

The Impact of Gender on Transport Choices and Decisions.

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Executive Summary

- The community partner of this project, Councillor Vicky Southworth (acting as a private citizen rather than a representative of Environment Canterbury) has a keen interest in increasing the number of users of active transport in Ōtautahi Christchurch.
- Active transport is defined in this project as being a form of transport that required physical activity, typically making the transport modes more environmentally-friendly than private transport alternatives.
- Councillor Southworth wishes to understand the perceptions and motivations behind active transport use, and how this relates to gender.
- With this context in mind, the research question “How do perceptions of active transport and motivations behind use differ between genders?” was formed.
- An online survey was created and dispersed to individuals living in Ōtautahi Christchurch.
- Questions on reasons for active transport use were asked, along with the participant’s perceptions of transport.
- Prior research indicated that the primary transport mode in the region was private car use, so questions regarding this mode were also posed.
- Comparisons were able to be drawn from the survey results and existing literature.
- Analysis was broken down into relevant quantitative questions, preference for active transport and motivations for choosing participants indicated transport modes were investigated.
- One of the shortcomings of this data is that there were a very limited number of participants who did not identify as being gender diverse or other.
- Ideally there would have been a larger population representation as there is a limited number of literature that includes these participants.
- The change in COVID-19 alert levels also proved to be a limitation.
- Ideally, both interviews and focus groups would have been conducted in conjunction with the survey to gain a deeper understanding of active transport use in Ōtautahi Christchurch.
- Further research should be undertaken specifically regarding those who identify as gender diverse.
- It is unclear from our data, and from existing data, whether they are disproportionately impacted or prevented from using active transport modes.

Introduction

This report will seek to explain and understand the data received from an online survey. These results will be compared with existing literature to understand their validity, address policy recommendations, and suggest topics of future research. Group 1 has developed the research question “How do perceptions of active transport and motivations behind use differ between genders?” to determine ways in which the Ōtautahi Christchurch active transport systems can be improved. The report will first discuss existing literature of five sub-themes that were identified in the early stages of the research process: infrastructure, social status, accessibility, climate change and safety. Key methodological points that contributed towards the survey creation will be identified in this section. An explanation as to how the data was collected and analysed is provided. The data results from the online survey and discussion will be provided in the subsequent section. Finally, suggestions for future research will be addressed.

Active transport is a cost-effective alternative to greenhouse gas emitting transport options. For the purpose of this investigation active transport was defined as walking, cycling and bussing. Not only is this beneficial for the planet, but it is also incredibly beneficial for human health. It encourages and facilitates exercise in individuals’ lives. However, barriers to engagement with active transport must be fully understood within specific societies to ensure that, where possible, attempts can be made to mitigate these issues. This research project has the objective of understanding if gender is a barrier to active transport within Ōtautahi Christchurch.

Key Concepts & Literature Review

Key Concepts

Five key concepts were used within the project to ease the understanding of the overall topic. The five concepts are accessibility, social status, infrastructure, climate change and safety. These concepts provided a structure within the project. This structure was the foundation built upon by focusing the questions within the survey on these concepts. Using an online survey for data collection enabled a wide range of respondents to complete it. This was in attempt to get a representative sample of the population in Ōtautahi Christchurch, which was essential for analysis and discussion. Displaying the data with graphs gave a sense of visualisation and enabled ease of understanding where the discrepancies are and why they occur. These points provided ease of determining the disparities amongst genders regarding active transport use and the motivations and perceptions of the transport modes.

The community partner for this project, Councillor Vicky Southworth, is interested in encouraging utilization of active transport, especially the public bus system of Ōtautahi Christchurch.

Accessibility

Throughout pre-existing literature, it is evident that accessibility contributes to motivations and perceptions of active transport amongst genders. Poor road infrastructure makes it susceptible for women to be a target for harassment (Levy, 2013). Harassment can dampen one's motivation to use active transport as it somewhat limits access due to issues regarding safety and security. Dixit and Sivakumar (2020) found that females tend to have lower accessibility to cars and higher accessibility to buses compared to males. Women tend to use cheaper modes of transport as it correlates with their income level (Dixit & Sivakumar, 2020). Men tend to use cars for daily commutes to their job (Dixit & Sivakumar, 2020). The role of destination displays how accessibility to facilities can influence what transport mode an individual chooses to take. Nearby facilities within neighbourhoods incentivises individuals to use active transport (Scheepers et al. 2016). These accessibility issues cause the ongoing disparities amongst genders regarding their choices of transport.

Social Status

Sociometric status or social status is of great significance in western culture (Anderson et al., 2012). This is defined as the degree of respect or rank an individual holds in their peer group. The fear an individual may hold regarding their actions impacts on people's perception of them could have an impact on their actions. An individual's mode of transport will impact this perceived social rank as all aspects of their outward appearance will. How this interacts with transport choices, gender and carbon emission mitigation efforts is something which is of significant interest to the community partner.

Active transport in general has been associated with lower status (Fitt, 2018). Males have also been shown to value social status highly, this has been linked to the fact that they are normally a household's source of income (Stroh et al., 1996). Females on the other hand, are more motivated to change their behaviour towards being more environmentally friendly to enhance social status. Climate change action has also been shown to increase an individual's social status in recent studies. In addition peer influence, the behaviour change driver here, has been shown to be one of the most influential forms of behaviour modification.

Infrastructure

Poor infrastructure has been noted in the literature to be a hindrance and a barrier towards women's involvement in active transport. It is especially prominent when women are the primary caregiver of children in a household (Emami, 2020). In addition, some studies show that current city infrastructure has neglected to consider indigenous people. These same studied indicated facilities have often been structured for cars, not people. Emami, (2020) showed how much women can be put off using buses or other forms of active transport due to safety concerns triggered by poor infrastructure. Within the survey, the issue of safety and security in different public spaces such as bus routes, and hubs was widely addressed.

There are apparent gender differences in the purpose of bicycle trips, desired amenities and safety perceptions on cycling infrastructure (Krizek et al., 2005). Furthermore, women's perspective towards infrastructure is not primarily based on directness or time but on an ecological approach that combines physical environment and social and safety concerns (Camp, 2013).

Climate Change

It is clear throughout existing literature that climate change is a motivating factor behind active transport use. However, there is a disparity between genders. In most westernised societies, women were typically more concerned with climate change and perceived it to be a greater threat than other genders (Showalter et al., 2019). Women were also more likely to make lifestyle changes to mitigate this threat, however, they were not still not as likely to engage in active transport. Contrastingly, within some indigenous communities, men were more likely to perceive the threat of climate change. However, men were not likely to change their lifestyle

in response to this threat (Huda, 2013). Those who identify as gender diverse were highly underrepresented in the existing literature on climate change and transport choice.

Safety

Safety is usually mentioned as a significant barrier while using active transport in Christchurch. Cycling is a common mode of transportation in Christchurch for many individuals. The top three safety concerns for cyclists were sharing the road with other vehicles, exceeding the speed limit, and sharing the road with heavy vehicles (Christchurch City Council, 2020). The risks associated while riding a bus include Offensive and threatening behaviours, mostly in isolated back streets, fear of intoxicated people, criminals and inadequate street lighting. Most female passengers encounter safety issues such as harassment and stalking while waiting for the bus (Kennedy, 2008). The main risks associated with walking are driver behaviour, particularly speeding and drinking and driving and poor infrastructure (Ministry of Transport, 2018). The government is developing a strategic plan to improve active transportation safety. This plan aims to improve the accessibility of transportation across the city and ensure citizens feel safe when travelling in Christchurch (Christchurch City Council, 2020).

Methods

Ethics

The Human Ethics Committee Policy was necessary for ethical review and approval in order to conduct the survey. The Human Research Ethics Committee (HREC) evaluates all research conducted inside or outside the University of Canterbury. Therefore, a survey consent application was created and submitted to the Human Ethics Committee at the University of Canterbury. This application contained research proposals, the research's main purpose, and research methodology.

