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Dialogues between Tactical Urbanism and Traffic Calming Measures in the (Re)Pensando Santana Program: Challenges and Potentialities

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SUMMARY

New approaches to urban planning can promote inclusive projects that prioritize pedestrians. This involves readjusting existing public space, redesigning streets to guarantee comfort and safety for all users, with a focus on people. The present study analyzes the challenges and potential of the tactical urban planning intervention of the (Re)Pensando Santana program, implemented after interventions in the perimeter known as "Area 40", both initiatives led by the City of São Paulo. This intervention sought to redesign the street to impact walkability and achieve greater safety for pedestrians. The research method used in this study is based on two theoretical perspectives, tactical urbanism and traffic moderation, in the data collection and analysis from public administration, in addition to obtaining data through field visits and interviews. While tactical urbanism interventions seek quick, low-cost solutions to improve public spaces, traffic calming measures aim to control the flow of vehicles, with the aim of improving the safety and quality of the urban environment. The results highlight that reducing speeds alone, despite being a significant advance in road safety, was not enough to improve public space. On the other hand, the articulation of the perspectives of temporary urbanism with traffic calming represented advances in security and in the transformation of the built environment, especially as a new urban planning process.

KEYWORDS: Tactical urbanism. Traffic calming. Pedestrian mobility.

1 INTRODUCTION

In the 21st century, the idea of redesigning streets as public spaces with special attention to pedestrians has been gaining increasing momentum. The emphasis is on creating urban environments that comfortably accommodate daily life and various modes of mobility. This contemporary paradigm seeks to provide safe and pleasant spaces for all citizens, prioritizing pedestrian and cyclist mobility. Additionally, it aims to promote equity in urban spaces, improve interaction among people, and foster a healthier lifestyle. Through this approach, the goal is not only to enhance mobility but also to transform streets into places of community interaction and well-being.

In São Paulo, as in other Brazilian cities, public transportation policies have historically been oriented towards promoting the flow of automobiles and motorized individual transport, to the detriment of other modes of mobility. This type of approach contributes to a city that is increasingly congested, polluted, and unequal. In addition, the deterioration of public spaces has become evident, with narrow, poorly maintained sidewalks, a lack of green areas, and insufficient spaces for social interaction, directly affecting the quality of life of citizens. This neglect in promoting an accessible and welcoming urban environment has led to a series of social, environmental, and public health challenges, highlighting the urgency of rethinking and reorienting mobility policies and the use of public space in favor of a more sustainable and equitable city.

The promotion of public transportation and active mobility is essential for creating inclusive, diverse, democratic, and safe cities (Baiardi, 2012). Since the early 21st century, there has been a significant shift in the global urban mobility discourse, with an increasing emphasis on pedestrian needs and safety. This shift has led to the increased promotion of active transportation modes that rely on human power. It reflects a growing recognition of the importance of a balanced and sustainable approach to urban development. Consequently, there is a rising theoretical demand for redesigning public spaces, moving from a previous focus on motorized private transportation to prioritizing public transit, cycling and walking.

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This transformation also involves the redesign of public spaces to encourage permanence, social interaction, and public appropriation of the urban environment. This new approach integrates urban mobility into daily life and other aspects, rather than treating it as a separate function of urban planning.

In March 2010, the United Nations General Assembly took a crucial step by adopting a resolution that established the 'Decade of Action for Road Safety' (UN, 2010), setting the period from 2011 to 2020 for this purpose. The initiative aimed to significantly reduce the number of fatalities from traffic accidents worldwide. The impetus for this decision stemmed from growing concern over the alarming increase in accidents, particularly involving pedestrians. This resolution represented an important step in raising awareness and implementing effective measures to promote road safety and protect the lives of all users.

In this context, the city of São Paulo recognized the need to invest in low-speed programs to enhance road safety and protect pedestrians. These programs, known as 'Calm Areas' or 'Areas 40', aim to create safer urban environments where pedestrians have priority and vehicles are limited to 40 km/h, minimizing the risk of accidents and promoting a more welcoming and inclusive public space.

The aim of this research is to analyze two initiatives led by the São Paulo City Hall, located in Santana, a neighborhood in the northern part of the city. These initiatives are the 'Area 40 Santana' program, proposed in 2014, and the tactical urbanism intervention '(Re)Thinking Santana', carried out in 2017 as part of the previously designated area.

Traffic calming areas, known in São Paulo as 'Area 40' or 'Calm Areas,' are urban planning initiatives that set speed limits for vehicles more compatible with the safety of pedestrians and cyclists. Complemented by signage and minor changes in the design of the streets, these measures aim to enhance road safety and create more welcoming spaces for everyone.

Tactical urbanism is a strategy that involves temporary and low-cost interventions in public space to improve road safety, foster community interaction, and quickly and flexibly test urban changes (Lydon et al., 2010). These temporary interventions, such as the use of paint, street furniture, and gathering areas, allow for assessing the impact of proposed changes in a cost-effective manner before implementing them permanently. The street, often mistakenly associated solely with vehicle circulation, is a significant public space, serving as a place for social interaction and daily use by people. Given the excessive emphasis on individual motor vehicles and the consequent degradation of urban space, tactical urbanism becomes an important tool for rapidly adjusting streets and other public spaces, allowing for swift reflection on their use in everyday life.

