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Design interventions for enhancing runner social interaction and motivation in public spaces: a centennial park case study

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Abstract. This research delves into the effects of social interaction and motivational factors on exercise routines, focusing specifically on runners within urban spaces like Centennial Park Sydney. It endeavors to bolster public health by scrutinizing the effects of integrating design elements into urban environments, with the aim of fostering greater social interaction among runners. The study will initiate with ethnographic observation of runners followed by the implementation of cultural probes and a series of small-scale design intervention prototypes within areas of Centennial Park placed randomly. These design interventions will encompass visual markers integrated into the routes, along with social seating and interactive art pieces integrated with the aim of compelling the runners to engage in social interactions. According to the research, when runners exercise with companions, they tend to be more committed to their training plans due to mutual encouragement and support. Additionally, engaging in conversations during the run can create a more positive and enjoyable experience, helping runners to forget about fatigue and discomfort, ultimately improving their performance.

Keywords: social interaction, design interventions, urban running spaces, motivation, public health

1. Introduction

1.1. Research statement

Building upon Lin et al.'s findings, this study examines how the presence of social companionship during physical activities can escalate exercise frequency and bolster the intrinsic motivation of participants [1]. Xu et al. emphasize that social support exerts a significant influence on fitness levels and physical condition through engagement in physical activities, with self-efficacy serving as a pivotal moderator [2].

Cohen-Cline et al. demonstrated that designing environments to be more active and engaging can significantly enhance individuals' proactivity in leading a healthy lifestyle [3]. While the aforementioned research uncovers various insights on how social support could be used in fitness contexts, it failed to acknowledge how public exercise spaces can be augmented through interventions made with art and design. This research proposes to investigate design interventions, such as the inclusion of interactive art installations, pathway markers, and social seating, within Centennial Park to provide an understanding of how these designs can improve engagement in social interactions and accelerate motivation among runners. It is intended to aid health activists and artists who are interested in designing active and social urban environments to promote the well-being of the public. The study seeks to conceptualise art and design interventions as a way to improve fitness in urban spaces while investigating the role of design in public health and sociability.

1.2. Background

Incorporating art into public spaces has been shown to foster societal interaction, thereby promoting social cohesion and reinvigorating urban communities, as evidenced by Cheung et al. [4] and Erdmann-Goldoni [5].

The study is preceded by existing public artworks such as The Pool by Lewin [6], Dune by Studio Roosegaarde [7] and Lightweave by Future Cities Lab [8], which are interactive, light-responsive installations that react to the movement of visitors to produce dynamic lights. Other public artworks, such as Pulse of the City by Zisiadis[9] and Mesa Musical Shadows by Daily Tous Les Jours [10], produce sound-based responses to the movement of people based on their heart rate and shadow respectively. Artworks such as Sunset/Sunrise by Millett [11] provided a soundscape mural that stimulated sensory engagement

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and physical activity for patients. Lozano-Hemmer [12] created the pulse room as an interactive artwork that interacts with the pulse rate of the participants to raise awareness of the self-regulation process of the heart. Installations such as In Orbit by Ackermann and Meyer-Büser [13] have promoted physical activity through meshed structures, encouraging participants to climb and move through the installation. While these art installations encourage physical activity and social engagement to improve health, they fail to particularly target runners in order to induce motivation for companionship and social interaction amongst each other.

There is a dearth of research examining how these installations could enhance the running experience by fostering social interactions. This study seeks to address this gap by analysing the ways in which design elements—social seating, interactive installations, and pathway markers—can transform running spaces into social hubs that encourage interaction.

2. Methodology

2.1. Methodological framework

A mixed method approach is employed in this study, as depicted in Figure 1, to assess the social dynamics of runners within urban running spaces. It also explores the potential of design interventions aimed at fostering social interactions to enhance motivation within the running community.