All participants provided voluntary consent before beginning the survey. Voluntary consent is a basic concept of research ethics that permits participants to complete the survey voluntarily after receiving sufficient details about what it implies to be a part of the study and providing consent before taking part in the survey (Xu et al., 2020). Using a *Qualtrics* survey, participants were informed in detail about the research questions and purpose before providing voluntary consent. Participants in the survey were requested to confirm their age beforehand, and only those over the age of 18 were allowed to participate.

Survey Method

Primary data was required to answer the research question, resulting in the creation of an online survey. Online data collection is a non-experimental research approach for acquiring information on a population's distribution and variables. In this context, the variables were gender in relation to transport choices. The primary goal of the survey method is to ensure that reliable data is collected for quantitative testing and qualitative analysis. Data-driven research decisions can then be made in response to the results (Coughlan et al., 2013). The first question of the survey was a matrix, asking participants to select the transport mode they used for various trips types. This allowed for skip logic to take place, and questions regarding perceptions and motivations behind use were limited only to the modes used by participants. Private transport was also included. As Councillor Southworth is particularly interested in improving the public bus system, a section regarding perceptions of this services was asked to all participants.

Methodological Framework

The methodological framework is a set of organized procedures or an approach for structuring how a task will be carried out in a particular order (McMeekin et al., 2020). The stages of methodology framework used are as follows:

- 1) Identify the research question
- 2) Select subthemes
- 3) Conduct literature reviews to identify relevant studies to subthemes
- 4) Create online survey to answer the research question
- 5) Disperse the survey
- 6) Export the data to analyse and draw conclusions

Method Limitations

Following consultation with the project supervisor and community partner, it was decided that in-person interviews and focus groups would have provided a deeper understanding of the issues at hand. During the time of data collection, the COVID-19 alert levels were undergoing review. This proved to be a limitation to the research process, as it constricted the opportunity for in-person data collection methods to occur safely. Once the South Island was reduced to Alert Level 2, the limitation of time became apparent. Therefore, it was decided that these

methods would be excluded at this point; however, it is suggested that these occur in the future, should research continue.

Data Collection

To create the survey, the online software *Qualtrics* was used. The web-based survey included 35 questions on the various modes of active and private transportation used by participants. In addition, reasons behind use and suggestions for encouraging other individuals to use active transport were also asked. A combination of qualitative and quantitative methodology was utilised, as a mixed-method approach allows for deeper insight and outcomes. Qualitative methods are useful as they can help researchers understand the reality and significance of responses in different circumstances. In contrast, quantitative methods help determine the accuracy and reliability of the statistical analysis (Queiros et al., 2017).

Results & Discussion

Sample and Exclusions

Of the total 361 responses, 193 were completed to a usable standard (n=193). To be classified as usable, the respondents' answers had to meet four requirements. Firstly to have ticked that they are over the age of 18 and consent to participation. Secondly, have indicated at least one preferred transport mode. Thirdly, identified their gender, and finally, indicated their age as over 18 in the question specifically asking about age. To filter out unusable responses, *Qualtrics* filter features were utilised. The final sample (n=193) contained a total of 103 females, 87 males and three individuals who indicated themselves as gender diverse or other. These participants were grouped together for the sake of simplicity. The average age group for the sample was 18 to 24 years old with 53% of respondents falling into this category. The most prominent ethnicity within the sample was New Zealand European/ European (77%) followed by Asian (9%) then Māori (4%). The sample was generally educated with the most frequent levels of education being both high school and Bachelor's degree. These indicate the general demographic fits that of a western, educated, industrialized, rich and democratic population. This reflects the general New Zealand population.

Quantitative

Within our sample some of the questions answered were on a Likert scale of 1 (completely disagree) to 10 (completely agree). Some of these questions were specifically relevant to the

research question thus the difference between means is of interest. One of the questions was asking how much participants through their mode of transport was reflective of their social status. The results showed a mean for male participants of $m=3.84$ ($n=87$), for female participants $m=3.56$ ($n=103$) and for participants who identified as other than female or male $m=4.50$ ($n=3$). These means indicate general disagreement with this statement with males disagreeing the most. When asked how much participants believed cultural norms impacted their choice of transport the mean agreement of participants was $m=2.77$ for males ($n=87$), $m=3.25$ for females ($n=103$) and $m=6.50$ for those who indicated themselves as other ($n=3$). This also indicated general disagreement with the statement among all genders, with males again disagreeing the most. When asked how much they thought climate change impacted their transport decisions, participants showed means of 4.93 for males ($n=87$), 5.35 for females ($n=103$) and 5.00 for those who indicated other ($n=3$). This is one of the only Likert scales we got an average where males disagreed with the statement and females agreed. This indicates the potential for some interesting thought process differences between genders and lines up with our research question.

Qualitative

Figure 1 conveys the survey participants preferred modes of transport. For all genders driving was the preferred transport mode. This was followed by walking for females, males and those who indicated themselves as others. For males cycling was an equal second with walking. For both males and females bussing was much less preferred than walking, cycling or driving but not 'other' transport modes. For those who indicated their gender as other or diverse, bussing was almost equal with cycling and 'other' transport modes were much less preferred.

Participants were also asked about the motivations for taking their preferred transport mode and the usual purpose of this use. The results for active transport modes (cycling, bussing and walking) were of most concern to the research question and help answer the research question.

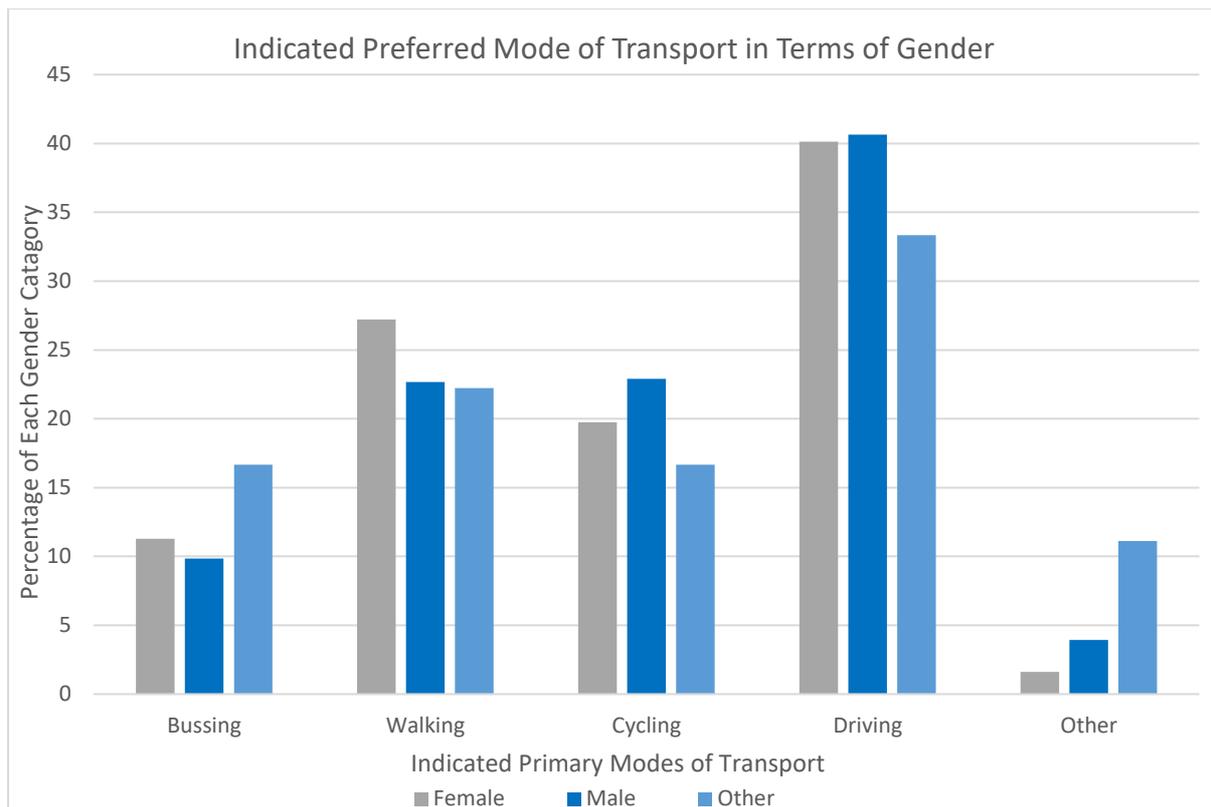


Figure 1: Indicated Preferred Mode of Transport in Terms of Gender.