This article aims to empirically investigate the relationship between tactical urbanism interventions and traffic calming measures. Specifically, it will analyze data from two initiatives in Santana neighborhood, São Paulo, to understand how temporary interventions can influence long-term urban planning discussions. A qualitative research methodology was employed, drawing from theoretical perspectives on tactical urbanism and traffic calming. Data was collected through literature reviews, analysis of public administration sources, and field observations, including interviews with relevant stakeholders. This approach allowed for a

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comprehensive exploration of the initiatives' impacts and their implications for future urban mobility strategies.

In addition to this introduction, the article is structured into five distinct sections. The second section provides a theoretical framework, exploring the concepts of tactical urbanism and traffic calming. The third section outlines the research methodology, including the data collection and analysis procedures. The fourth section presents and discusses the research findings, relating them to the theoretical framework. Finally, the fifth section concludes the article by summarizing the key findings and suggesting implications for future research.

2 TACTICAL URBANISM AND TEMPORARY INTERVENTIONS

Tactical urbanism emerged in the 21st century as a response to growing disillusionment with traditional urban planning approaches, which often involve costly, time-consuming long-term projects that fail to address the immediate needs of communities. Tactical urbanism offers a more participatory and creative approach, emphasizing low-cost, collaborative interventions to transform urban spaces. By adapting public spaces and encouraging community involvement, tactical urbanism expands opportunities for collective or common urban use. This can include the implementation of community gardens, installation of urban furniture, and creation of green and recreational areas.

Temporary and low-cost interventions have a historical presence in Brazilian urbanization, but they have only recently become recognized as official strategies in urban planning. Traditionally, professionals focused on regulation and large-scale projects, emphasizing a broader scope. Tactical urbanism represents a paradigm shift, enabling low-cost, localized interventions that facilitate rapid and experimental transformations of the urban environment (Lydon et al., 2010; Fontes, 2011, 2012; Barat; Fontes, 2016; Marino, Barbosa, 2022).

It is essential to discern between top-down and bottom-up approaches in urban production. As Rosa (2011) points out, bottom-up urbanism is a form of resistance rooted in local interventions of collective appropriation, characterized by creative experimentation and temporary social alliances. This concept is also known as insurgent urbanism (Miraftab, 2009).

In contrast, top-down urbanism represents the traditional model, coordinated by public management. It involves large-scale transformations, encompassing parts or all of the city through Urban Operations, Master Plans, Housing Programs, and other initiatives. Rosa argues that top-down urbanism should be re-evaluated to facilitate connections between diverse local initiatives and provide shared spaces for experimentation.

Not all temporary interventions are focused on reversing socio-territorial disparities (Miraftab, 2009; Barbosa; Marino, 2021; Marino; Guerra, 2021). This study adopts a broader definition of tactical urbanism, encompassing both top-down and bottom-up processes (Lydon et al., 2010; Fontes et al., 2020). However, this definition differs from the original concept of tactics as outlined by De Certeau (1988), which rejects any form of institutionalization. Recent literature on insurgent urbanism (Miraftab, 2009) aligns more closely with De Certeau's original concept, but this perspective is not explored in this study.

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Tactical and temporary urbanism prioritize human-scale interventions and local engagement, involving both top-down and bottom-up approaches. While these initiatives often emerge from civil society, successful implementation typically requires collaboration with public authorities to achieve wider and more sustainable outcomes (Lydon et al., 2010; Fontes et al., 2020).

Lydon and Garcia (2015) identify five key characteristics of tactical urbanism: (i) a gradual approach to change; (ii) citizen participation in the local transformation process; (iii) building the capacity of public and private organizations to address specific issues and foster collaboration; (iv) short-term projects with realistic goals; and (v) a low-risk, high-reward approach. Tactical urbanism challenges the top-down model of urban planning, which often involves limited public participation and decision-making dominated by specialized professionals (Barata; Fontes, 2016).

Considering the complexity of proposed changes to street designs, particularly in relation to safety, tactical urbanism offers a cost-effective and temporary approach to testing proposed changes in public space design, especially those related to safety. By involving the community and enabling experimentation, tactical interventions can advise permanent solutions. The National Association of City Transportation Officials (NACTO), from United States of America, recommends temporary measures to evaluate, refine, and catalyze transformations in public spaces until long-term implementation becomes feasible (ITDP, 2018). São Paulo City on 'Urban Design and Road Works Manual' similarly emphasizes experimental interventions as a design principle, offering an alternative for testing and verifying proposals through practical studies (São Paulo, 2021).

Temporary intervention adopted methods commonly found in the tactical urbanism literature, particularly the testing of ideas in urban spaces. In São Paulo, the municipality, supported by Bloomberg and local communities, implemented innovative planning approaches through these interventions.

3 TRAFFIC CALMING

Traffic calming aims to create safer streets with improved environmental conditions by implementing physical interventions that reduce speed, excessive traffic volume, and accidents (Carvalho; Silva, 2013). The concept extends beyond merely reducing vehicle speeds and traffic volume. It involves actions to modify the behavior of various modes of mobility, promoting street safety and comfort for all users, especially pedestrians and cyclists. Traffic calming measures can be strategically applied to ensure local street safety, implemented systematically and sequentially, and complemented by other measures to reinforce desired effects (São Paulo, 2021).

