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# Cycling for All – Addressing Gender and Age-Specific Needs in Urban Mobility

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**ABSTRACT**

This research analyzes cycling experiences across gender and age demographics (50+) utilizing questionnaire data from the USA and Canada, providing significant insights for enhancing cycling infrastructure in Serbia. The data indicates that male cyclists prioritize concerns related to physical infrastructure, such as traffic congestion and narrow roads, whereas female cyclists focus on safety and navigational difficulties. Cyclists 66+ choose comfort, familiarity, and well-maintained surfaces, whereas younger respondents exhibit dissatisfaction with heavy traffic and construction areas. Through the comparison of these data, we provide specific recommendations for Serbia, utilizing examples of successful cycling experiences in North America and insights from their deficiencies. Essential recommendations encompass the establishment of exclusive bicycle lanes, the upkeep of road conditions, and the improvement of navigational assistance. This research emphasizes the need of gender-sensitive and age-inclusive cycling strategies to promote sustainable urban transportation in Serbia, while recognizing the constraints of self-reported data and geographical diversity.

## 1. Introduction

Cycling has become more popular as a mode of transportation, entertainment, and exercise, especially among older adults. The increasing interest in cycling among adults aged 50+ provides a chance to examine their experiences, pinpointing aspects that enhance cycling and those that provide obstacles. Comprehending these elements is essential for enhancing bicycle infrastructure, policy, and advocacy initiatives designed to promote active transportation. This paper analyzes the perspectives of cyclists aged 50+ by examining open-ended questions about the good and bad aspects of their journey, emphasizing possible variations depending on gender and age.

Previous studies have investigated the incentives and obstacles to cycling across different groups. Research indicates that older adults cycle for health advantages, social interaction, and environmental considerations, however encounter challenges including safety hazards, insufficient infrastructure, and personal constraints (Aldred et al., 2016; Heinen et al., 2010; Kardan et al., 2023).

Gender disparities in cycling behaviors are well-documented, with males generally participating in riding more frequently and over larger distances, while women tend to exhibit heightened worries over safety and the quality of infrastructure (Garrard et al., 2008; Lubitow et al., 2019; Mitra & Nash, 2019). Age-related variations suggest that whereas many older persons continue to be enthusiastic cyclists, others face diminishing confidence owing to physical constraints or perceived risks (Keppner et al., 2023; Pucher & Buehler, 2012). Nevertheless, limited research has particularly investigated how older cyclists express their experiences in open-ended forms, constraining a comprehensive knowledge of their subjective viewpoints.

This study applied qualitative analysis methods, such as network word diagrams, to illustrate prevalent themes and connections among the replies. These approaches have been effectively employed in social sciences to examine textual data and discern significant patterns in perception and behavior (Drieger, 2013; Lamba & Madhusudhan, 2022). This research investigates the confluence of age and gender to elucidate how various subgroups of older riders perceive their experiences, allowing targeted improvements in cycling regulations and infrastructure.

The findings, sourced from cyclists in the United States and Canada, have larger implications for other locations, like Serbia, where cycling as an alternative means of transport is gaining popularity but has analogous infrastructure and cultural problems (Jevremović et al., 2024).

The primary objective of this study is to point out the elements that affect cycling experiences among 50+ adults. This research enhances the wider debate on age-friendly and gender-sensitive mobility planning by revealing trends and inequalities in experiences related to gender and age. The findings intend to guide decision-makers: politicians, urban planners, and bicycle advocacy organizations, providing lessons that may be tailored to various socio-cultural situations. This study highlights the necessity of inclusive cycling policies that cater to the varied requirements of an older demographic, enhancing safety and enjoyment in cycling for everyone.

## 2. Methodology of the research

For the purposes of this research, part of the data collected within the fifth year of the "50+ cycling survey", which was conducted during (2024 and 2025), for the USA and Canada, was used. This study consists of two parts:

- General survey of the 50+ respondents, on attitudes and use of bicycles;
- On-line Journal completed by some responding to the general survey that includes a description of a bicycle trip on a specific route.