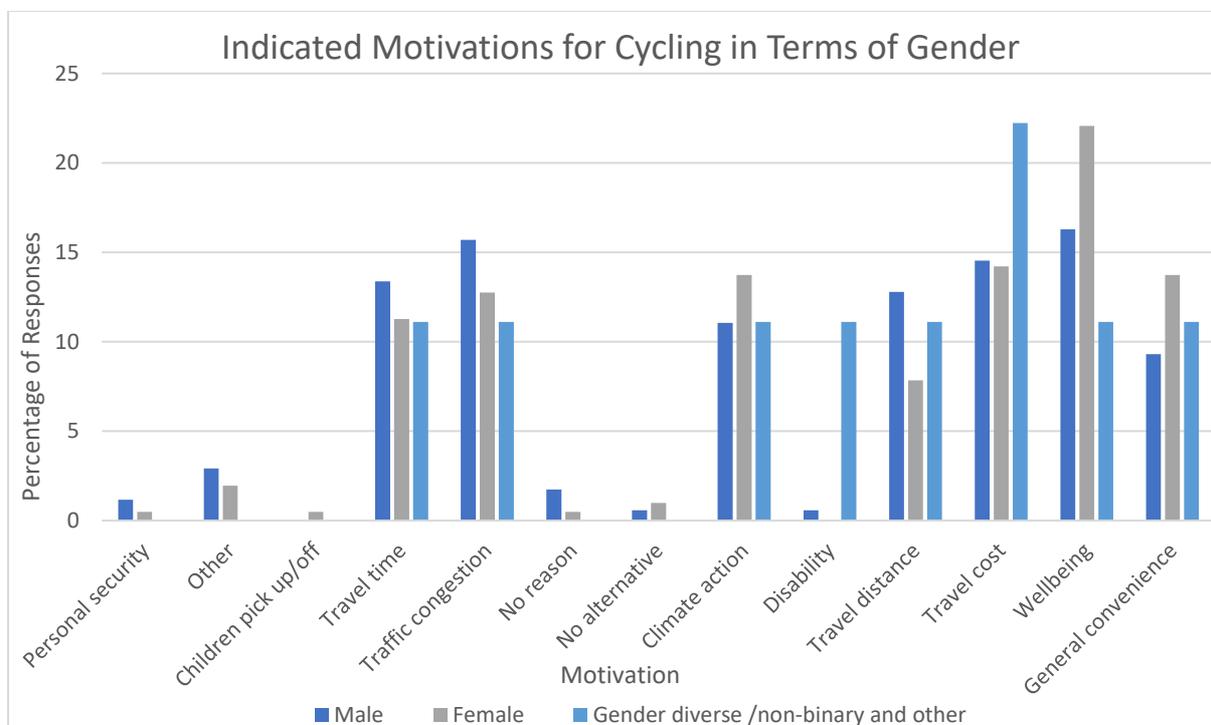


Figure 2: Indicated Motivations for Cycling in Terms of Gender.

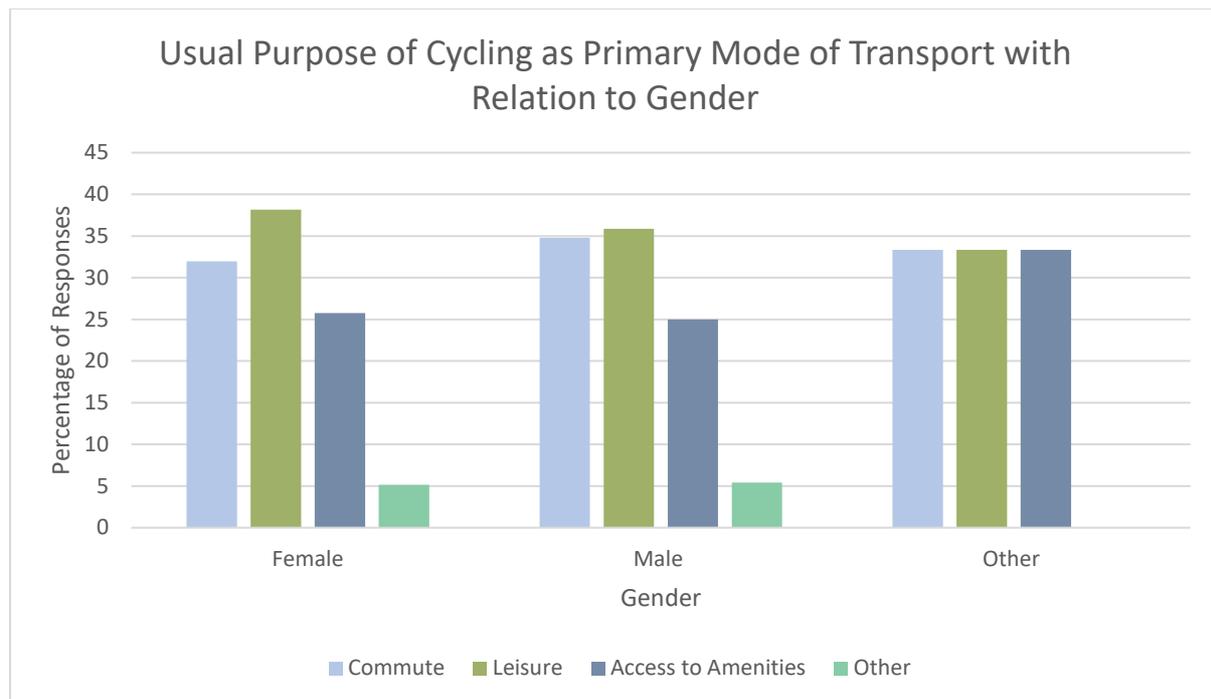


Figure 3: Usual Purpose of Cycling as Primary Mode of Transport with Relation to Gender.

Cycling

For cycling, wellbeing was the most significant motivator for females (n=103) and males (n=87) while those who indicated themselves as ‘other’ showed travel cost to be the most significant motivator (n=3) as seen in Figure 2. Males indicated travel cost, travel time and congestion to be highly motivating factors along with wellbeing. For females and those who indicated themselves as ‘other’, travel cost, climate action, general convenience and congestion were also shown to be highly motivating although wellbeing was by far the most prominent motivator for both these groups. Results showed the main purpose of choosing to bike was for leisure or commuting for females and males followed by access to amenities then ‘other’ reasons (*Figure 3*). For those who indicated their gender as other, all motivations aside from ‘other’ reasons were equal.

Once individuals have purchased a bicycle and required safety equipment, there is very little cost associated with cycling. This makes it accessible to all genders, hence the most prominent motivating factors being travel cost, general convenience, travel time and congestion. Cycling allows for users to move through traffic with relative ease, often making it the ideal choice for those who do not wish to spend time in traffic. Cycling is a form of active transport that requires significant physical activity. It is therefore a very accessible form of exercise for individuals who wish to increase their overall wellbeing, without taking time out of their day to attend a gym class or complete an alternative form of exercise. This is reflected in wellbeing being a prominent motivating factor for all genders. It did not appear that social status impacted upon any of the gender’s choice to cycle. Unfortunately, infrastructure and safety can impact upon some individuals' choice to cycle. For women, it is more likely that a lack of adequate infrastructure, and the associated safety risks will be a discouraging factor. This is reflected in the survey results, as seen in Figure 1, as a higher proportion of men chose cycling as their primary transport mode than any other gender. Literature conveys that women are more likely to change their lifestyle choices to combat the threat of climate change. Climate action was consequently a higher priority for women than other genders.

