

Urban Cycling Project (CityStudio)

Investigating the Influences for Cycling Behaviour in Older Adults

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KIN 464: Health Promotion

Executive Summary

The “Urban Cycling Project” is designed to investigate the influencing factors for cycling behaviour in older adults. This project is designed by Kinesiology students at the University of British Columbia, with supervision by City Studios and Dr. Andrea Bundon. In this project, the researchers conducted semi-structured interviews with older adults in the Greater Vancouver area in order to gain insight on how the city can improve existing bike routes to promote and increase their use. During the mentioned interviews, the participants – older adults (ages 65 and over), were asked about their perceptions of safety and comfort with regards to the existing bike routes. This study followed a qualitative methodology, and all the participants were asked about the same broad topics.

The main findings of this project were regarding safety, and two key sub-themes arose: the continuity of the bike routes, and shared road use between pedestrians, cyclists and motorists. The findings also indicated that the majority of participants (4/5) refused to ride on major thoroughfares and would consider route safety above all other factors when choosing to cycle for physical activity or active transport. Our findings indicate that older adults may not use much of the city’s existing cycling infrastructure, as it is frequently or intermittently unprotected from traffic.

The main limitation the researchers faced during this study was the minimal number of participants, which was concluded to be due to factors such as weather restrictions and disinterest in the study. The interviews conducted were 30-40 minutes each, and this provided information-rich data for the analysis.

This study found four main recommendations with regards to the current cycling infrastructure in the Greater Vancouver area:

1. An increased amount of physically separated bike lanes in order to ensure consistent safety of both riders and drivers. In addition, the implementation of a resource, such as a map on the City of Vancouver website, which highlights the bike routes as well as information about the current level of safety of the infrastructure.
2. Encourage health-promoting behaviours by creating programs for older adults to be incentivized through their active involvement in cycling and active transport.
3. Pamphlets outlining some common “rules of the road” should be offered to those purchasing a bicycle, similar to the booklet for receiving a driver’s license, or community workshops to inform the public of how to keep everyone safe on the road.
4. Incentives for participating in formal safety refresher courses. Another aspect to this incentive would be discounted bikes and parts. This ties into the culture around cycling around the community and future outlook for alternative means of transport.

Introduction/Literature Review

Cycling infrastructure in healthy cities have the opportunity to improve the health of citizens by lowering traffic congestion and reducing the levels of carbon emissions associated with automobile transport (Bitton, Daddio, & Andrew, 2014). Recreational or transportation-based cycling can be health-promoting, as these facilitate opportunities for integrating physical activity into citizens' daily life (Chodzko-Zajko et al., 2009; Sallis, Frank, Saelens, & Kraft, 2004). The Canadian federal government reinstated 65 as the eligible age for Old Age Security (OAS) (Jackson, Clemens, & Palacios, 2017). Canadian 'older adults' represent a growing proportion of the total population landscape. Based on census data, the percentage of Canadian 'older adults', aged 65 and above, is projected to increase from under 15% (2010) and reach 25% of the total population in the year 2063 (Jackson et al., 2017; Statistics Canada, 2017). Creating opportunities for older adults to engage in health-promoting physical activity may have a two-fold influence on the health promotion of this particular demographic (De Hartog, Boogard, Nijland, & Hoek, 2010; Garrard, Rissel, & Bauman, 2012). Just under two thirds of Canadian adults are considered overweight or obese (Statistics Canada, 2014), and there is strong belief that the health benefits attributed to physical activity can be influential influencing such statistics in older adult populations (Jackson et al., 2016; Kelly et al., 2014; World Health Organization, 2010). The promotion of physical activity in older adult populations may help dilute costs associated with healthcare spending (Philp, 2007; Pratt, Macera, & Wang, 2000), as per-person spending estimates are shown to be 4.4 times greater for older adult populations than younger populations (15-64) (Jackson et al., 2017). Canadian trends point toward an increase in the 'older adult' population (Statistics Canada, 2017), and therefore a predictable increase in healthcare spending may be associated with this trend (Jackson et al., 2017). Health-promotion strategies, such as developing cycling infrastructure, which aims to reduce overall costs associated with healthcare spending (Philp, 2007; Pratt, Macera, & Wang, 2000), must address the needs of 'older adults', as the relative impact of their healthcare expenses are predicted to increase (Jackson et al., 2017). The older adult population is increasing relative to the Canadian population as a whole (Jackson et al., 2017), and it is important to address the specific needs of 'older adults' when designing and constructing cycling infrastructure for All Ages and Abilities