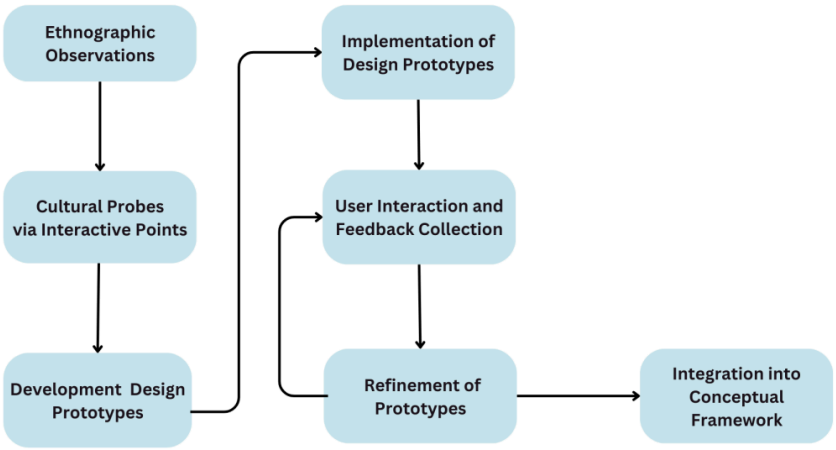

Figure 1. Iterative design and feedback process (image by author- Xiaomiao)

Sangaramoorthy and Kroeger [14] outlined that ethnographic observations aid in capturing the actions of individuals in public spaces in a non-interventional manner without influencing their behaviour. Data collection will involve conducting ethnographic observations to document the actual behaviour of individual runners and groups of runners and how they move in these spaces of Centennial Park. To gather supplementary data, Cultural probes will also be used in this research before and after the deployment of the prototypes to elicit further insights from runners in Centennial Park regarding the social interactions in the park and their motivation to run.

2.2. Timeline

The research will be conducted for six weeks, during the initial phase, weeks 1 and 2- ethnography observations will be conducted as shown in Figure 2, focusing on observations of runners and their social behaviours in Centennial Park. Cultural probes will also be introduced in weeks 1 and 2 to gather user insights. The process of designing prototypes and installing these prototypes within the park is scheduled for Weeks 2 and 3, where design elements like social seating and pathway markers will be set up in the park.

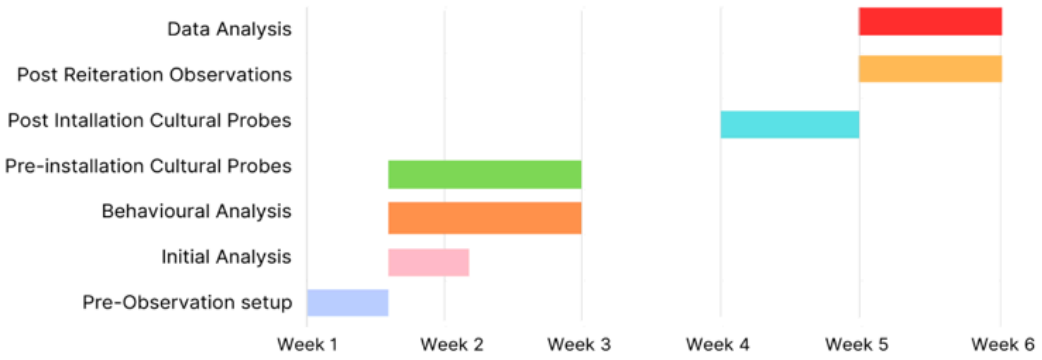

Figure 2. Practice-based research timeline (image by author- Xiaomiao)

During this phase, design elements, including social seating and pathway markers, will be strategically installed to facilitate the desired social interactions. User feedback collection will be conducted during week 4, focusing on capturing runner reactions and interactions with these prototypes. Based on feedback, the prototypes will be reiterated and refined in week 4 and week 5. In Week 6, evaluations of user interactions will be compiled as part of the final observational phase. These evaluations will be synthesized within the conceptual framework, contributing to the formulation of the research outcomes.

2.3. Participant selection

The target participants for the observations are runners and park users. Emphasis will be placed on organized running groups and individual runners who may be inclined to engage in group activities following the implementation of the proposed interventions. The participants are self-selected by individuals who interact with cultural probes and design interventions that are placed discreetly throughout the park, and their responses are stored as anonymous feedback.