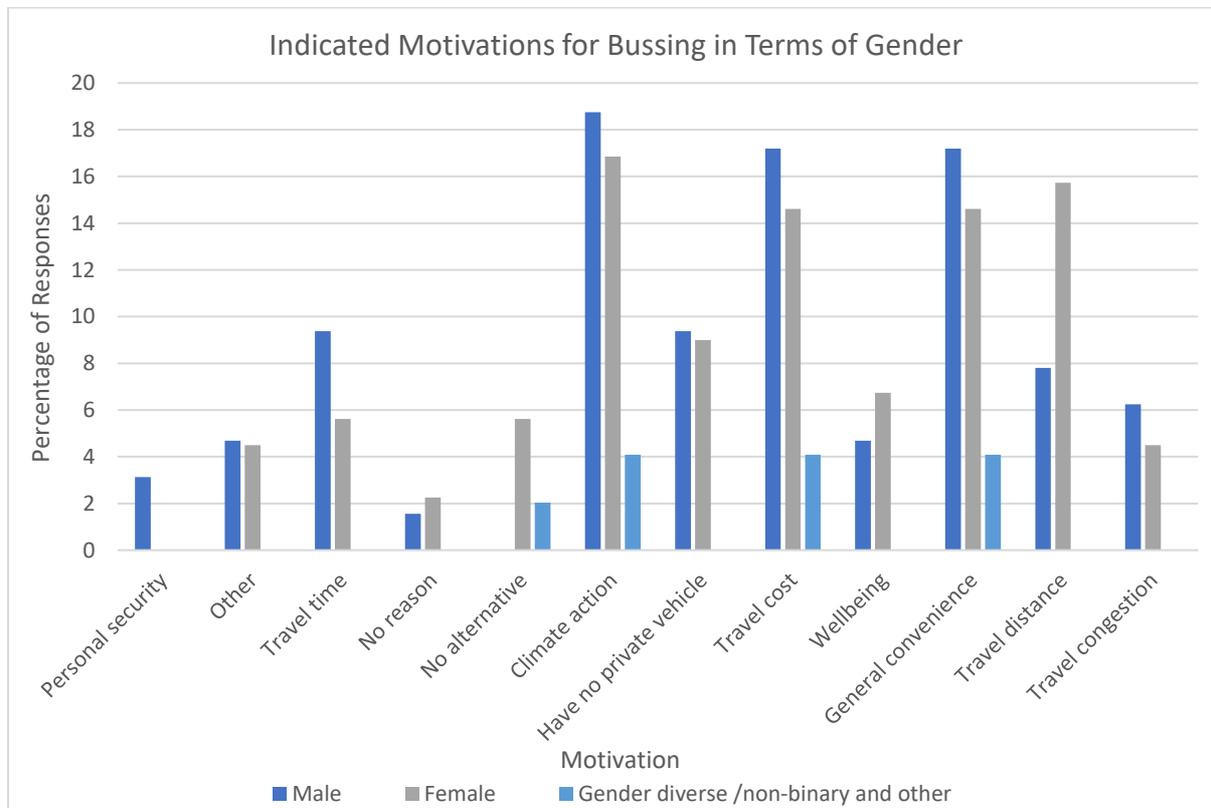


Figure 4: Indication Motivations for Bussing in Terms of Gender.

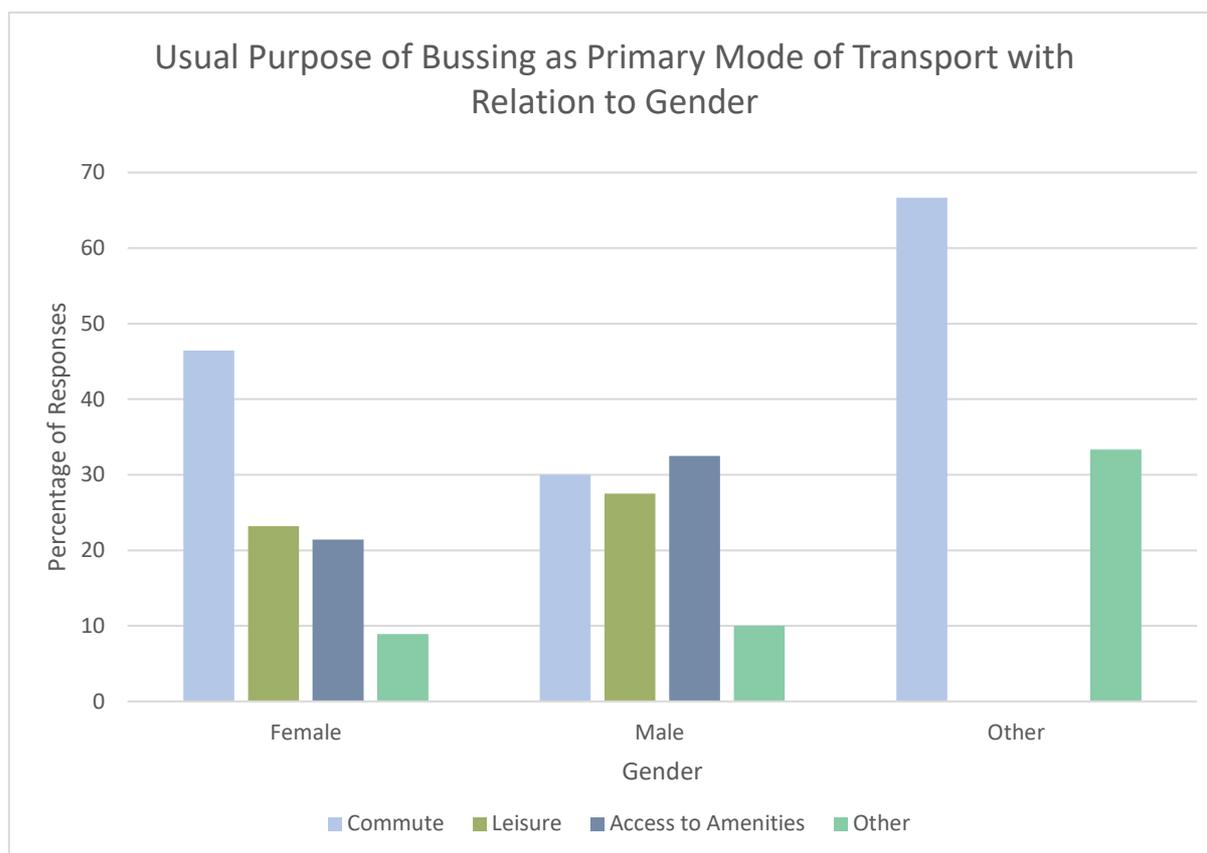


Figure 5: Usual Purpose of Bussing as Primary Mode of Transport with Relation to Gender.

Bussing

When asked why participants chose to use the bus system for transporting, males (n=87), females (n=103) and those who indicated themselves as ‘other’ (n=3) all indicated the most prominent motivators to be travel time, general convenience and climate action (*Figure 4*). For all these categories the percentage of participants who indicated them as a significant motivator was around equal within genders. When asked why they chose to use busses, females and those who indicated themselves as ‘other’ or gender diverse indicated the most common use to be for commuting (*Figure 5*). For males access to amenities was the most frequent use closely followed by commuting and leisure.

