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A new urban greenway in Vancouver, British Columbia: Adolescents' perspectives, experiences and vision for the future

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A B S T R A C T

Introduction: There is a need to design cities that promote recreational physical activity, active transport and social interactions among residents to keep up with the rapid urbanization of cities in the 21st century. An urban greenway is a built environment change, which has shown promise. We were provided with an opportunity to partner with the City of Vancouver to better understand perceptions of adolescents who live in close proximity to Vancouver's newly constructed 9-kilometer Arbutus Greenway (greenway), about the greenway's relevance to them. The purpose of our study was to describe factors that facilitate or inhibit active transport, recreational physical activity and social interactions along the greenway and highlight key elements that render the greenway more attractive, enjoyable, and easy to use for youth.
Methods: We recruited 42 grade 8–10 secondary school students attending three secondary schools located within 1-kilometer of the greenway. We conducted seven semi-structured focus groups to discuss experiences with and perceptions of the greenway. We applied a four-stage Framework analysis to identify themes. Participant demographics were determined by questionnaire. Postal codes were entered into geographic information system software to calculate distances from participants' homes and schools to the greenway.
Results: We identified proximity, social connections, weather and safety as factors that influenced participants' engagement with the greenway.
Conclusions: To our knowledge, this is one of the first studies to explore factors that facilitate and inhibit youth engagement with an urban greenway. Youth shared their perspectives, experiences and ideas about how to make the greenway more attractive. Youth are often underrepresented in municipal decision-making processes, despite the fact that they are able to contribute their own unique perspectives. To help youth establish meaningful connections with and find value in local greenways, it is necessary for city planners to engage youth in the decision-making process.

1. Introduction

With rapid urbanization and industrialization of cities in the 21st century, there is a need to design cities that promote recreational physical activity, active transport and social interaction among residents (Matsuoka and Kaplan, 2008; Boniface et al., 2015). An urban greenway is a built environment change that has the potential to foster the development of social capital (Leydan, 2003) and promote and enhance active transport and recreational physical activity (Smith et al., 2017) in children, youth and adults. Greenways are defined as "a linear open space established along either a natural corridor, such as a riverfront, stream, valley, or ridgeline, or overland along a railroad right-of-way converted to recreational use, a canal, scenic road, or other route" (Little, 1990,p. 2). Urban greenways are often designed as multi-modal paths that allow for users to engage in a various modes of transportation and forms of physical activity. Often, numerous facilities (washrooms, gardens) and amenities (water fountains, benches, trail markers) are added along these greenways to entice usage and improve the user's experience.

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Constructing and maintaining an urban greenway costs upward of a million dollars. However, the potential health impact to the local community could be cost-effective in the long term (Dallat et al., 2014). To this end, the City of Vancouver (the City) in British Columbia (BC), Canada invested $11 million to convert an expired-railway that extends 9 km (km) north to south across Vancouver, into a multi-modal transportation and recreation corridor (Arbutus Greenway (greenway)). Subsequently, we were provided an opportunity to partner with the City to better understand perceptions of youth (who live in proximity to the greenway) about the greenway's relevance to them.

Although a myriad of studies investigate different aspects of adolescent health, they seldom engage youth as active participants in the research process (Langhout and Thomas, 2010; Vivoni, 2013). Youth have the capacity to provide unique insights and ideas to municipal processes that reflect personal and age-specific needs (Chawla, 2002). Thus, listening to youth experiences and perceptions will provide us with a better understanding what comprises *their* 'real world' setting (Jacquez et al., 2013; Race et al., 2017).

Youth insights have potential to position policy makers to more aptly respond to young people's unique experiences (Jacquez et al., 2013). Thus, we aimed to fill a gap in the literature by understanding youth perceptions of the greenway that could inform urban form design and maximize youth engagement in greenway infrastructure in the future.

Our specific objectives are twofold: 1) to describe factors that facilitate or inhibit youth active transport, recreational physical activity and social interactions along the greenway and, 2) to describe key elements that youth perceived as contributing to the greenway's attractiveness, user enjoyment, and ease of use.

2. Materials and methods

2.1. Study context

For this descriptive study (Arbutus Greenway Evaluation (AGE) – Jr) we used qualitative methods and recruited youth attending secondary schools located within 1-km of the greenway. The greenway is an expired railway corridor that comprises 42 acres of land extending 9-km north to south, from the Fraser River to False Creek in Vancouver, Canada. The City purchased this land from Canadian Pacific Railway in March 2016, with the long term vision to develop an asthetically rich, multi-modal transportation and recreation corridor to "connect people, parks and places from False Creek to the Fraser River" [https://vancouver.ca/streets-transportation/arbutus-greenway.aspx]. The greenway passes through 6 diverse neighbourhoods, connects 7 commercial districts and has 14 schools located within 1-km. This creates potential for the greenway to become a safe and attractive travel, recreation and socialization corridor for children and youth.