(AAA). It has been demonstrated that the needs and limiting factors influencing ridership will vary greatly based on age (Van Cauwenberg et al., 2018). Research has shown that some factors which do not hinder younger adults are significant deterrents for older adult – primarily factors surrounding rider safety (Simons et al., 2014; Yen, Fandel Flood, Thompson, Anderson, & Wong, 2014). Younger cyclists may often under-evaluate the safety risks which are concerning to older adults (Van Cauwenberg et al., 2018; Winters, Sims-Gould, Franke, & McKay, 2015; Zander, Passmore, Mason, & Rissel, 2013). Thus, designing cycling infrastructure with the safety needs of older citizens in mind may best encompass the needs of all cyclists. Infrastructure and design can facilitate ridership in ‘older adult’ populations by controlling traffic speeds, creating safe street crossings, and more importantly creating bike routes which are completely separated from traffic (Van Cauwenberg et al., 2018). Perceived safety can be improved through effective cycling infrastructure, road design, and consistent maintenance of existing routes (Van Cauwenberg et al., 2018). In light of Vancouver’s Transportation year 2040 goals of designing safe, fun, convenient, and comfortable infrastructure for children, seniors, and people new to cycling (Bracewell, 2014) a panacea one-size fits all approach for (AAA) may not adequately or equitably encompass the safety needs of the growing population of ‘older adults’ looking to adopt cycling for health-promotive purposes (Van Cauwenberg et al., 2018).

Methods and Rationale

The purpose of this study is to determine how older adults perceive bike routes with regards to safety and comfort. Are there barriers that are preventing this group from participating? Can we make bike routes more accessible and inclusive?

The methodology from this study follows a qualitative design. We are gathered qualitative information, data in the form of words, by conducting semi-structured interviews (Thomas, Nelson & Silverman, 2015). All participants were asked about the same broad topics but focused more on some areas by asking follow up questions which allowed us to capture context within the individual experiences (Thomas et al., 2015). We engaged with older adults, ages 65 and over, who reside in the Greater Vancouver area to discuss this topic. We collected data from different areas around Vancouver that were nearby major bike routes such as Creekside Community Center and UBC’s BodyWorks gym. A total of 5 participants, 4 males and 1 female, were interviewed through random sampling. A consent form was provided to each

participant (see Appendix C). Participants were then recorded with a voice recorder in order to collect data which was transcribed after the interview. This process allows for the participants to remain anonymous. We then used thematic analysis to explore concepts, experiences and phenomenon amongst the group of participants (Braun & Clarke, 2006; Thomas et al., 2015). The data that we collect from the semi-structured interviews was organized into themes and interpretation was used in this type of analysis (Thomas et al., 2015; Braun & Clarke, 2006). Audio trails were used to record each step performed in the research process (Thomas et al., 2015). To ensure confirmability, peer debriefing occurred where the research team discussed how data was analysed amongst peers (Thomas et al., 2015).

This study holds critical worldview that drives a relativist ontology; this means that we acknowledge that there may be many possible truths (Thomas et al., 2015). Each person we interview will have their own truth due to social and historical context of the individual. Epistemology is the conscious and unconscious questions, assumptions and beliefs that the researcher brings into the research (Thomas et al., 2015). The epistemology of a criticalist is a subjectivist who understands that the researchers cannot separate themselves from the research project (Thomas et al., 2015). The researcher has effects upon the environment due to influence from experience, cultural, emotional, social and personal factors (Thomas et al., 2015). There is an understanding that confounding variables from the researcher may still be present. The theoretical worldview provides background of how the data will be interpreted, analysed and understood by the researcher (Braun & Clarke, 2006).