2.4. Anticipated outcomes

The primary anticipated outcome of this research is to elucidate the extent to which design interventions can affect social interactions among urban runners. The expected outcome of this research is observed interactions around installation interventions, as well as positive responses for social interaction and motivation relating to cultural probes coupled with affirmative responses indicating enhanced social interaction and motivation as a result of the cultural probes. The level of success of this project will be determined by the time spent on the prototypes accompanied by the observed changes in the dynamics of groups of people and the quality impressions from participants about the social attributions of the design components. The project aims to garner insights about design for social well-being in relation to the artistic design of public space for real-world application in cities related to urban planning, public health, and the arts.

The efficacy of the intervention will be assessed by engaging individual runners and targeted running groups, including Rejoov Runners and Run Squad, which regularly host group runs in Centennial Park.

3. Analysis of outdoor running activity in Centennial Park

3.1. Introduction of Centennial Park

The observation site is located at Centennial Park, an expansive public park in the eastern suburb of Paddington, within the City of Randwick. Centennial Park covers an irregular pentagonal area adjacent to numerous sports facilities such as the Sydney Cricket Ground and the Royal Randwick Racecourse. Inside the park, there is a circular walking path that serves as the main activity area for outdoor running and cycling enthusiasts, as shown in Figure 3.

Figure 3. Centennial Park map

To summarize our observations in a few words, most residents of Paddington choose to enter the park through the northern gate. Once inside, a straight path leads directly to the circular trail, which serves as the starting point for numerous local runners (Single/In Groups).

3.2. Initial observation

During the preliminary observation, several characteristics of runners were identified. First, age distribution: Most runners were adults between the ages of 20 and 40, with relatively fewer older individuals or teenagers observed, as shown in Figure 4; Second, running patterns: There were noticeable differences between solo and group runners. Female runners, in particular, were more likely to run in pairs or small groups, as shown in Figure 5; Third, clothing and adaptation to weather: Nearly all runners wore shorts or tight-fitting athletic pants. Due to the extreme heat, many male runners were shirtless as shown in Figure 6.