Theoretically, all genders have equal access to the public bus system in Ōtautahi Christchurch. However, there is a gender disparity in bus use. Females and ‘other’ were more likely to use the bus for commuting, which somewhat suggests that this is out of necessity, especially when compared with males who often chose the bus for leisure or access to amenities. Existing literature on the topic suggests that women may choose to use the bus as this is often a more affordable option. However, from the survey results, a higher proportion of ‘other’ and male

participants choose the public bus system than females for travel cost, perhaps due to the high bus fares in Ōtautahi Christchurch. In terms of social status, the survey results reflect existing literature. In many societies, those who identify as male are less likely to bus because they view it as being of a lower status. Within the Ōtautahi Christchurch area, the bus has been anecdotally described as the ‘loser cruiser’, which may contribute towards male apprehension about taking the bus. It is emphasized within the existing literature that infrastructure and safety are limiting factors towards female engagement with the public bus system. This is somewhat reflected within the survey results, as no female participants selected ‘personal security’ as a reason for choosing the public bus system. However, climate action was selected by all genders as being a motivator for bus use. This conveys that most participants perceive the public bus system to be environmentally friendly. As Environment Canterbury is working to increase bus user rates, it is positive that participants have the perspective that this option is sustainable.

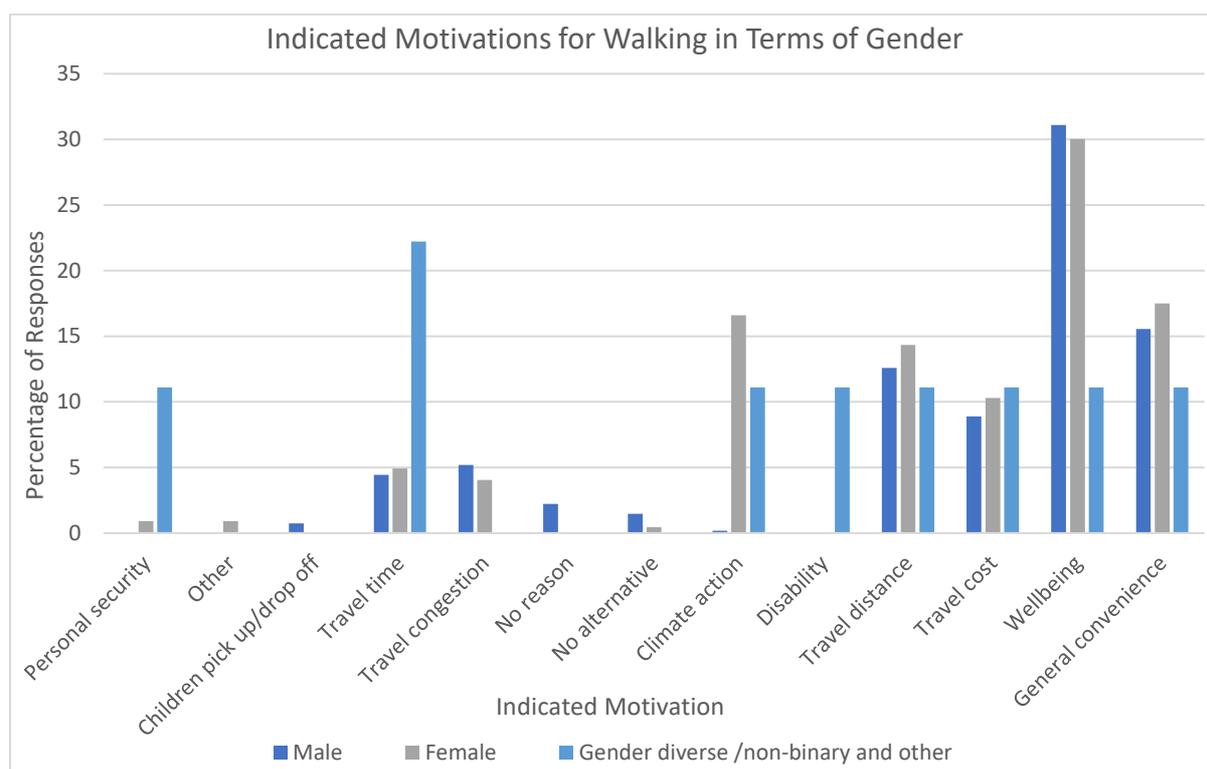


Figure 6: Indicated Motivations for Walking in Terms of Gender.

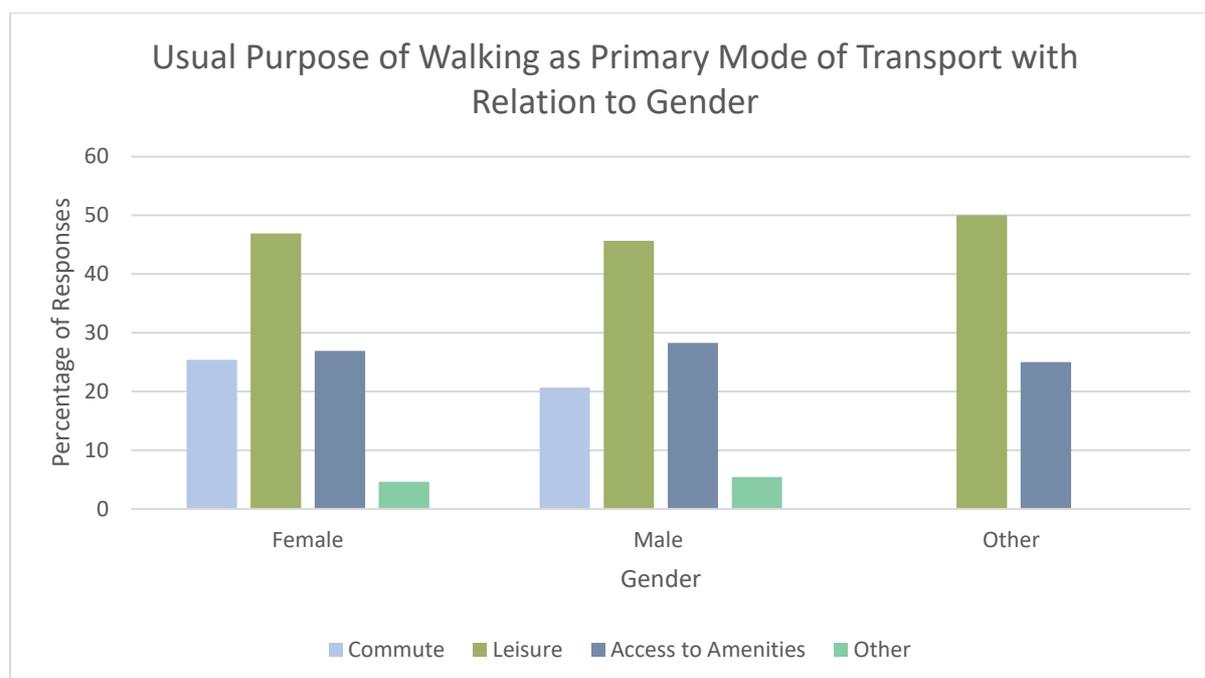


Figure 7: Usual Purpose of Walking as Primary Mode of Transport with Relation to Gender.

Walking

As seen in Figure 6, both female (n=103) and male (n=87) participants indicated the most common use for choosing walking as a mode of transport was wellbeing followed by climate action and general convenience. Those who categorized themselves as other than female or male (n=3) indicated that the most prominent motivation was equal between climate action, disability, travel distance, travel cost, wellbeing and general convenience. This is likely due to the small sample size. For all genders leisure was the primary indicated purpose for walking as a mode of transport followed by access to amenities (Figure 7).

For some individuals, walking is a challenging mode of active transport. For those with disabilities, accessibility can be limited. However, some of the results from the survey conducted contrast this (Figure 6). Those who identify as ‘other’ selected ‘disability’ as one of their primary reasons for choosing to walk. The relationship identified here is contradictory to the existing literature, although it should be noted that ‘other’ only contributed a small number of participants to the study population, so conclusions cannot be made from this survey. It should also be noted that this gender demographic is highly underrepresented within the existing literature. Infrastructure is unlikely to be a motivating factor towards participants' choice to walk. Unlike the other modes of active transport that were studied, general convenience, travel cost and travel distance were not highly motivating factors behind the

decision to walk. In all gender categories, the primary use of walking was for leisure. This suggests that individuals simply choose to walk for their overall wellbeing, rather than it being a necessity in their lives. Wellbeing is identified strongly as being the largest motivator behind walking within the survey results. This is followed by climate action, suggesting that for those who do need to commute or access amenities, walking is chosen rather than required. Personal security is only selected by those who identify as ‘other’, suggesting that safety may be a limiting factor for other genders. Further study in this area would be useful to determine if the time of day impacted upon participants' safety surrounding walking. It is likely, based on existing literature, that those who identify as woman or other would be more likely to feel unsafe walking at night, especially when there is limited infrastructure.