Traffic calming first emerged in the late 1960s in England as a response to growing concerns over the environmental and social impacts of increasing motor vehicle use in urban areas. In the early 1970s, the Netherlands introduced the innovative concept of woonerfs, or 'living streets', designed to prioritize community needs over vehicular traffic. By intentionally omitting traditional road markings and traffic signs, woonerfs created a more flexible, human-centered environment. These streets emphasized their social function as spaces for gathering,

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playing, and community thriving, rather than simply serving as traffic corridors. Simultaneously, Germany pioneered pedestrian zones, especially in city centers, combining retail, dining, and cultural activities to transform urban areas into vibrant destinations for residents and visitors.

Brazil's traffic calming projects are relatively recent and often implemented independently of comprehensive urban mobility plans. Globally, traffic calming gained prominence in the 2010s with various projects reducing vehicle speeds, enhancing street safety and comfort for all users. Studying traffic calming measures to control speed and mitigate conflicts in urban crossings is an important topic for road safety (Gehl, 2013).

Moderation is achieved through physical interventions designed to reduce the number of high-risk accident locations and prioritize human life. These interventions often involve relocating or controlling vehicle access within moderation zones. By limiting traffic flow, moderation measures also contribute to reducing noise and air pollution, and reclaiming urban space for pedestrian and cyclist use (Cupollino, 2006).

These physical interventions can be implemented to mitigate speeding and enhance public safety and accessibility. They may include: (i) vertical devices (e.g., speed humps and speed tables); (ii) horizontal devices (e.g., raised crosswalks, chicanes); (iii) lane narrowing; (iv) traffic management measures (e.g., traffic signals, roundabouts); and (v) reduced speed limits.

Vertical devices are physical interventions designed to reduce speeding on roadways. Common examples include rounded speed bumps, raised crossings, and rumble strips. Rounded speed bumps are elevated road surfaces that gradually slow drivers, offering a smoother transition than traditional bumps. Raised crossings, or pedestrian speed bumps, elevate the road surface at crossings to promote slower speeds and improve pedestrian safety. Rumble strips are textured surfaces that create vibrations and noise, alerting drivers to slow down. When implemented effectively, these measures can significantly reduce accidents and promote safer, pedestrian-friendly traffic environments (Cupollino, 2006).

Horizontal devices are physical interventions designed to mitigate speeding and enhance road safety by disrupting the linear flow of traffic. Common examples include sidewalk extensions, parking bays, and chicanes. Chicanes are zigzag-shaped road features that force vehicles to slow down, often used in urban areas to create safer zones and discourage excessive speed. This promotes a more pedestrian-friendly environment and safer circulation for cyclists and vehicles (Cupollino, 2006).

Road changes refer to interventions aimed at reducing road width and improving traffic flow and safety. These measures can involve horizontal and vertical signage, as well as physical modifications like sidewalk widening, parking space marking, and central island construction. Additionally, dedicated lanes for cyclists and buses can be implemented to enhance safety and efficiency for various modes of transportation. These changes often include traffic management measures, such as new signage and designated parking areas. To maximize the benefits of these interventions, they should be integrated with other strategies, such as road closures, mini-roundabouts, and shared spaces, to promote safer and more pedestrian-friendly urban environments (Cupollino, 2006).

Speed limit reduction can be achieved through the combination of various restrictive measures to ensure compliance with the established speed limit for the area. Each case presents specific characteristics and requires a particular type of solution. All mechanisms and

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possibilities of traffic calming interventions should be used to reduce conflicts between different modes of mobility and increase safety for everyone, especially the most vulnerable. Better results are achieved when these actions are planned and implemented in conjunction with other public policies (Alves; Ferreira, 2014).

To minimize conflicts between different modes of mobility and enhance safety for all road users, especially the most vulnerable, all available traffic management strategies should be implemented. There are several types of devices that can be used to mitigate these conflicts. One such device is crossings, which can be at grade or grade-separated, signalized or not. Pedestrian traffic lights can be activated by push buttons or integrated into the vehicle traffic cycle, determining the right of way for each group. In areas with low vehicle volume, traffic lights may not be necessary, allowing pedestrians to cross during gaps in traffic. In areas where vehicle volume is very high and speeds are elevated, and there is no possibility of modifications, elevated or underground paths can be used for crossing the road (Lucchesi; Albano, 2013).

Another measure is the extension of sidewalks at intersections. These extensions reduce the crossing distance for pedestrians, increase space and comfort at the intersection, and improve visibility for both pedestrians and drivers. Curb ramps or raised crossings are also devices that enhance safety at intersections (Lucchesi; Albano, 2013).

Reducing speeds is one of the most effective ways to increase pedestrian safety, preventing fatalities and reducing the severity of injuries in the event of accidents. Decreasing vehicle speeds by just 1.6 km/h can reduce traffic fatalities by 6%. Beyond the benefits for pedestrian safety, lower speeds mean reduced carbon emissions, air and noise pollution, and also make the city more humane, friendly and safe for those who walk and interact in public spaces (Rizzon et al., 2021).