The city of Vancouver has spent a significant amount of funds on developing and improving the cities main bike routes to make them more safe and accessible to all ages. However, recent studies suggest that these bike routes are mainly used by teens and younger adults, and only 26.9% of adults over the age of 50 years biked in the last 12 months (Statistics Canada, 2014). Furthermore, 79.2% of senior men and 43.8% of senior women in Canada use cars as their primary form of transportation (Statistics Canada, 2009).

The purpose of this study is to conduct semi-structured interviews with seniors (older adults aged 65 and above) in the Greater Vancouver area in order to gain more insight regarding what ways the city of Vancouver can improve the existing bike routes to promote and increase the use of these routes by mentioned population. Previous studies suggest that older adults prefer

bike lanes that are completely separate from motorized traffic, with clearly visible lines, and free of obstacles (Van Cauwenberg et al., 2018).

This study focuses on gaining more insight with regards to the older adult population of the Greater Vancouver area. The age range (65 and above) is chosen due to City Studios naming seniors as one of the less present population in the new bike routes. Stats Canada categorizes seniors as older adults aged 65 and above (Statistics Canada, 2009).



(Northwest Prime Time, n.d.)

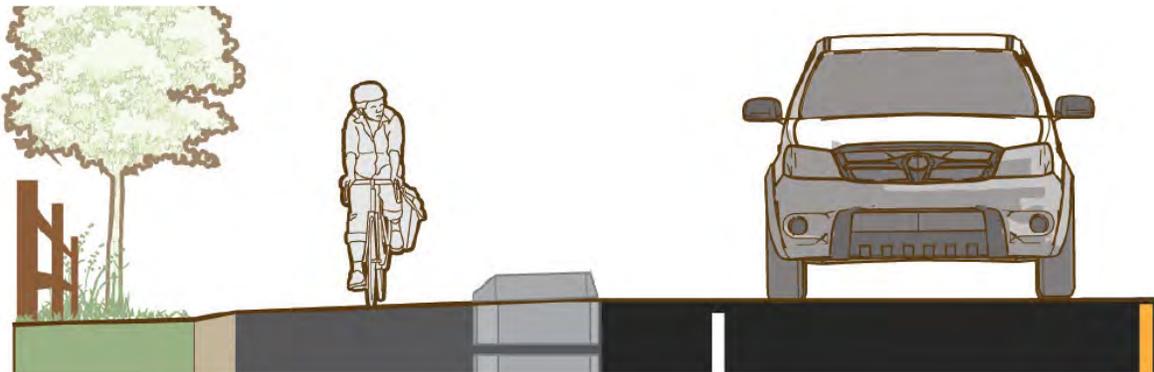
Findings

Participant interviews followed the phases of thematic analysis described by Braun & Clarke (2006). Data was transcribed verbatim, and initial broad codes were generated from the transcribed interviews to highlight the data which stood out (Clarke & Braun, 2006). Phase three solidified the overarching theme brought up by our research (Clarke & Braun, 2006) – ‘safety’ – due to the high recurrence of this theme in each of our interviews with participants and in most avenues of dialogue. It was clear from all five interviews that for cycling to be adopted routinely it is paramount that the safety concerns of older adults need to be better addressed by city initiatives and cycling infrastructure. For example, even when interviewed about their favorite part of Vancouver’s cycling infrastructure, participants would often even be prompted to recall safety concerns associated with their favorite routes. Two key sub-themes were brought up under the overarching theme of ‘safety’: (1) cycling infrastructure and design: building protected, continuous, and user-friendly routes, and (2) invest in education and culture relevant to promoting cycling.

(1) Cycling Infrastructure and Design

All five participants actively voiced that a complete sense of safety while riding was only achieved when routes were fully separated from other road users. Participants voiced opinions that routes completely separated from traffic or routes where cyclists were

completely separated from other road users (for example by cement barriers) were the routes that provided a full sense of protection and safety through design. Four of five participants defined themselves as cyclists who by no means would ride on major thoroughfares, due to safety concerns. Continuous routes – preferably those separated from other road users – were described as those which were the most effective at engaging participants in health-promotive physical activity along Vancouver’s cycling infrastructure. Participants also frequently described a sense of decreased safety when faced with discontinuities or variance in the level of safety provided by a bike path. We believe that continuous and safely separated cycling infrastructure and design are key for future developments in Vancouver in order to promote cycling towards populations of riders which can be considered more vulnerable.