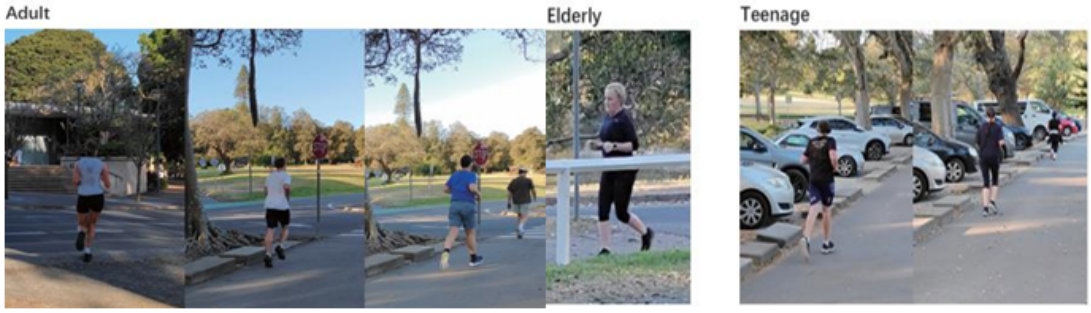

Figure 4. Age distribution of observed runners

Figure 5. Running patterns

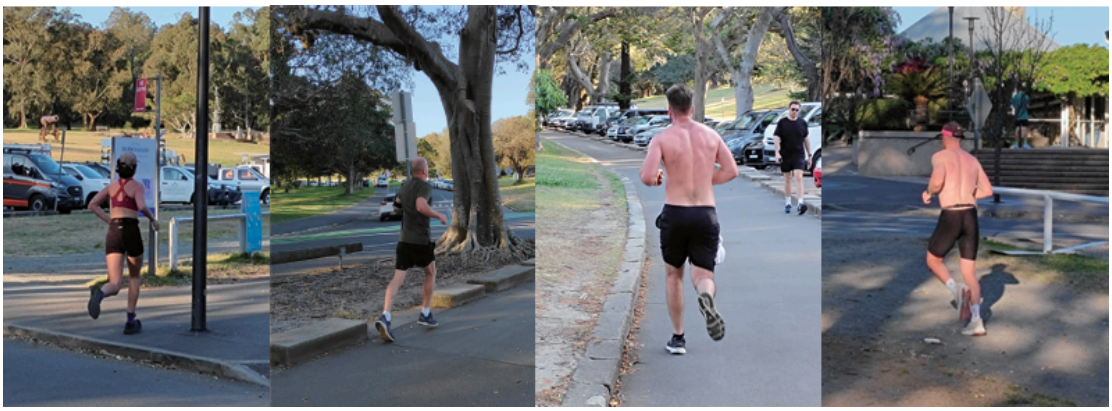

Figure 6. Clothing choices of runners

These runners' patterns explain a phenomenon: they have made running a regular part of their daily routine, and those who run with companions tend to engage in more conversation during their runs. I noticed that, compared to solo runners, they focus less on the act of exercising itself and more on the sense of environment and roadside signs during their running.

4. Device intervention and field observation

Some research indicates that runners may form many sporting ties (e.g., in sports clubs or in online communities such as Strava), but the Core Sports Network (CSN) consists of strong sporting ties and reflects the inner circle of someone's personal sports network. Scholars also claim that the members of this network, along with their companions, play an important role in sustaining running as a daily activity, as this sense of companionship can be vital in maintaining consistency [15].

4.1. Device intervention

We installed signposts (Figure 7) along the walking loop in the park to indicate the distance from the park entrance, as well as to help runners estimate their distance from others.

Figure 7. Signposts

4.2. Field observation

Through our observations, we found that most runners with companions are more likely to observe their surroundings and notice the roadside signs. In contrast, those running alone tend to be more immersed in their own work and they are less attentive to changes in the surrounding environment (Figure 8, 9).

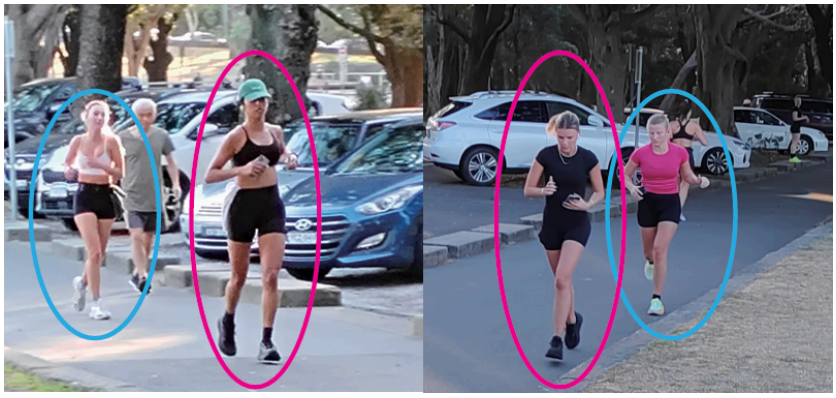

Figure 8. Female runners

Photo: Xuanhe Miao 22/02/2025 Location: Busbys Pond, Centennial Parkland

Photo: Xuanhe Miao 25/02/2025&27/02/2025
Location: Duck Pond, Centennial Parkland

The two photos above show a group of runners running in the same spot on two days in a row

Figure 9. Group runners

Around Busby Pond, many runners train in pairs or single groups. Group runners are more likely to talk about our signs when they passed by there. The data showed that runners exercised longer than those who ran alone. Among them, female runners were more likely to seek exercise partners, with about a third of them having companions. When a group of female runners exercises, they often help each other, for example, some female runners will stop at our sign and help to stretch or carry water bottles and towels (Figure 10).