In addition to general socio-economic questions and several specific questions related to the way of using a bicycle, the on-line journal focuses on open-ended questions that describe a specific route and what users found good/bad on the chosen route.

Both the general survey and on-line journal can be found on the following website: https://dbltildecore.org/50-cycling-survey/

Accordingly, this paper presents the results of two open-ended questions:

- What worked well for you on this cycling trip?
- What didn't work so well? in relation to the gender and age of the respondents.

The aim of this research was to determine potential differences in respondents' perceptions of the good and bad aspects while cycling in relation to gender and age, and to use the results as guidelines for improving the overall quality of cycling in Serbia for 50+ users. The results were processed and analyzed using the Python programming package, version 3.10.

## 3. Results

This chapter is composed of two parts. The first part presents general socio-demographic data on the respondents, while the second part presents the results of the analysis of open-ended questions.

### 3.1. Socio-demographic characteristics of the data

The total sample analyzed in this paper is 306 respondents, of whom 60% are men and 40% are women. The distribution of respondents by age and gender is shown in Table 1.

**Table 1.** Distribution of respondents by age and gender

| Age | Male | | Female | |
|---|---|---|---|---|
| | n | [%] | n | [%] |
| 50-55 | 22 | 48.9 | 23 | 51.1 |
| 56-60 | 14 | 35.9 | 25 | 64.1 |
| 61-65 | 31 | 72.1 | 12 | 27.9 |
| 66-70 | 46 | 58.2 | 33 | 41.8 |
| 71+ | 71 | 71.0 | 29 | 29.0 |

The table shows that the distribution of respondents by age is almost equal for all age categories of users, with the exception of 71+ users (100 respondents).

### 3.2. Cyclist journey analysis by gender

This chapter presents answers and analysis to open-ended questions regarding gender.

Figure 1 shows the positive aspects of journey for males.

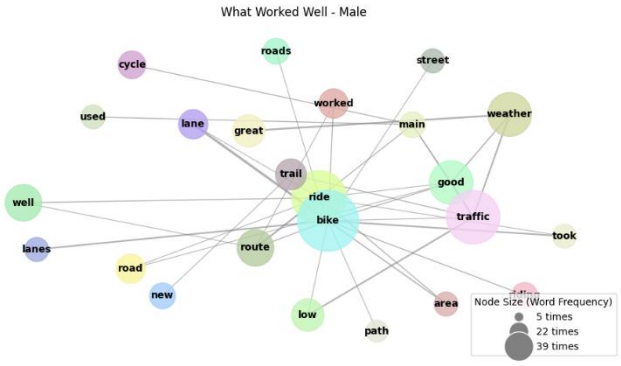


**Figure 1.** Positive journey aspects for males

Terms such as "trail", "main", "street", "road", "lanes" and "route" indicate that the quality and accessibility of cycling facilities were favorably acknowledged. The high frequency of "traffic" suggests that favorable conditions were a crucial influence, particularly in relation to the term "low". The prominence of "weather" indicates that favorable conditions significantly contributed to the enjoyable bike experience, while "path" and "trail" underscore the significance of designated biking routes or natural pathways.

Figure 2 shows the positive aspects of journey for females. Results show the similar trend as for males. Words "trail", "route", "lanes", "roads", and "separated" suggest that the quality and availability of biking infrastructure were positively noted. Words "nice", "good", "well", "less", "worked" and "time" reflect overall satisfaction with the biking experience.

Here we can also see the first important difference. Words "safe" and "separated" highlight the importance of safe and dedicated biking spaces, while "familiar" suggests that familiarity with the biking environment contributed to a positive experience, which is pronounced in the case of females.