(U.S. Department of Transportation Federal Highway Administration, 2016)

(2) Invest in Education and Culture Relevant to Promoting Cycling: Sharing Road Space and Creating Policy for Cycling Culture

The second sub-theme of ‘safety’ was surrounding the elements of education and creating a culture accommodating upkeep and maintenance of daily cycling. All five participants voiced concerns surrounding the shared road use (pedestrians, cyclists, and motorists), and all five participants voiced concerns that all three road users may at times operate according to their own ‘set’ of rules. Cyclists make ‘rolling stops’ at stop signs and pedestrians ‘J-walk’ – soon prompting dialogue about steady tensions and conflicts which occur between various road users. Participants were all in favor of increased accountability on behalf of the road-user (regardless of form of transportation) and increased availability of information and education which might

promote better shared use of road space. For example, several participants noted that the exact rules regarding roundabouts were somewhat unclear as motorists (in cars) and that the rules were even less clear when all three forms of road users are engaged in the roundabout. Participants frequently mentioned that while cycling infrastructure could promote their physical behavior there were elements of culture which made cycling less favorable. Participants frequently mentioned that increased access to safe and accessible bike storage or lockers as well as policies promoting showers in workplaces and new buildings, so that commuting by bike would be more favorable and comfortable.

Discussion

Results from our thematic analysis identified safety concerns as the primary factor influencing adoption of cycling in older adult populations. Safety concerns were further grouped into being based on the physical constructs of the cycling infrastructure (1) or being factors based in the environment of the cyclist and the interactions with other road users (2). The findings echo the research of Van Cauwenberg et al. (2018) who found that older adults were deterred to cycle due to factors such as safety, and younger cyclists were likely deterred by variables such as distance and duration – safety was of less concerns to younger riders (Van Cauwenberg et al., 2018). Younger cyclists appear to evaluate safety and risk less acutely than older adult cyclists (Van Cauwenberg et al., 2018), and this might be beneficial when designing of cycling infrastructure for all ages and abilities (AAA). The findings showed that 4/5 participants interviewed would refuse to ride on major thoroughfares and would consider route safety above all other factors when choosing to cycle for physical activity or active transport. This data shares some evidence that – due to factors surrounding perceived safety and risk – older adults are likely not using much of the existing cycling infrastructure which is frequently or intermittently unprotected from traffic.

Our study faced several challenges or limitations. For example, we were able only to recruit the bare minimum (5) of participants, yet our interviews with our participants were adequate in length – exceeding 20 minutes, some as long as 30-40 minutes – providing us with information-rich data for our later analysis. While our data was rich, our small pool of participants is a factor impacting the application of our findings to a larger scale - future city initiatives for cycling infrastructure. Our research project might be conducted on a larger scale,

and a larger scale project with more participants would provide significantly better insight into our research question: how to influence older adults to cycle for active transport or physical activity. While the findings of our study are limited, due to the size of our participant sample, we believe that replicating the study on a larger scale would provide relevant insights for making Vancouver's cycling infrastructure friendlier to riders of all ages and abilities, including older adult cyclists.

Recommendations

1. A common theme that we encountered was the inconsistency of safety measures implemented along bike lanes. We recommend that there should be an increased amount of physically separated bike lanes in order to ensure consistent safety of both riders and drivers. Physically separated routes have been shown to promote the greatest sense of security. Additionally, we recommend the implementation of a resource, such as a map on the City of Vancouver website, not only to highlight the bike routes but also to provide information about the current level of security of the infrastructure. For example, indicating the presence of a division barrier, no division, or where the bike lane starts/end. By providing people with the knowledge, they should be able to feel more confident using the infrastructure.
2. Pamphlets outlining some common "rules of the road" should be offered to those purchasing a bicycle, similar to a booklet for receiving a driver's licence, or community workshops to inform the public of how to keep everyone safe on the road. This will tie into the safety of cyclist and pedestrians alike which was found a common theme from our findings. For example, the image on the right demonstrates Colorado's implementation of this recommendation (Crawford & Weiss, 2015).
3. Encourage health promoting behaviours by creating programs for older adults to be incentivized through their active involvement in cycling and active transport. For example, volunteer-run programs can be implemented promoting cycling for older adults by co-