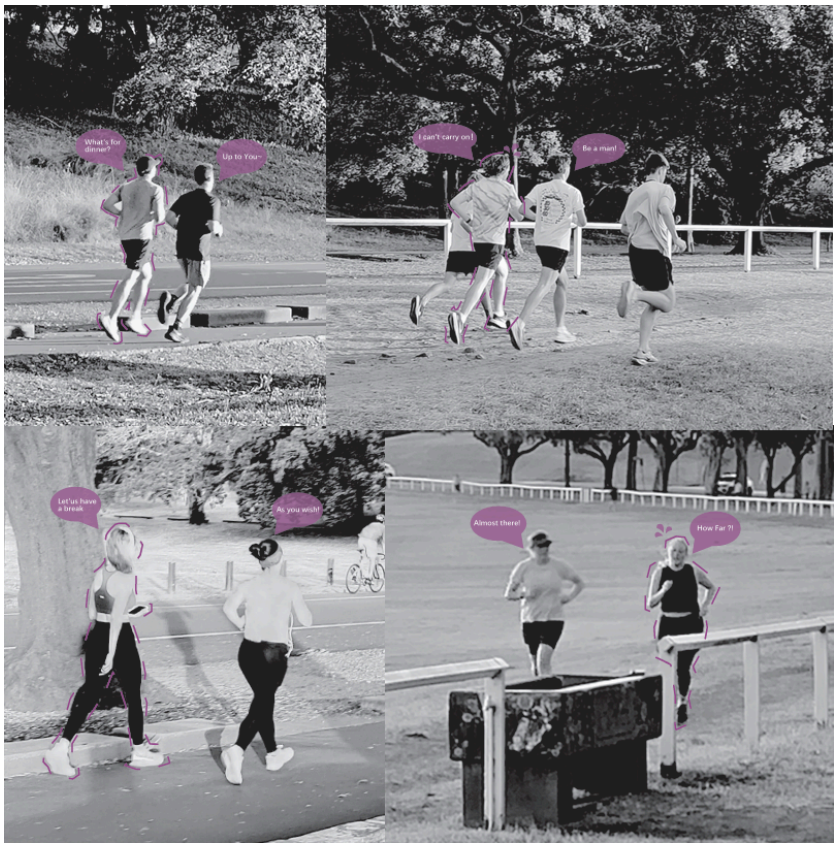

Figure 10. Running with compainion

4.3. Date analysis

The Figure 11 shows how the number of runners varies across different sections of the park depending on time and weather conditions. In each chart, the black portion represents the number of runners, while the combined black and white figures represent the total sample size (each figure symbol represents 10 people, with a total sample size of 80). The data covers four locations within Centennial Park. The highest number of runners is found on the "Runner's Path" because it is the park's largest circular trail and serves as a main route connecting various park entrances. No matter which entrance runners use, they can easily find this path. In contrast, the fewest runners are seen near the "Duck Pond", as this area is relatively secluded and located farther from the park's busiest northern gate. Some runners may avoid this area due to the distance. Additionally, weather changes can also affect runners' willingness to exercise. On the morning of March 7th, a noticeable decrease in runner numbers occurred across all paths due to a drop in temperature (Figure 12).

Figure 11. The change in the number of runners over time at different locations

Figure 12. Duck pond and runner's path

The Figure 13 shows the changes in exercise duration between solo runners and those running with companions. From the chart, it is obvious that runners with companions tend to exercise for longer periods (more than 30 minutes), while solo runners are more likely to engage in shorter sessions (less than 30 minutes). At the same time, changes in temperature have a significant impact on both the duration and willingness to exercise. On the morning of March 14th, due to a drop in temperature, the number of runners decreased noticeably, falling well below the levels observed during warmer weather.

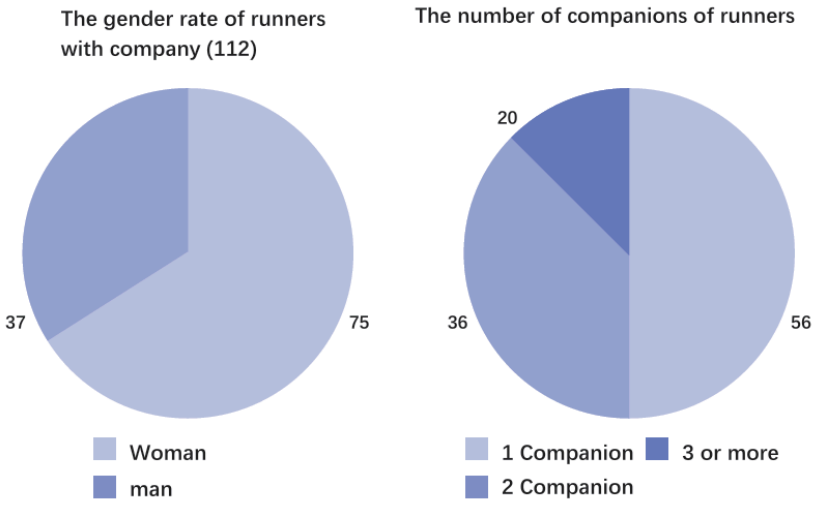

Figure 13. The gender rate of runners with company and number of accompanied runners

5. Results and discussion

Therefore, the following three conclusions can be drawn. First, runners with companions typically exercise for longer durations compared to those who run alone. Second, temperature is one of the key factors influencing the number of people engaging in physical activity. Third, among most runners, female runners are more likely to participate in group social activities and mutual assistance.