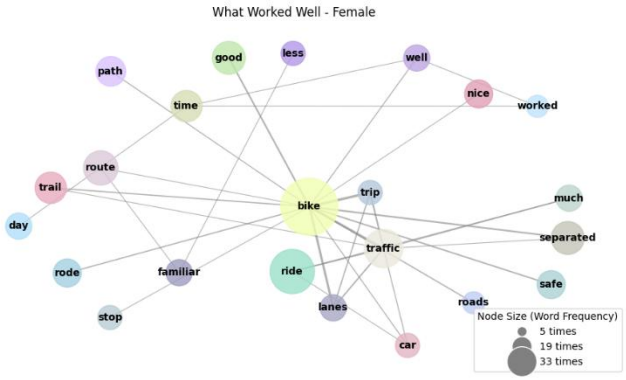


**Figure 2.** Positive journey aspects for females

Figure 3 shows the negative aspects of journey for males.

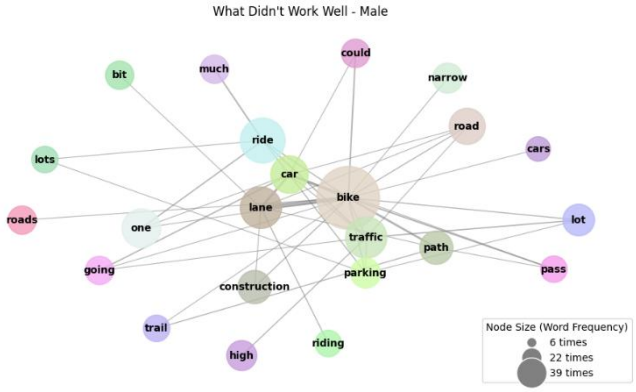


**Figure 3.** Negative journey aspects for males

Terms "lane", "traffic", "path", "parking", "construction" and "narrow" suggest the issue with some type of the infrastructure. Since there is a connection of "construction" and "lane", we can assume that some of the respondents had the problem with work zones that were blocking the bicycle paths. Words "could" and "much" imply that respondents had ideas for improvement or felt strongly about the issues, while "bit" and "lots" reflect the frequency or extent of the problems encountered. Figure 4 shows the negative aspects of journey for females. Similar as with males, females also pointed out "lane", "traffic", "road", "turn", "path" and "trail" suggesting the issues with infrastructure. It is interesting to note the connection of "cars" and "lane", which could evidence that there were cars (obstacles) in the bicycle lane. "Narrow" also appears for females and indicates problems with narrow roads or lanes. One of the differences that we can see here are the words: "turn", "left", "get", and "across" that in combination with "trying" suggest difficulties in navigating roads, making turns, or crossing streets safely.

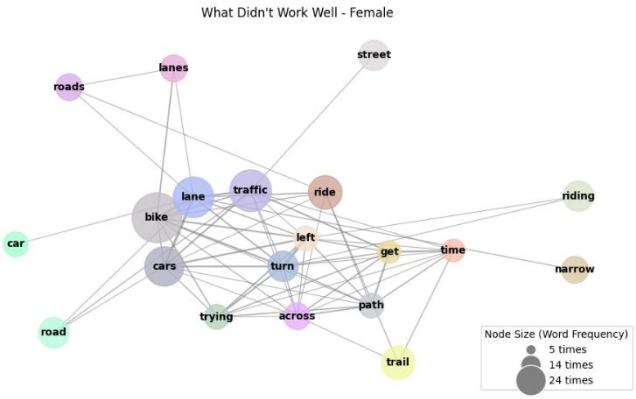


**Figure 4.** Negative journey aspects for females

The overall comparison and main conclusions between males and females are shown in Table 2.

**Table 2.** Key differences between males and females

| Aspect | Key differences |
|---|---|
| What Worked Well | • Males focus on traffic and weather<br>• Females emphasize familiarity and routes |
| What Didn't Work Well | • Males mention construction<br>• Females focus on turning difficulties |
| Overall | • Males prioritize physical issues<br>• Females emphasize navigational challenges |

From the given table it is quite clear what was and was not good on the analyzed journeys, thus pointing out the specific advantages and disadvantages of individual user groups that should be taken into account when planning and designing cycling infrastructure.