branding with local cycling companies (such as Norco or Rocky Mountain) to provide group rates on bicycles and bike parts. Similarly, programs can be created to provide incentive to individuals who complete cycling safety programs by remuneration or discounts at local bike shops.

4. Another recommendation would be incentives for participating in formal safety refresher courses. This would be a good incentive for people looking for alternative means of getting around the city while being safer on the road. Another aspect to this incentive would be discounted bikes and parts at participating retail shops for seniors if they can prove they have taken formal safety courses. This ties into the culture around cycling around the community and future outlook for alternative means of transportation.

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Appendix A: Interview Question Guide

What city do you live in?

How old are you?

Do you participate in cycling? If so, why? Physical activity? Transportation? Environmental or Economic reasons? etc.

Do you feel that current bike routes and cycling infrastructure promote to your health?
(Ex: do you use current bike paths/cycling infrastructure (personally: wheeling, waking, etc) for health-promotion purposes or for leisure and recreation)

Do you feel that your health is indirectly promoted through the design of bike routes and cycling infrastructure?
(Ex: increased green space (potted planters on bike routes), safer walkways and paths (less need to be concerned about traffic-related accidents))

Do you feel that current bike routes and cycling infrastructure promote your health indirectly by promoting the health of people and persons in your life or social settings (family, friends, and other persons in your social community) through their own use and shared use of cycling routes and infrastructure?

(Ex: do current cycling routes allow (family members/friends/etc) to visit. Are people in your social circle positively influenced by the use of this infrastructure, and does their influence indirectly promote your health in a positive way; or through social interactions with other route/path users - increased sense of community)

What improvements can be made to current cycling infrastructure and bike routes to directly improve/influence your health-promotion?

(ex: more routes for personal physical activity, recreation, or leisure) or indirectly improve/influence your health (ex: by creating more green spaces, by creating safer spaces for moving by foot/wheels; or by influencing family/friends to socialize/visit more frequently, or by creating an environment where social interactions are facilitated)

Finally, what is your favourite aspect of Vancouver's bike routes and cycling infrastructure?

Appendix D: Thematic Analysis

What city do you live in?

How old are you?

Do you participate in cycling? If so, why? Physical activity? Transportation? Environmental or Economic reasons? etc.

Do current bike routes and cycling infrastructure contribute to your health promotion (through physical activity and movement opportunities)?

- Yes promotive of health through volume of routes
- Investment into initial culture of cycling, which can be a challenge/obstacle for many, but the health benefits will be available in the long-run

Do built environmental aspects of the city's cycling infrastructure (ex: potted planters – green spaces; separated/traffic-calmed bike routes) influence your health?

Are social interactions (either by frequency, length, or quality of interaction) influenced by Vancouver's cycling infrastructure? Do cycling infrastructures facilitate opportunities for civic engagement and socialization?

- Biking with partner/spouse
-

Does Vancouver's current cycling infrastructure address your safety needs when contemplating to (use cycling infrastructure: cycle/walk) for (leisure, recreation, physical activity, or active transport)?

- Construction near bike lanes can be iffy
- Messy intersections (ex: DT)
- Some routes are built in high-risk areas (ex: cosco, bike routes in front of both vancouver hospitals) :: adding bike routes to roads can perhaps increase road tension between road users
-

How can cycling infrastructure be designed to better influence your health maintenance?

- Routes sometimes lack vision – simply done for political reasons
- Concerns with continuity of routes :: routes end suddenly, or with no real major landmark/destination

Finally, what is your favourite and/or least favorite aspect of Vancouver's bike routes and cycling infrastructure?