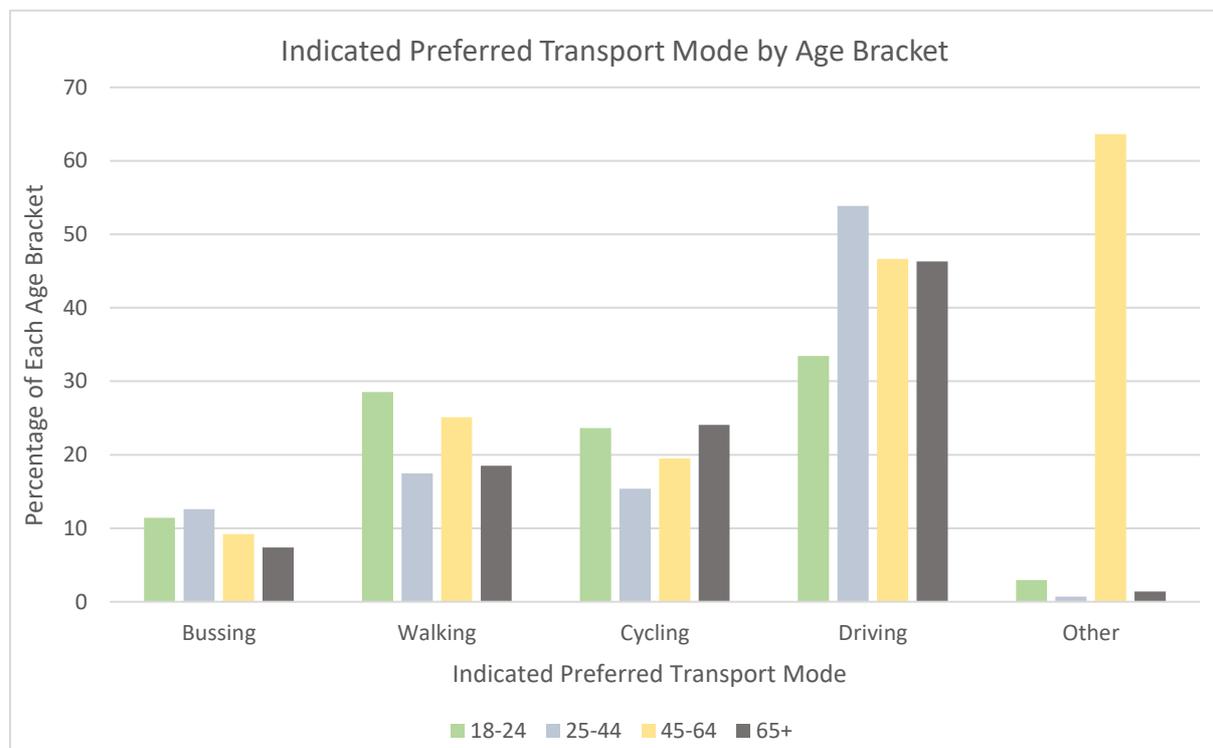


Figure 8: Indicated Preferred Transport Mode by Age Bracket.

Age Group

It was proposed by the community partner that the age group of the survey participants may impact their chosen mode of transport and whether they think this choice is impacted by climate change. Figure 8 shows the percentage of each age bracket which selected each mode of transport as their preferred. Ages 18 to 24 (n=100) showed an almost even spread between walking, cycling and driving with slightly less choosing bussing as their primary mode and a very small percentage indicating 'other' as their primary mode. Participants who indicated their age group as 25 to 44 (n=33) tended to prefer driving as a transport mode followed by walking, cycling and bussing at similar percentages with 'other' transport modes showing only a very small percentage. The age group 45 to 64 (n=45) had an interesting spike in 'other' transport modes with it being the most preferred transport mode. This was followed by driving, walking then cycling with bussing being the least preferred transport mode. Finally the age group 65 plus (n=12) showed similar results to that of the 45 to 64 age group without the unusual 'other' transport mode spike with driving being the most preferred followed by walking, cycling then bussing with the least percentage indicating it as their preference. These results show that age could be a factor influencing the results. This area should be explored in further studies.

Policy Recommendations

Changing regulations to improve road safety for active transport complies with the data and indicates that safety was a major issue regarding active transport (Mandic et al., 2019). Implementing cameras near bus stops, providing efficient lighting and opening cafes/kiosks near bus stops, these are just some examples of how road safety can be improved to promote active transport use. Making public transport more accessible and affordable can allow a wider range of people to use the bus as it was found that the survey participants believe that the bus fares should be subsidised as the current fares are quite expensive (Mandic et al., 2019). Within Ōtautahi Christchurch, the fares for adults range from \$2.65 to \$15.00 (Metro, 2021). A partial subsidy on these fares could incentivise more people to use the bus as an active transport mode. Designing and transforming the city for people will encourage positive health and environment outcomes (Mandic et al. 2019). The promotion of active transport can encourage positive health outcomes for individuals. Building nearby facilities within neighbourhoods which have a lack of facilities, can incentivise active transport use thus reducing carbon emissions.

Conclusion

The survey results demonstrated the gender perceptions and motivations behind active transport use. The existing literature of five sub-themes, including accessibility, social status, infrastructure, climate change, and safety, has been sufficiently reflected and interconnected to the gendered differences in perceptions. The results convey that improving the active transport system in Ōtautahi Christchurch will empower women to engage in active transport without safety concerns as well as positively impacting on their health and environment outcomes. A limitation of this research was the underrepresentation of those who identify as gender-diverse or other. A possible extension of this research could include an analysis of how the time of day influences individuals safety perceptions of active transport. Results from this research can be applied to future transport policy to improve public physical and mental health, with regard climate change.

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References

- Anderson, C., Kraus, M. W., Galinsky, A. D., & Keltner, D. (2012). The local-ladder effect: Social status and subjective well-being. *Psychological Science, 23*(7), 764-771.
<https://doi.org/10.1177/0956797611434537>
- Camp, A. (2013). Closing the bicycling gender gap: The relationship between gender and bicycling infrastructure in the nation's largest cities.
- Canterbury District Health Board. (2016). *Active and public transport infrastructure: a public health perspective*. Retrieved from <https://www.cph.co.nz/wp-content/uploads/ActivePublicTransportInfrastructureReview.pdf>
- Chowdhury, S., & van Wee, B. (2020, 2020/08/01/). Examining women's perception of safety during waiting times at public transport terminals. *Transport Policy, 94*, 102-108. <https://doi.org/https://doi.org/10.1016/j.tranpol.2020.05.009>
- Christchurch City Council. (2020, September). *Transport survey results*.
<https://ccc.govt.nz/the-council/how-the-council-works/reporting-and-monitoring/life-in-christchurch/transport>
- Coughlan, M., Cronin, P., & Ryan, F. (2009). Survey research: Process and limitations. *International Journal of Therapy and Rehabilitation, 16*(1), 9-15.
<https://doi.org/10.12968/ijtr.2009.16.1.37935>
- Dixit, M., & Sivakumar, A. (2020). Capturing the impact of individual characteristics on transport accessibility and equity analysis. *Transportation research part D: transport and environment, 87*, 102473.
- Fitt, H. (2018). Habitus and the loser cruiser: How low status deters bus use in a geographically limited field. *Journal of Transport Geography, 70*, 228-233.
<https://doi.org/10.1016/j.jtrangeo.2018.06.011>

Gomez, B., & Jones, J. P. (2010). *Research methods in geography: a critical introduction*. Wiley-Blackwell. <https://go.exlibris.link/Bkhh1YSv>

Emami, L. (2020). Pursuing Women-Empowerment in the Public Transport System: A case study in Sweden. In.