### 3.3. Cyclist journey analysis by age

Given the limitations in the scope of the paper, this chapter presents only the key similarities and differences that were observed when analyzing open-ended questions by age category.

Table 3 shows the key differences between the age groups. Overall, we can identify some good and bad experiences that respondents encountered during their trips. Users from all age demographics expressed appreciation for less traffic, secure pathways, and pleasant riding conditions. Conversely, negative responses indicated that traffic congestion, poor road conditions, and insufficient infrastructure were persistent issues.

This research and its conclusions can substantially assist decision-makers in devising age-specific strategies for the construction and improvement of bicycle infrastructure. Efforts for younger age groups (50-60) should prioritize alleviating traffic congestion and resolving persistent construction issues, but middle-aged older cyclists (61-65) necessitate enhancements in navigational clarity, including explicit signs and distinctly designated junctions.

**Table 3.** Key differences between age groups

| Aspect | Key differences |
|---|---|
| What Worked Well | • 50-55: Focus on low traffic, residential areas, and smooth rides<br>• 56-60: Satisfaction with new infrastructure and familiar routes<br>• 61-65: Preference for quiet, separated lanes and paths<br>• 66-70: Appreciation for designated routes and specific surfaces like gravel<br>• 71+: Comfortable, familiar rides, especially during the day |
| What Didn't Work Well | • 50-55: Stressful rides, bumpy roads, and slow progress<br>• 56-60: Busy roads, lack of separation, and high traffic<br>• 61-65: Construction zones, navigation challenges (e.g., turns)<br>• 66-70: Difficulties crossing roads, interactions with pedestrians, and narrow spaces<br>• 71+: Poor pavement quality, construction, and limited space |
| Conclusion | • Younger Ages (50-55): Practical concerns for traffic and road conditions dominate both positive and negative feedback<br>• Middle Ages (56-60 to 61-65): A mix of satisfaction with infrastructure but frustration with ongoing challenges like construction and navigation<br>• Older Ages (66-70+, 71+): Positive feedback emphasizes comfort and familiarity, while negative feedback highlights physical challenges like narrow spaces and poor surfaces |

Older adults (66+) require infrastructure that emphasizes comfort, safety, and accessibility, with smooth surfaces, larger pathways, and less contacts with motorized vehicles. While these needs are generally applicable to all age groups, our research specifically identifies which user categories in a particular context most urgently require certain measures.

## 3. Discussion

Cycling is a sustainable, healthful, and eco-friendly transportation choice; nevertheless, its uptake is significantly influenced by the quality of infrastructure and user experience. This study analyzes input from male and female cyclists across various age groups (50+) to ascertain the positive and negative aspects of their most recent riding experience. By synthesizing these findings with international research, we suggest general solutions to enhance bicycle infrastructure and promote inclusion in Serbia.

The analysis reveals distinct patterns between genders. Male cyclists emphasize physical infrastructure issues, such as traffic congestion, construction zones, and narrow roads, consistent with other studies (Aldred et al., 2016; Van Cauwenberg et al., 2019; Winters et al., 2015). Female cyclists, however, emphasize safety, familiarity, and navigational obstacles, including turning maneuvers and contacts with vehicles. This corresponds with international studies suggesting that women necessitate safer and more segregated riding conditions to feel at ease (Garrard et al., 2008; Pucher & Buehler, 2012; Van Cauwenberg et al., 2018).

Age-specific tendencies underscore varying requirements. Cyclists aged 50-60 like improved facilities but express frustration with elevated traffic congestion and persistent building activities. Cyclists aged 66+ value comfort, familiarity, and navigational ease, frequently identifying inadequate pavement quality and restricted space as obstacles. These findings correspond with research highlighting the significance of age-friendly riding conditions, including well-maintained surfaces and minimized vehicle encounters (Van Cauwenberg et al., 2019; Winters et al., 2015).