3 METHODOLOGY

This study employs a qualitative research approach, consisting of several key stages. Initially, a comprehensive literature review was conducted to establish a theoretical foundation. Subsequently, public administration documents related to the topic were analyzed. In-depth interviews were then conducted with managers and professionals involved in the process to gain valuable understandings and perspectives. Field research followed, allowing for the collection of empirical data to complement the information gathered in the previous stages. Finally, the intervention was analyzed, providing an overview of its impact and results in the Santana neighborhood, São Paulo.

The literature review process involved comprehensive theoretical research on tactical urbanism and traffic calming, with consultations of books, articles from the Scielo platform, and academic works from thesis and dissertation databases. The search prioritized recent concepts and studies to support the analysis of the subject matter.

Next, reports and empirical data from the project and the Santana intervention were analyzed in detail. The temporary intervention offered a unique opportunity to evaluate the entire project lifecycle, from its initial conception to its implementation and final assessment of outcomes. The process of tactical and temporary urbanism facilitated a comprehensive immersion in the experimentation of ideas and solutions, allowing for a careful analysis of the

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produced effects. As a result of this endeavor, significant products were generated that underpinned the development of definitive and more robust projects. The essential data for this analysis was gathered from a detailed report produced by ITDP (2018), providing a solid foundation for comprehending the intervention process.

To complement the data collection, a field visit was conducted on December 9, 2023, to assess the current conditions of the site and document the permanently implemented traffic calming elements installed after the 2017 intervention. Additionally, data on the number of accidents in the study area during the three years before and after the intervention was gathered from São Paulo's municipal public administration. This data was tabulated, georeferenced, and compared to analyze the impact of the interventions on accident reduction.

The analysis of data collected from reports and field visits provided a comprehensive understanding of the outcomes of tactical urbanism and traffic calming interventions, particularly in terms of reducing pedestrian accidents, including injuries and fatalities, on roads within the study area during the specified periods. Semi-structured interviews with municipal managers and Bloomberg collaborators involved in the intervention helped to fill data gaps and gain deeper insights into the intervention process.

4 RESULTS AND DISCUSSION

Although walking is widely practiced in São Paulo, there is a significant disconnect between the popularity of this mode of mobility and the challenging conditions faced by pedestrians in the city. Inadequate urban infrastructure, such as damaged sidewalks and dangerous crossings, poses significant obstacles for pedestrians. Additionally, insufficient time at traffic signals and concerns about motor vehicles contribute to a hostile urban environment for pedestrians. These issues need to be urgently addressed to promote safer and more accessible mobility for everyone in the city (Calliari, 2021).

Given the significant number of people who rely on pedestrian infrastructure, it is imperative that this infrastructure meets criteria that ensure safety during transit. Although there are laws and manuals regulating the installation of pedestrian devices, these guidelines often do not adequately reflect the needs of users. Unfortunately, pedestrian circulation in São Paulo has not received adequate attention, except for a few isolated studies that mainly focus on issues related to crossings and intersections (Luchesi; Albano, 2013).

It is observed that, in general, sidewalks are inadequate for accommodating pedestrian flows, exhibiting insufficient widths, poor pavement conditions, significant unevenness, and obstacles such as newsstands and bus shelters. Pedestrians not only face limited space but also encounter frequent conflicts with vehicles. Street safety concerns arise from the potential for pedestrian-vehicle collisions and the physical deficiencies of the infrastructure (Ferreira; Sanches, 1997).

Between October 2013 and April 2016, the São Paulo Department of Mobility and Traffic, in partnership with the Traffic Engineering Company (CET), implemented twelve traffic calming areas known as 'Áreas 40' throughout São Paulo. These areas, with a maximum speed limit of 40 km/h, were established in regions with high pedestrian accident rates. The selection of these areas considered their central locations, which attract large numbers of pedestrians

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due to diverse land uses, transportation options, and services. This analysis justified the implementation of lower speeds to ensure safe and comfortable circulation for all road users, especially pedestrians and cyclists, who are often victims of traffic accidents in São Paulo (São Paulo, 2016).

The neighborhood of Santana, recognized for its subcentrality, was chosen for the implementation of an 'Área 40' due to its distinctive urban features. Santana has a significant commercial center and an extensive public transportation network, including a metro station and a bus terminal. As a result, the area experiences high levels of pedestrian and vehicular traffic daily. Given its dynamic urban environment and history of traffic accidents, Santana was selected for the 'Área 40' initiative in 2014 (São Paulo, 2016).

The 'Área 40 Santana' project involved installing vertical regulatory and warning signs, along with a new horizontal street marking scheme within the designated area. The maximum permissible speed was reduced from 50 km/h to 40 km/h on collector streets and from 60 km/h to 50 km/h on arterial avenues within the perimeter. Additionally, the speed limit on Cruzeiro do Sul Avenue, between General Ataliba Leonel Avenue and Conselheiro Saraiva Street, was lowered to 40 km/h due to the high pedestrian traffic in Santana's commercial zone and the presence of a dedicated bus lane and a bike lane. This marked the third 'Área 40' perimeter established in São Paulo, following successful implementations in the Central area and the Lapa neighborhood (São Paulo, 2016a, 2016b).

Although the implementation of the 'Área 40' in Santana led to a decrease in accidents, incidents continued to occur, indicating a need for further adjustments to the street design. Consequently, in 2017, the São Paulo Municipality launched a temporary urban intervention in Santana, in collaboration with the Bloomberg Initiative for Global Road Safety and with support from ITDP Brazil (ITDP, 2018). This initiative also benefited from the involvement of the Santana Tucuruvi Subprefecture and the Municipal Department of Mobility and Traffic, which provided additional support (ITDP, 2018).