Huda, M. N. (2013). Understanding indigenous people's perception on climate change and climatic hazards: A case study of chakma indigenous communities in rangamati sadar upazila of rangamati district, bangladesh. *Natural Hazards*, 65(3), 2147-2159. <https://doi.org/10.1007/s11069-012-0467-z>

Kennedy, D., & Land Transport NZ. (2008). *Personal security in public transport travel in new zealand: Problems, issues & solutions*. Land Transport New Zealand.

Krizek, K. J., Johnson, P. J., & Tilahun, N. (2005). Gender differences in bicycling behavior and facility preferences. *Research on Women's Issues in Transportation*, 2, 31-40.

Levy, C. (2013). Travel choice reframed: "deep distribution" and gender in urban transport. *Environment and Urbanization*, 25(1), 47-63.

Mandic, S., Jackson, A., 1964, Lieswyn, J., Mindell, J., García Bengoechea, E., Spence, J. C., Wooliscroft, B., Wade-Brown, C., Coppell, K., Hinckson, E., & University of Otago. (2019). *Key policy recommendations for active transport in new zealand*. University of Otago.

McMeekin, N., Wu, O., Germeni, E., & Briggs, A. (2020, 2020/06/30). How methodological frameworks are being developed: evidence from a scoping review. *BMC Medical Research Methodology*, 20(1), 173. <https://doi.org/10.1186/s12874-020-01061-4>

Metro. (2021). *Fares*. <https://www.metroinfo.co.nz/travel-and-fares-info/fares/>

Queirós, A., Faria, D., & Almeida, F. (2017). Strengths and Limitations of Qualitative and Quantitative Research Methods. *European Journal of Education Studies*, 0. Doi:<http://dx.doi.org/10.46827/ejes.v0i0.1017>

Scheepers, C. E., Wendel-Vos, G. C. W., van Kempen, E. E. M. M., de Hollander, E. L., van Wijnen, H. J., Maas, J., den Hertog, F. R. J., Staatsen, B. A. M., Stipdonk, H. L., Int Panis, L. L. R., van Wesemael, P. J. V., & Schuit, A. J. (2016). Perceived accessibility is an important factor in transport choice — results from the AVENUE project. *Journal of Transport & Health*, 3(1), 96-106. <https://doi.org/10.1016/j.jth.2016.01.003>

Showalter, K., López-Carr, D., & Ervin, D. (2019). Climate change and perceived vulnerability: Gender, heritage, and religion predict risk perception and knowledge of climate change in hawaii. *The Geographical Bulletin* (Ypsilanti, Mich.), 60(1), 49-71.

Singer, P. (2021, August 22). *ethics*. Encyclopedia Britannica. <https://www.britannica.com/topic/ethics-philosophy>

Stroh, L. K., Brett, J. M., & Reilly, A. H. (1996). Family structure, glass ceiling, and traditional explanations for the differential rate of turnover of female and male managers. *Journal of Vocational Behavior*, 49(1), 99-118. <https://doi.org/10.1006/jvbe.1996.0036>

Xu, A., Baysari, M. T., Stocker, S. L., Leow, L. J., Day, R. O., & Carland, J. E. (2020, 2020/10/02). Researchers' views on, and experiences with, the requirement to obtain informed consent in research involving human participants: a qualitative study. *BMC Medical Ethics*, 21(1), 93. <https://doi.org/10.1186/s12910-020-00538-7>

Appendix

Qualtrics Survey

Kia ora,

You are invited to participate in a research study on the impact of gender on transport choices and decisions. This study is being conducted by Luca Ware, Grace Stapleton, Sarika Ramola, Ilfaaz Huk and Kug Lee from the University of Canterbury | Te Whare Wānanga o Waitaha. This survey will help to identify varied motivations, needs and perceptions about how we travel. The results will help develop policies and communication strategies that will encourage the update of different transport modes. The survey involves answering a series of questions about the different transport modes you might use to get around. Completing the survey should take around 10 minutes.

Who can I contact if I have any questions or concerns?

If you have any questions about the research, please contact Grace Stapleton, gks46@uclive.ac.nz, and if you have any concerns please contact Dr Lindsey Conrow at lindsey.conrow@canterbury.ac.nz. This study has been reviewed and approved by the University of Canterbury Human Research Ethics Committee (HREC). If you have concerns or complaints about this research, please contact the Chair of the HREC at human-ethics@canterbury.ac.nz.

Statement of consent

I have read the study information and understand what is involved in participating. By completing the survey and submitting my responses, I consent to participate.

You must click the consent button below to access the survey questions.

- I agree to consent and am over the age of 18.

Skip logic :

If I agree to consent and am over the age of 18 is not selected= End of the survey

First section

What is your usual travel mode to your destination? Please specify what each was used for:

	Commute	Leisure activity	Access to amenities	Other
Bus	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Walk	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cycling	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Car	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other <input type="text"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Allow multiple answers

Skip logic :

If a car(commute, leisure activity, access to amenities and others) is selected from (what is your usual travel mode to your destination) = link to the car section

Skip logic :

If a bus(commute, leisure activity, access to amenities and others) is selected from (what is your usual travel mode to your destination) = link to the bus section

Skip logic :

If cycling(commute, leisure activity, access to amenities and others) is selected from (what is your usual travel mode to your destination) = link to the cycling section

Skip logic :

If walking(commute, leisure activity, access to amenities and others) is selected from (what is your usual travel mode to your destination) = link to the walk section

What are your main reasons for choosing to drive? Select as many as apply.

- Travel time
 - Travel cost
 - Travel congestion
 - Travel distance
 - General convenience
 - Wellbeing
 - Personal security
 - Children pick up/off
 - Disability
 - Climate action
 - No alternative
 - No reason
 - Other
-

Allow multiple answers

Display this question :
if what is your usual travel mode to your destination? = Car is not empty

Do you ever have difficulty finding a parking space?

I never have difficulty										I always have difficulty	
0	1	2	3	4	5	6	7	8	9	10	
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	

Display this question :
if what is your usual travel mode to your destination? = Car is not empty

How stressed does traffic congestion make you?

Not stressed at all										Highly stressed	
0	1	2	3	4	5	6	7	8	9	10	
<input type="radio"/>											

Display this question :
if what is your usual travel mode to your destination? = Car is not empty

What are your main reasons for choosing to bike? Select as many as apply

- Travel time
- Travel cost
- Travel congestion
- Travel distance
- General convenience
- Wellbeing
- Personal security
- Children pick up/off
- Disability
- Climate action
- No alternative
- No reason
- Other

Allow multiple answers

Display this question :
if what is your usual travel mode to your destination? = Cycling is not empty

How safe do you feel cycling in Christchurch?

Not safe at all									Completely safe	
0	1	2	3	4	5	6	7	8	9	10
<input type="radio"/>										

Display this question :
if what is your usual travel mode to your destination? = Cycling is not empty

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What, if anything, makes you feel unsafe when cycling? Select as many as apply

- Lack of cycle lane
- Other aggressive road user
- Private vehicle-centric infrastructure
- Street parking
- Lack of traffic lights for cyclists
- Harassment
- Other
- Nothing makes me feel unsafe

Allow multiple answers

Display this question :

if what is your usual travel mode to your destination? = Cycling is not empty

What, in general, do you think needs to improve/change to support cycling? Select as many as apply

- Safer cycle routes
- More cycle routes
- More cycle storage facilities
- Security from the bicycle theft
- Road conditions (e.g., potholes, shoulder debris)
- Subsidy to purchase a bicycle
- More shower/changing facilities at destinations
- Other
- Nothing needs to change

Allow multiple answers

Display this question :

if what is your usual travel mode to your destination? = Cycling is not empty

What are your main reasons for using the bus? Select as many as apply

- Travel time
- Travel cost
- Travel congestion
- Travel distance
- General convenience
- Wellbeing
- Personal security
- Children pick up/drop off
- Disability
- Have no private vehicle
- Climate action
- No alternative
- No reason
- Other

Allow multiple answers

Display this question :
if what is your usual travel mode to your destination? = Bus is not empty

How safe do you feel for using the bus?