Recommendations:

- Increase amounts of maps/green signs/painted bikes on roadways (for ^ visibility)
- More lighting (^ Visibility)
- Better road communication between cyclists and non-cyclists (motorists/pedestrians)
- Education for all parties/road users :: decrease tension between road users
- Greater communication with other municipalities to avoid discontinuities in major cycling routes (ex: near UBC or near BBY coming from YVR)

CODES:

→ (Visibility) :: better signage for communication

Can specific roads be fully designated to single modes of transport

- ex: one road for buses, one for cars, one for bikes?..

→ (Protection) :: Separated bike paths (from pedestrians & motorists) is the golden standard; Bike routes (ex: Ontario st; 37th) are preferred over thoroughfares

Ultimately shared roadspaces means greater risk

- Certain routes begin as bike routes but merge into thoroughfares (ex: cornwall coming off burrard street bridge) :: continuity

→ (Culture) :: are we lacking compared to other cycling cities (ex: copenhagen, Amsterdam) for providing citizens opportunities to make cycling feasible/enjoyable (showers/safe lockers for bike @ destinations) – make policy requiring new buildings create such spaces :: thus encouraging the behaviour (of cycling).

Creating tension with other road users

→ (Education) :: But will it work?:: How to share road spaces → needs to involve all users in the implementation and creation of safe cycling spaces

Lack of clear rules between cyclists/motorists increases risk

- Ex: Cyclists not stopping at stop signs, Pedestrians J-walking, ...

→ (Investment) :: Initial investment into cycling (& cycling culture) – LT benefits may outweigh the ST constraints and difficulties associated with

Cycling seminars

- How to gear-up; How to care for your bike; local route 101s; etc

Community Leaders/experts to initiate and communicate knowledge

- Vancouver is a difficult city to ride in year round (cold, wet) :: gear, knowledge, and expertise can help make the transition less difficult

(Themes)

[1] Cycling Infrastructure & Design - Protected, Continuous, and User-Friendly routes:

→ Fully protected routes are the gold standard > shared bike routes (ex: Ontario/37th) > thoroughfares

→ A lack of continuity in certain routes disrupts the sense of perceived rider safety

→ Routes which are intermittently separated by cement dividers in some sections and not in other sections present a decreased sense of safety :: There should be continuity of 'safety' within the route and design

→ discontinuity of safety elements (such as cement barriers) within a cycling route may provide the sensation of discontinuity (sensation of changing bike routes/being on a new route)

→ Signage, paint (green), etc for clearly indicates safe cycling spaces (reduce conflicts between road users)

[2] Investing in Education and Culture Relevant to Cycling – Sharing road spaces, creating policy inclusive of cycling culture, and facilitating individual engagement in:

→ Educate all road users regarding shared spaces :: there needs to be behaviour/rules that apply to all road users (pedestrian, cyclist, motorist) – for example who has the right of way in a roundabout, and does this right-of-way vary depend on the specific road user (pedestrian, cyclist, motorist)

→ Culture to completely influence cycling behaviour can be promoted through policy design of building infrastructure (bike lockers, showers, etc)

→ Individual investment into cycling culture (bike, gear, etc – to cope with the demands of the city: weather, etc) can be rigorous :: might be facilitated by community lay worker/expert

{Recommendations}

(1) Strive to build cycling routes which are fully separated from other road users – pedestrian and motorist alike – to promote safety (physically separated routes promote the greatest sense of security)

(2) Provide maps through COV website which not only highlights the bike route but also the current level of security provided by the infrastructure (barrier w/ traffic, w/ traffic no barrier, etc)

(3) Employ the use of community experts to influence the community and population by making recommendations for: route planning, gear purchasing (to deal with vancouver's elements/hills). Ultimately creating a pool of community resources and experts to positively influence cycling culture and promote safe cycling from within the target population or community.

(4) Incentivize behaviour which is health promoting: create programs for older adults to be incentivized through their active involvement in cycling and active transport. Volunteer-run programs promoting cycling for Older Adults can be co-branded with cycling companies (local ones such as Norco, Rocky Mountain) to provide group rates on bicycles and bike parts. Similarly programs can be created to incentivize individuals who complete cycling safety programs by remuneration or discounts at local bike shops.