The selection of intervention points for the project was guided by both technical criteria and practical considerations that ensured the feasibility of the initiative. To inform this process, analyses were conducted on collision and pedestrian accident data, pedestrian and vehicular traffic volumes, bus route and volume data, and visual assessments of pedestrian and driver behavior. These technical analyses refined the scope of the project. Practical considerations included the feasibility of implementing and removing the interventions within a short timeframe without disrupting vehicular or bus traffic, the need for clear signage, and the existence of a high pedestrian volume to maximize opportunities for public engagement and education on traffic calming concepts (ITDP, 2018).

Within the 'Área 40 Santana' perimeter, two intersections were selected for targeted intervention: the junctions of Dr. César Street with Voluntários da Pátria Street and Dr. César Street with Salete Street. While other intersections in Santana exhibited higher rates of pedestrian and vehicular accidents, these locations were not chosen due to the extensive modifications required, which were incompatible with the scope of temporary interventions.

The selected areas for intervention exhibit specific conflicts between pedestrians and vehicular traffic. The intersection of Voluntários da Pátria, Dr. César, and Leite de Moraes streets, for instance, presents a configuration with a slight offset in the alignment of the

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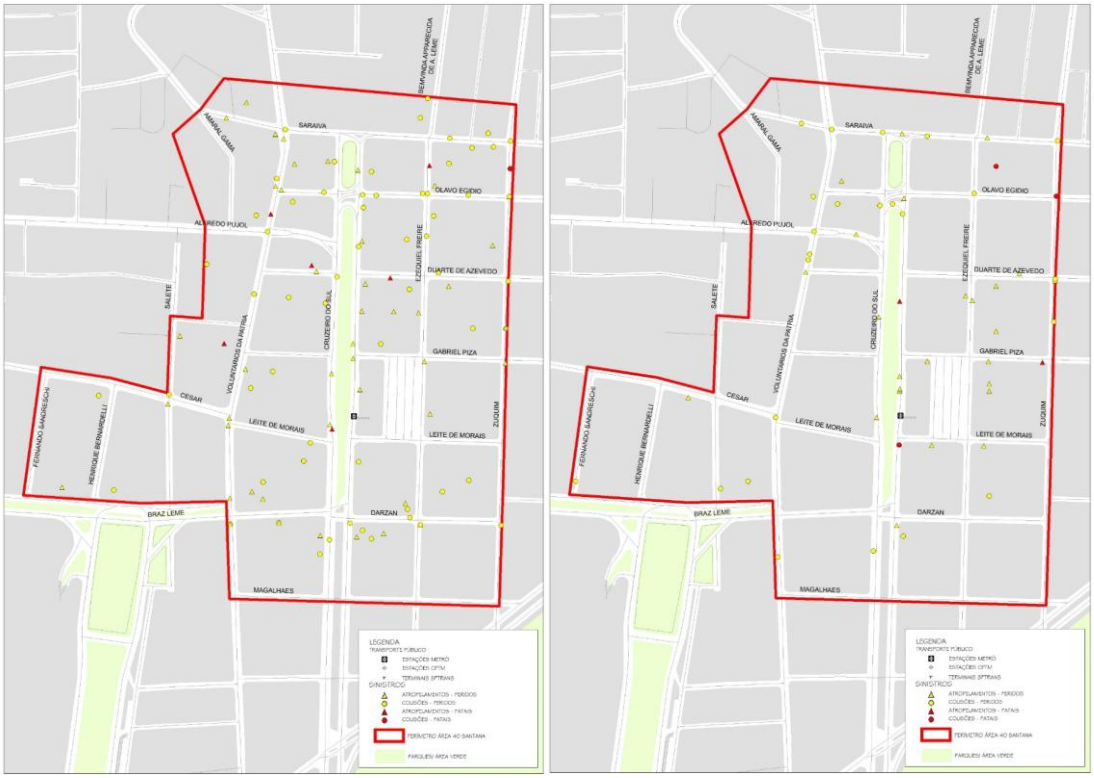
roadways, and the sidewalks are inadequate to accommodate the pedestrian volume during peak hours. This inadequate infrastructure incentivizes pedestrians to cross at various points, often outside of designated crosswalks. Furthermore, the central median, while serving as a waiting area, is also insufficient in accommodating the pedestrian volume (ITDP, 2018).

The subsequent analysis was conducted using traffic accident data collected from the São Paulo Traffic Engineering Company's Annual Traffic Accident Report within the 'Área 40 Santana' perimeter (São Paulo, 2016a). For the intervention, traffic accident data from three years prior to the commencement of the studies and three years thereafter were collected and compared (SÃO PAULO, 2016b). By analyzing the occurrence of georeferenced accidents, as depicted in Figure 1, during the periods 2015-2017 and 2018-2020, it is possible to observe the number of injured and fatal victims on each street. It should be noted that each accident may involve multiple vehicles, and the number of victims will always be equal to or greater than the number of accidents, as each incident can result in one or more casualties, irrespective of the number of vehicles involved. The annual average of accidents serves as a comparative parameter for assessing the efficacy of traffic calming measures.