In relation to the global literature, we point to both universal and localized challenges. Traffic conditions, safety, and infrastructure quality are consistent themes worldwide (European Cyclists' Federation, 2014; European Transport Safety Council, 2020; Heinen et al., 2010; OECD, 2018). However, the specific emphasis on turning difficulties and construction zones highlights localized issues that must be addressed to create a supportive cycling culture.

Based on these insights, the authors of this paper recommend the following:

- Dedicated bike lanes should be prioritized, particularly in urban areas, to reduce interactions with vehicles and enhance safety. These bike lanes should be of sufficient width, such as 6 feet minimum, to support cycling uptake and continued cycling by older adults.
- Regular maintenance of roads and paths is essential to accommodate older cyclists who face physical challenges. To accomplish this, maintenance standards for clearing debris and repairing divots and holes that recognize the particular issues for people cycling.
- Traffic management measures, such as car-free zones or restricted vehicle access, can alleviate stress for younger cyclists.
- Clear signage and digital tools can assist with navigation, addressing frustrations expressed by older cyclists. This is especially important when crossing a street or moving through an intersection, and includes infrastructure needed to cross high stress roadways along a low stress route.

- Promoting familiar and comfortable routes, such as those connecting residential areas to parks or shopping centers, can encourage cycling among females and older adults. This includes adding signage indicating connections where existing signage may refer to motor vehicle access only, i.e., a posted sign indicating a 'Dead End' for a street when there is a pathway for people cycling and walking. Building these connections where they do not exist.

These recommendations correspond with the findings of this paper, adhere to worldwide best practices, and address any inconsistencies in Serbia that may resemble those in the USA or Canada. This study emphasizes the significance of gender-sensitive and age-inclusive bike infrastructure. By synthesizing these findings with international literature, Serbia may formulate targeted measures to establish a safer, more accessible, and inclusive cycling environment, therefore promoting sustainable urban transportation for all.

## 4. Conclusion

This study offers significant insights on cycling experiences including gender and age demographics in the USA and Canada, emphasizing the varied requirements and obstacles encountered by cyclists. Males prioritize physical infrastructure concerns such as traffic congestion and narrow roads, whereas females stress safety and comfort. Cyclists 66+ prioritize accessibility, familiarity, and navigational ease, whereas younger respondents' express dissatisfaction with elevated traffic density and construction sites. These findings highlight the necessity of gender-sensitive and age-inclusive bicycle infrastructure to promote sustainable urban transportation. This paper possesses some limitations. The research relies on self-reported feedback, which may be influenced by personal biases thus influencing the quality of the results. The sample size and geographic coverage may not adequately represent the larger population. A primary limitation of this research is the inability to associate the findings with a specific type of infrastructure (such as cycle paths or bicycle lanes), as respondents utilized numerous types of infrastructure during a single journey. We assert that this study may reveal special features corresponding to a certain category of infrastructure, thus greatly assisting in the planning and construction of cycling facilities for older users. This study exclusively addresses the overall advantages and downsides, independent of any specific infrastructure type. Furthermore, the analysis did not differentiate between respondents from the USA and Canada; instead, all were assessed together. By delineating these user categories, country-specific outcomes may be derived, allowing for the comparison of user characteristics to inform policy formulation and execution at the national level.

Subsequent study must rectify these deficiencies by utilizing bigger, more heterogeneous samples and examining supplementary variables, including geographical disparities, and seasonal influences on cycling activity. Additionally, research should concentrate on journeys undertaken via a singular form of infrastructure to provide insights into the distinct advantages and disadvantages of one infrastructure type relative to another. Examining the impacts of infrastructure enhancements on bicycle engagement may provide useful insights.

By addressing these restrictions and implementing the recommendations presented in this paper, policymakers may provide a safer, more accessible, and inclusive cycling environment, therefore fostering sustainable mobility and public health for individuals across all age groups, not alone for older adults.

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