- | Not safe at all | | | | | | | | | | Completely safe | |
|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|--|
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | |
| <input type="radio"/> | |

Display this question :
if what is your usual travel mode to your destination? = Bus is not empty

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What, if anything, makes you feel unsafe when taking the bus? Select as many as apply

- Poor facilities (e.g., bus stops, bus lounges)
- Poor lighting on streets
- Isolated streets, alleyways, and/or secluded pathways
- Sexual harassment
- Disruptive people (e.g., drunken, intoxicated, noisy people)
- Racism
- Other
- Nothing makes me feel unsafe

[Allow multiple answers](#)

[Display this question :](#)
[if what is your usual travel mode to your destination? = Bus is not empty](#)

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What, if anything, needs to change to improve the experience of the bus users? Select as many as apply

- More frequent bus schedule
- Additional bus routes
- Faster journey times
- Cheaper fares
- Season tickets
- Comfortable modern facilities (e.g., bus stops, lounges)
- Safer environments
- Bus transfer system (e.g., fewer transfers, simpler transfers)
- Other
- Nothing needs to change

[Allow multiple answers](#)

[Display this question :](#)
[if what is your usual travel mode to your destination? = Bus is not empty](#)

What are your main reasons for choosing to walk? Select as many as apply

- Travel time
- Travel cost
- Travel congestion
- Travel distance
- General convenience
- Wellbeing
- Personal security
- Children pick up/drop off
- Disability
- Climate action
- No alternative
- No reason
- Other

Allow multiple answers

Display this question :
if what is your usual travel mode to your destination? = Walking is not empty

How safe do you feel for walking in Christchurch?

Not safe at all											Completely safe
0	1	2	3	4	5	6	7	8	9	10	
<input type="radio"/>											

Display this question :
if what is your usual travel mode to your destination? = Walking is not empty

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What, if anything, makes you feel unsafe when walking? Select as many as apply

- Poor CCTV and police resources
- Poor condition of footpaths and walkways
- Poor lighting on streets
- Isolated streets, alleyways, and/or secluded pathways
- Sexual harassment
- Disruptive people (e.g., drunken, intoxicated, noisy people)
- Racism
- Other
- Nothing makes me feel unsafe

[Allow multiple answers](#)

[Display this question :](#)
[if what is your usual travel mode to your destination? = Walking is not empty](#)

What, if anything, needs to change to improve for walkers? Select as many as apply

- Better footpaths / walkways
- More destinations along the routes (e.g. shops, cafes, diaries, parks etc)
- Bright street lights
- More pedestrian crossings
- Traffic calming
- CCTV covering for pedestrian areas
- Other
- Nothing needs to improve

[Allow multiple answers](#)

[Display this question :](#)
[if what is your usual travel mode to your destination? = Walking is not empty](#)

Second section

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How frequently do you take the bus?

- Less than once a month
 - 1-2 days/month
 - 3-4 days/month
 - 1-2 days/week
 - 3-4 days/week
 - 5 days/week or more
 - I never take the bus
-

What is the approximate distance between your home and the nearest bus stop?

- 0 to 100 metres
 - 100 to 200 metres
 - 200 to 300 metres
 - 300 to 400 metres
 - 400 to 500 metres
 - 500 to 600 metres
 - 600 to 700 metres
 - 700 to 800 metres
 - More than 800 metres
-

How satisfied are you with the bus service quality/service performance? If you have never taken the bus, please rate how satisfied you think you would be with the quality/service performance of the bus service if you were to take it

- | Extremely dissatisfied | | | | | | | | | Extremely satisfied | |
|------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
-

What is dissatisfying about the bus service/performance in Christchurch?

- Delayed often (unreliability)
- Limited bus routes
- Poor transfer system
- Too slow
- Expensive fare
- Unsafe environment
- Noise level
- Cleanliness
- Other

Allow multiple answers

Display this question :
if how satisfied are you with the bus service quality/service performance = Net promoter score(0,1,2)
selected

What improvements would encourage you to take the bus more often?

- Easier to transfer and connect
- Easier to access bus stop
- Lower fares
- Faster trip times
- Fewer schedule delays
- Less transfer waiting time
- More frequent services
- Timetable information that is easier to access/understand
- More safety and security while riding
- Feeling safer while travelling to and from the bus
- Improved driver behaviour
- Better conditions at stops
- Cleaner buses and facilities
- Improved odour and temperature on bus
- Easier to obtain a Metrocard
- E-payment capability (rather than cash or Metrocard)
- Other

Allow multiple answers

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In your opinion, what are some reasons people choose not to use active transport modes(walking, cycling, busing) in Christchurch?

- Poor transport infrastructure
- Feeling unsafe
- Cost is too high
- Negative stigma around certain modes
- Concerns regarding social status
- Poor accessibility for amenities (i.e., people can't get to the places they want to go)
- Poor accessibility to facilities (i.e., people live too far from bus stops, cycleways, or places to walk)
- Cultural behaviour / norms
- Other

[Allow multiple answers](#)

In what ways has COVID-19 affected your transport mode use and choice? Select as many as apply

- I take fewer trips overall
- I take more trips overall
- I have changed my primary transport mode
- My transport mode has become less expensive
- My transport mode has become more expensive
- I feel less safe on my transport mode
- I feel safer on my transport mode
- I now work (mostly) from home
- It has not changed my transport mode at all

[Allow multiple answers](#)

How much does your choice of transport mode reflect your social status?

Not at all reflective											A great deal, completely reflective
0	1	2	3	4	5	6	7	8	9	10	
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

How much do cultural norms impact your transport choices?

Not at all											A great deal
0	1	2	3	4	5	6	7	8	9	10	
<input type="radio"/>											

How much does concern for climate change impact your transport choices?

Not at all											A great deal
0	1	2	3	4	5	6	7	8	9	10	
<input type="radio"/>											

Third section

Next, we would like to ask you a few questions about yourself. This assists us in ensuring the representativeness of our survey. Feel free to skip any questions you do not wish to answer.

Gender: how do you identify?

- Male
 - Female
 - Gender diverse / non-binary
 - Unsure
 - Other (please specify)
 - Prefer not to answer
-

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What is your age?

- Less than 18 years old
 - 18 to 24 years old
 - 25 to 44 years old
 - 45 to 64 years old
 - 65 years or older
 - Prefer not to answer
-

What is your ethnic group(s)?

- New Zealand European / European
- Māori
- Pacific Peoples
- Asian
- MELAA (Middle Eastern, Latin American and African)
- Other ethnicity
- Prefer not to answer

[Allow multiple answers](#)

In which Christchurch suburb do you live?

- Please specify
 - Prefer not to answer
-

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What is the highest level of education you have completed?

- High school
 - Diploma
 - Bachelor's degree
 - Postgraduate or higher
 - Trade school
 - Apprenticeship
 - Other
 - Prefer not to answer
-

What is your occupation status?

- Student
- Employed - full time
- Employed - part time
- Employed - work from home most days (full or part time)
- Unemployed
- Retired
- Prefer not to answer

[Allow multiple answers](#)

What is your annual income?

- Less than \$25,000
- \$25,000 - \$50,000
- \$50,000 - \$100,000
- \$100,000 - \$200,000
- Prefer not to answer

We thank you for your time spent taking this survey.
Your response has been recorded.
If you missed the consent button on the first page, you can refresh and engage it again.

-End of the survey-