Figure 1- Traffic Accidents in the 'Área 40 Santana' Perimeter, 2015-2017.



Source: Developed by the author based on data from São Paulo (2016b).

Table 1 provides a synthesis of accident data obtained from the CET report (SÃO PAULO, 2016b), detailing the number of incidents involving pedestrians, both fatal and non-fatal, across different vehicle types within the 'Área 40 Santana' boundary. These accidents were georeferenced and are visually represented in Figure 1 for the time periods of 2015-2017 and 2018-2020.

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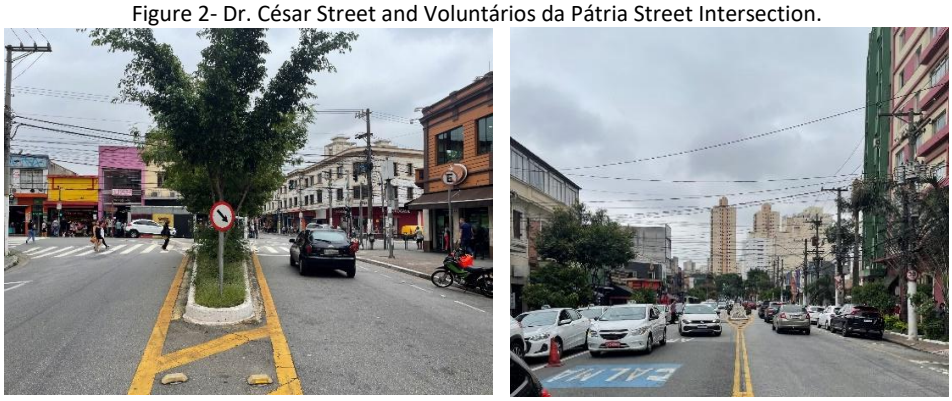
Table 1- Summary of Accidents by Type and Year in Área 40 Santana, 2015-2017 and 2018-2020.

Sinistro - Tipo/ Ano		2015	2016	2017	2018	2019	2020
Sinistros Veiculares Veiculares	feridos	48	32	16	14	10	7
	fatal	1	0	0	1	1	1
Atropelamentos	feridos	21	14	21	9	12	7
	fatal	5	0	2	1	0	1
Total de acidentes - Ano		75	46	39	25	23	16
Total de acidentes - Triênio		160			64		

Source: Developed by the author using data from São Paulo (2016b).

The implementation of traffic safety measures had a significant impact on road safety indicators compared to the previous three years. Fatalities decreased by a notable 86%. Additionally, pedestrian accidents decreased by 44%, while vehicle accidents decreased by 53%. These results clearly demonstrate the benefits of the traffic calming initiatives implemented during the specified period. The effectiveness of these measures is evidenced not only by the significant reduction in fatalities and accidents but also by improvements in environmental conditions and overall road safety. The tactical urbanism project implemented at the intersections of Dr. César Street with Salete Street and Voluntários da Pátria Street was an important tool for the public authorities, in partnership with a non-profit organization and community participation, in the process of planning road changes.

Figure 2- Dr. César Street and Voluntários da Pátria Street Intersection.



Source: Photo by the author (2023).

Finally, in a third phase, after the implementation of the '(Re)Thinking Santana' program, permanent changes were made to the intersection of Dr. César and Salete Streets, based on the design tested during the temporary action. These interventions (Figures 3 and 4) involved implementing a roundabout, along with separating elements such as delineator posts and an extended sidewalk at the intersection. This configuration increased the pedestrian waiting area for crossing, reduced vehicle turning radii and lane widths, lowered vehicle speeds, modified the behavior of various street users, enhanced street safety, and improved overall comfort.

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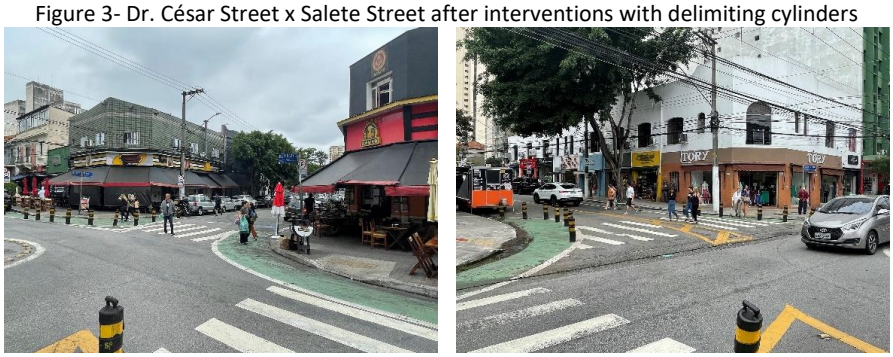
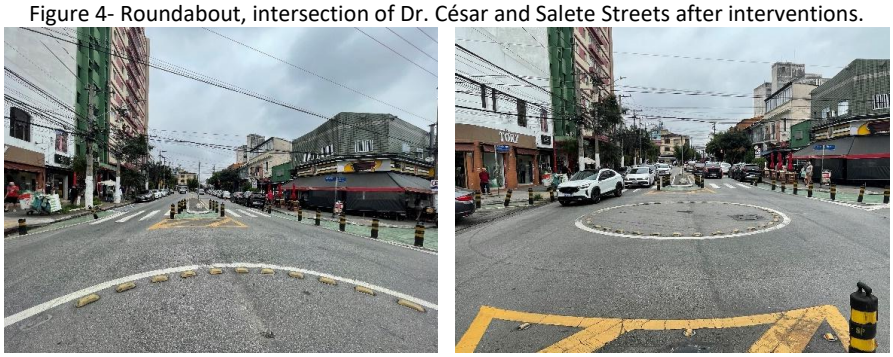
Figure 3- Dr. César Street x Salete Street after interventions with delimiting cylinders



Source: Photo by the author (2023).

