect between a business being both a restaurant/entertainment venue, and located on a pedestrian street. The model indicates that being a restaurant/entertainment venue on a pedestrian street was associated with a drop in the reported change in revenue, but again the standard error is large, indicating inadequate evidence to be confident about the direction and magnitude of the relationship. This result is surprising, as it runs counter to my original hypothesis, formed from my interviews, that restaurants and entertainment venues thrived on pedestrian streets. There are several potential explanations for this contradiction. First, restaurants located on pedestrian streets were nearly always situated in the downtown area of cities. The pandemic may have caused fewer people to dine downtown, instead favoring the more peripheral, auto-accessible restaurants on my pseudo-control streets during lockdown. This was often the very motivation behind pedestrian street interventions, and suggests that downtown restaurants on pedestrian streets were at a disadvantage. Additionally, a restaurant owner may have been more likely to agree to an interview with me regarding their pedestrian street program if they had had a positive experience, thus adding a positive selection bias to my interview sample.

The model did indicate that several other independent variables had statistically significant impacts on revenue. Population density was positively related to change in revenue in the model. For example, the model predicts that a business in an area with one standard deviation greater population density (3,391 ppl/mi^2) is expected to have 8% greater revenues. Total city population, on the other hand, displayed a negative relationship, with the model predicting a single standard deviation increase in total city population (2,452,020 residents) being expected to decrease revenue by 9.6%. Additionally, a respondent's 5-point likert response indicating their agreement or disagreement with the statement "Closing commercial streets to cars can be good for businesses" proved to substantially impact percent change in revenue. The model predicted that a single standard deviation increase on a respondent's 5-

point scale response (1.34 points) would expect to be accompanied with a 6.9% increase in the reported change in revenue.

Overall, this model shows that on average, these pedestrian street interventions are more likely to increase than decrease business revenues, predicting their implementation to, on average, be associated with a 5% increase in revenues. The model's large standard error, however, suggests that the actual mean effect of pedestrian street interventions could be anywhere between -7 and +17% increase or decrease in revenue. The high level of uncertainty associated with this treatment effect may, in part, be a product of a somewhat subjective and biased measurement of change in revenue as reported by business operators (often reporting for a fiscal quarter many months in the past). The uncertainty of the model warrants additional study on this subject using more objective measures of business revenue. Additionally, a more complex analysis of this survey data, taking into account the variation between different cities and streets, may aid in explaining this uncertainty.

Table 3: Linear regression model results.

Term	**Coefficient**	**Standard Error**	**P Value**
Intercept	-5.034	5.272	0.340
Pedestrian Street Treatment	5.176	5.903	0.381
Restaurant/Entertainment Venue	-5.364	7.716	0.487
Owner	-8.423	5.215	0.107
WalkScore (z-score)	-3.641	2.558	0.155
Population Density [ppl/mi^2] (z-score)	7.138	3.655	0.051*
City population (z-score)	-9.708	3.641	0.008***
Attitude toward Pedestrian Streets (z-score)	6.825	2.467	0.006***
Pedestrian Street Treatment-Restaurant/Entertainment Interaction	-18.083	10.689	0.091*

* 10% Significance Level
** 5% Significance Level
*** 1% Significance Level

Recommendations

The results of this study's interviews and survey point to key issues and clear actions that cities can take to increase the benefits of pedestrian streets to businesses. Pedestrian streets can provide much more than a boost to local businesses, but below I focus only on issues and strategies facing businesses. Successful pedestrian streets should have policies and plans that carefully balance the goals of local business owners and the public.

- Issue: Pedestrian streets tend to benefit food and drink establishments more than other business types.

  Strategy: During site selection for a pedestrian street program, municipalities should pay attention to the ratio of restaurant to non-restaurant establishments. Streets with many dining options are good sites for pedestrian streets and are likely to attract more foot traffic. While non-restaurant types are likely to benefit as well, cities should be prepared to make adjustments to the program to accommodate all types of businesses, thus maintaining overall support for the pedestrian street.
- Issue: An insufficient supply of off-street parking can deter customers, especially the elderly and disabled.

  Strategy: In order for all business types to benefit from pedestrian streets, reliable off-site parking is a necessity. This will allow businesses to retain the long-term clients who are used to driving to their business, as well as to benefit from the new customers who arrive by foot. To accommodate those with limited mobility, cities can provide them with reserved priority parking.
- Issue: Alcohol consumption in the street can be an important attractor for pedestrian activity, but also has the potential to lead to unrest.

  Strategy: To increase the overall level of order and comfort on the street, cities can clearly designate areas where alcohol can and cannot be consumed outdoors. Additional law enforcement on busier nights could also be warranted.
- Issue: Pedestrian streets can cause complications with inbound and outbound deliveries.

  Strategy: Delivery-related headaches can be mitigated by in-advance coordination between businesses and shippers, with the possible permission of delivery vehicle access to the street during off-peak hours. Cities should be especially sensitive to retailers who lack back alleyway access.

- Issue: Without sufficient public investment in aesthetics, pedestrian streets can appear unattractive and unwelcoming.

  Strategy: Cities have control over the aesthetics of pedestrian streets, and should invest in creating an inviting and vibrant commercial space from end to end, especially during cold winter months. For example, cities can increase the appeal of pedestrian streets by adding more trees and flowers, pedestrian-scale lighting, and cold weather accommodations like propane heaters and outdoor dining structures.
- Issue: Businesses are less likely to support pedestrian street programs when cities do not keep adequate channels of communication open.

  Strategy: One of the most essential measures cities can take is to treat businesses as valued stakeholders throughout the entire pedestrian street program with outreach, regular communication, and opinion gauging throughout. Cities can show that they value business input by implementing requested changes to the route and frequency of pedestrian streets.

Conclusion

Pedestrian street programs substantially impacted businesses during the COVID pandemic. Businesses told me about the benefits of pedestrian streets, including increased outdoor seating, improved outdoor atmosphere, and growth in new customers. Most survey respondents would be in favor of a more permanent or frequent street closure program. Others, however, struggled with issues surrounding parking, safety, deliveries, winter conditions, and city involvement. Planners can take actions to amplify these benefits and minimize these costs in order to improve businesses' experiences on pedestrian streets.

I was unable to determine with sufficient certainty whether or not pedestrian street interventions increased or decreased business revenue, but it is more likely that the effect was positive. My model's

uncertainty warrants future study of the relationship between business performance and pedestrian streets using more objective data.

The 97 COVID-related pedestrian streets across the US represent more than just a trend. They are a signal that cities are starting to reconsider the way they utilize valuable urban street space, and present an opportunity to implement thriving permanent pedestrian spaces in the post-pandemic future. My study shows that local businesses, under the right circumstances, can thrive as well.

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