Some evidence shows that there are three primary factors contributing to group runners exercising for longer periods compared to solo runners: partner Support, accountability and enjoyment.

Running with others provides encouragement and motivation. Companions can push each other to maintain pace, take fewer breaks, and extend workout times. To be more specific, running as a team can bring a direct effect on female runners, which for many is the hardest part of physical fitness. Someone who may loathe the idea of going for a solo run or struggle to persevere during a solo workout at the gym. Especially female runners, they often find it easy to power through a competition or even to run laps and execute drills during practice, because of the motivation of camaraderie [16].

When runners schedule to meet with others, they are more likely to stick to the plan and complete longer sessions as they feel accountable to their group. "Social connectedness is a huge advantage. As a team member, runners are not just part of a

community, which can provide a sense of responsibility and purpose. Runners can act as a companion, and while accompanying their teammates, they will feel supported by their teammates, which may affect the role runners play in the social circle, promote their development together, and make them more responsible for the team and society" [17].

Running with others can make the activity feel more enjoyable. Conversations during the run can distract from physical fatigue, leading to extended exercise durations. From a macro perspective, our data points out that social factors warrant more attention in current approaches to physical (in) activity and exercise behavior. Social factors were associated with greater subjective enjoyment mainly with the first two points: positive personal emotions and personal energy. A positive attitude and mindset, in turn, lead to a sense of enjoyment that makes some differences and is associated with more regular and efficient running times [18].

6. Conclusion

In conclusion, under our designed intervention, most runners with companions tend to notice the signs along the path and adjust their exercise plans through ongoing communication with their partners. With mutual encouragement and support, they are often more motivated to stick to their training goals and extend their workout duration. Meanwhile, solo runners may also stop to read the information on the signs and use their own exercise devices—such as smartwatches or fitness bands—to plan their workout time accordingly. Moreover, with the distance indicators on the signs, runners can more easily manage their exercise duration and distribute their energy more effectively, leading to better performance. From a mental health perspective, certain environmental signs can enhance runners' willingness to interact with one another, helping to reduce fatigue and anxiety. This emotional stability and improved focus can also lower the risk of injury during exercise.

The research is fortified by the mixed research method chosen, which provides real-time insights into the behaviour of the runners while also gaining feedback directly from the participants. According to Kassan et al., behaviours observed during ethnography and cultural probes can derive insights directly from the participants. The study is also limited by weather and seasonal changes that vary throughout the year, as it can impact the behaviour of the runner and park visitors. Additionally, the perspective from voluntary user feedback on their own accord through interaction with the prototypes and cultural probes can also fail to accurately represent the participant. To address these limitations, this study aims to perform observation of runners under various environmental factors in order to identify the effect of the runners to the design intervention.

Conducting observations and cultural probes on these runners can help to highlight the effectiveness of the design intervention. The research is targeted towards urban planners, artists, and health activists who are interested in improving the design of public spaces to enhance social interaction and public well-being. The outcome of this research will be presented to the local council and the community-based organisations that may facilitate the development of motivating the public through health interventions.

The recommendations of this study will guide the planning and development of urban parks through interactive social relations among runners. The research resonates well with the strategic plan of Centennial Parkland to foster better community engagement and better health, as outlined by Parklands. The development and testing of art and design interventions - such as socially oriented seating and interactive pathway markers cater to the park's vision and strategic goals. The proposed solutions will tackle existing limitations, such as affordability, through the use of sustainable materials to reduce periodic maintenance and a generalised design that will suit different abilities.

This study offers practical, empirically supported recommendations for integrating art and design, which can be readily applied to enhance fitness and social interaction in similar urban settings.

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