The implementation of this intervention was rapid, unlike geometric interventions, which involve works that are often time-consuming. However, it requires more frequent periodic maintenance due to wear and tear on the paint.

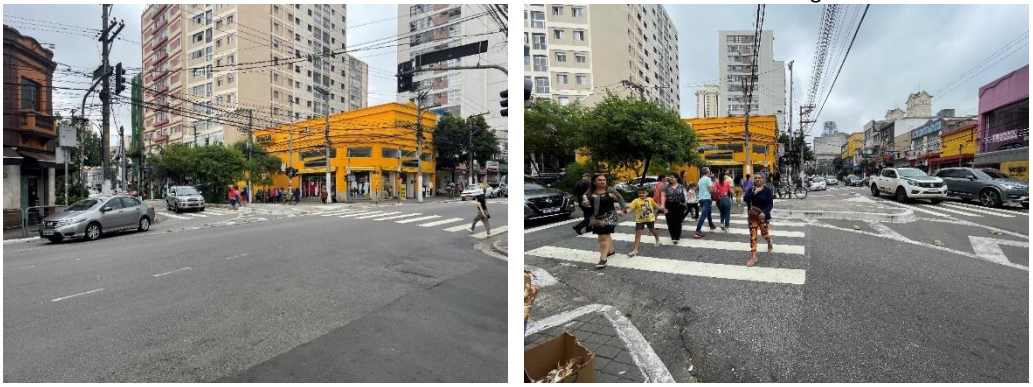
Figure 4- Roundabout, intersection of Dr. César and Salete Streets after interventions.



Source: Photo by the author (2023).

The second intersection tested in the action, Dr. César Street and Voluntários da Pátria Street, received an alteration with the use of a zebra crossing (Figure 5), a signaling clearly focused on vehicles. The redesigned layout was implemented with channelization markings, which, as the name suggests, have the function of channeling the direction of vehicle traffic, resulting in a reduction in speeds, which impacts pedestrian safety. Pedestrians can cross and wait on the zebra crossing, as it overlaps the pedestrian crossing, but the pedestrian is left with the rough edge. The proposed alteration for this intersection was experimented with in the temporary urbanism action with a bolder reduction of vehicle space and more space for pedestrians.

Figure 5- Intersection of Voluntários da Pátria and Dr. César Streets after zebra crossing modifications.



Source: Photo by the author (2023).

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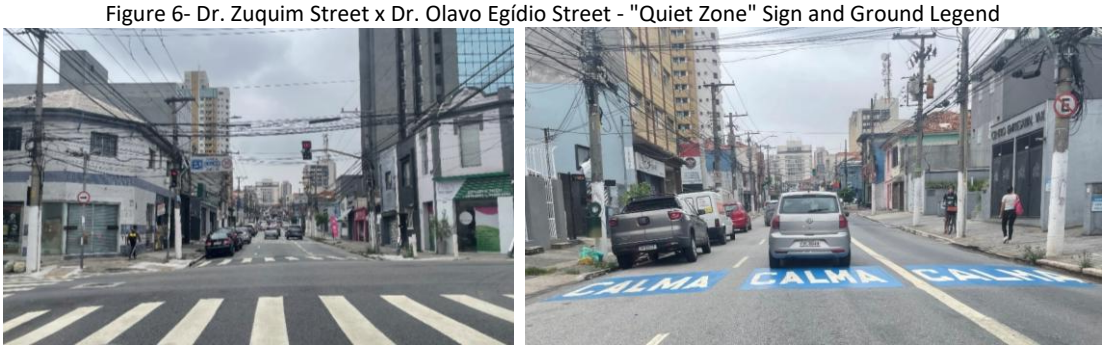
Projects developed from this initiative, with new proposals for street safety, were implemented as resources became available. Through prioritization of actions, sidewalk extensions were carried out at eight intersections and seven elevated crossings. As a final step, a speed limit of 30 km/h was regulated for the entire route within the perimeter.

Pedestrian traffic in the city of São Paulo often does not receive the attention it deserves, except in a few studies that focus primarily on specific aspects such as intersections and crossings (Luchesi & Albano, 2013). The implementation of "calmer" signage (Figure 6) has the potential to draw the attention of drivers within the intervention areas, suggesting a behavioral change by encouraging them to drive at more moderate speeds (Alves & Ferreira, 2014). This approach aims not only to improve pedestrian safety but also to promote a more harmonious coexistence among different modes of mobility in the city.

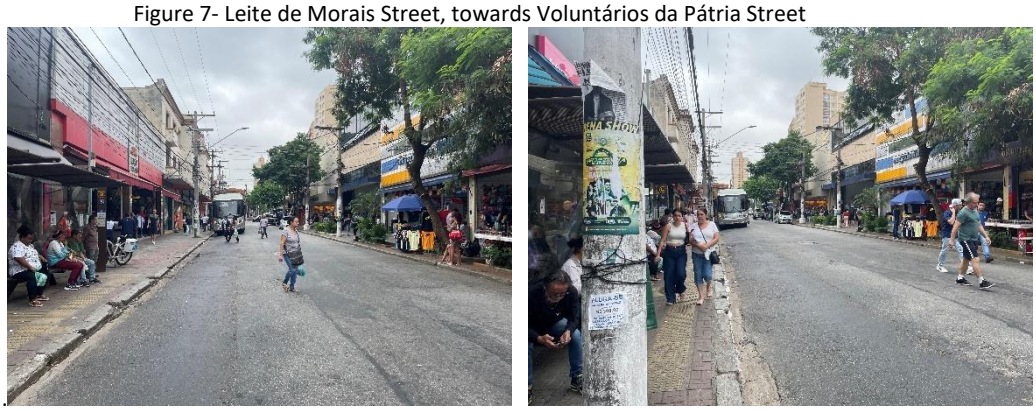
Figure 6- Dr. Zuquim Street x Dr. Olavo Egídio Street - "Quiet Zone" Sign and Ground Legend



Source: Photo by the author (2023).

A recent analysis of the region's road system, conducted in 2023, revealed that sidewalks are still inadequate to meet pedestrian needs due to insufficient width, poor pavement conditions, and the presence of obstructions such as utility poles, vendor stalls, and street furniture.

Figure 7- Leite de Morais Street, towards Voluntários da Pátria Street



Source: Photo by the author (2023).

The results indicate that the reduction in the number and severity of accidents, along with the humanization of public spaces, was achieved through a process that articulated contemporary tactical urbanism strategies and traffic calming measures. Notably, interviews emphasized the importance of playful initiatives to avoid perpetuating a car-centric culture.

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Finally, the study demonstrates that, despite the lack of significant sidewalk widening to benefit pedestrians, the impact of implementing traffic calming measures and speed reduction on decreasing accidents is notable. This analysis underscores the ongoing importance of investments and efforts in public space redesign and traffic safety policies, aiming not only to reduce accidents and fatalities but also to improve the quality of life and well-being of citizens who use public spaces.

5 FINAL CONSIDERATIONS

The empirical analyses of the tactical urbanism and traffic calming initiatives in Santana, known as the '(Re)Thinking Santana' and 'Área 40' programs, aimed to identify the challenges and opportunities presented by these interventions in improving pedestrian safety, public space quality, and accident reduction.

In the specific case of Santana, it was observed that the temporary intervention effectively reduced vehicle speeds due to the narrowing of traffic lanes and the reorganization of traffic flows, including the implementation of a roundabout. Analysis of the data in light of theoretical frameworks revealed three main arguments. The first emphasizes the importance of continuity in public policy, particularly regarding tactical urbanism interventions. These interventions are initially implemented rapidly and temporarily, so it requires evaluation and potential integration into more comprehensive street redesign projects that can be replicated across the city.

The second argument concerns pedestrian prioritization. While some tactical elements of the intervention, such as roundabouts and advanced pedestrian crossings, have been incorporated into subsequent street projects, other pedestrian-specific aspects, such as the longitudinal widening of sidewalks, have not yet been fully integrated and await policy guidelines for implementation.

The third argument relates to the appropriation of public space in everyday life, transforming and expanding circulation areas into spaces for dwelling and leisure, as advocated by tactical urbanism. The analysis of the Santana intervention revealed an improvement in street safety and pedestrian mobility, yet there is a gap in the inclusion of new uses in the public realm. Given the absence of permanent elements such as green spaces, benches, and other urban furniture, the potential for transforming these spaces into places for leisure and social interaction remains untapped. Nevertheless, the reorganization of the street may have provided wider areas for pedestrian circulation, allowing for moments of pause and rest along the route.

By allowing people to engage with public space more actively and creatively, tactical and temporary urbanism contributes to a more inclusive and vibrant city. This approach not only enhances the quality of life for residents but also strengthens local belonging and identity. Therefore, it is essential to consider the significance of public space beyond its function of circulation, encouraging it as a place for social interaction and cultural expression in the contemporary urban context.

It is evident that no significant physical changes have yet been implemented that would provide a substantial benefit to pedestrians. If the objective is to ensure safety and clearly

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delineate pedestrian areas while prioritizing this mode of mobility, then it is important to undertake permanent physical modifications to the street design.

Tactical urbanism, temporary interventions, and traffic calming are relatively recent concepts in Brazilian public policy. Nonetheless, it is important to emphasize the significance of these approaches and the emergence of new paradigms in urban planning, even though they are still in the early stages of implementation as public policy in São Paulo.

After the successful implementation of temporary interventions, it is important to acknowledge that safety measures are the ones that have persisted in the long term. Although temporary changes in public space may have had an immediate and positive impact, it is the ongoing maintenance and development of street safety measures that have ensured lasting benefits. Therefore, in the future, efforts should focus on implementing and enhancing measures that comprehensively redesign public space, promoting a model of the city that prioritizes people over vehicles.

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