Not set for final completion until 2034, phased development (Phases 1–4) will happen in accordance with funding cycles and multiple City transportation and capital plans. Our interviews took place during the "Temporary Path Construction Phase" of greenway development. At the time of our data collection, there was limited (or no) construction occurring along the Greenway. Completed features include a: 4–6 m wide paved path, mulch trail adjacent to the paved path in select areas, bike share stations on the north end, benches located along the entire greenway and some intersection improvements with signalized crossings. No street lights were installed at the time of the interviews, although lighting additions were planned. More extensive development was set for "Phase 1" (2018–2022) after extensive public consultation.

We collected data during the 2017 public consultation phase of greenway development. As such, there was limited construction on the path at that time. We administered a demographic questionnaire and conducted focus groups in fall 2017. The University of British Columbia's Clinical Research Ethics Board (certificate: H17-00739) and the Vancouver School Board approved the study protocol.

2.2. Partcipants and protocol

Eligible participants were students enrolled in three of four secondary schools located within 1-km of the greenway. We chose to specifically target three of the four schools, because the locations of those three schools most closely matched locations where our research group also conducted intercept surveys for the City of Vancouver. We recruited participants for focus groups in October and November 2017. Prior to recruitment, we approached and obtained permission to conduct the study from principals of the three target secondary schools. Principals then connected us with teachers who they deemed a 'good fit' (i.e. Leadership Program, Social Studies) for our study. Two members of our research team presented the study to five classes (grades 8–10) across the three schools. Interested students (n = 116) received consent and assent forms from our research team. Of these students, 42 students (36% recruitment rate) provided informed assent and parental consent to participate. All 42 participants participated in focus group interviews. However, during data analysis one participant's data was excluded. The participant was a European exchange student who had only lived in Vancouver for a month and did not have any knowledge of the greenway. Fig. 1 illustrates the general location of each participant's home in relation to their school and the greenway.

In Table 1 we provide characteristics of neighbourhoods, schools and the greenway (see Fig. 2, Fig. 3 and Fig. 4) within the three school catchment areas. We retrieved information on school population from each school's website. For each school catchment, we obtained walk and bike scores (Redfin Real Estate, 2019) to represent neighbourhood walkability and bikeability (scored between 0 'car-dependent' and 100 'walker's paradise'; calculated based on distance to nearby amenities, intersection density and block lengths). As a proxy for area-level socio-economic status, we obtained household income data from the 2016 National Household Survey (Statistics Canada, 2016) and calculated average annual income for each catchment area. We used Census data (Statistics Canada, 2016) to obtain population counts and calculated population density as population within school catchment (population count)/ school catchment area (km^2).

Fig. 3. Arbutus Greenway white delineating line (June 2017).

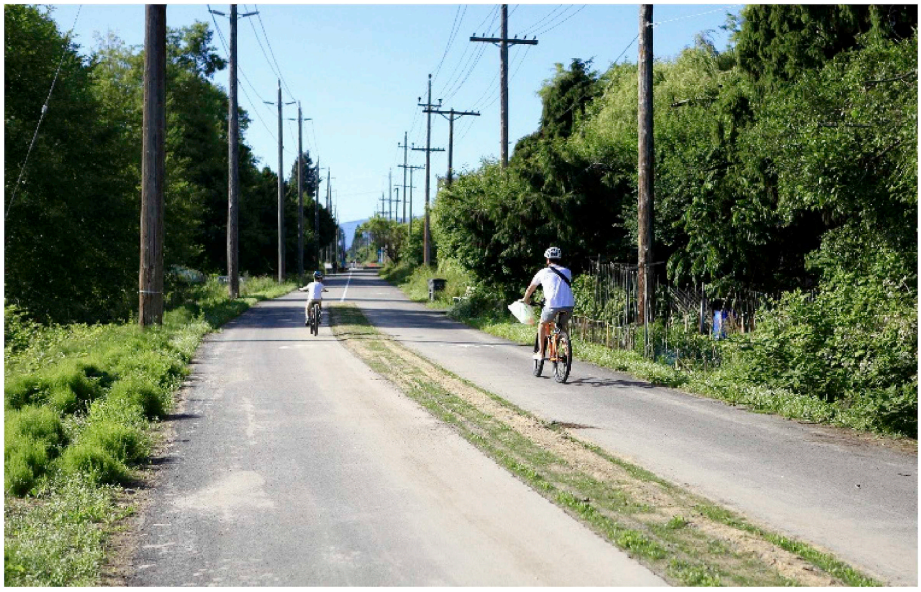

Fig. 4. Arbutus Greenway with grass delineation (June 2017).

2.3. Measures

We conducted 7 in-depth, semi-structured focus groups with the 42 participants (6 participants in each focus group). Two focus groups were held at School 1 (5 boys, 7 girls; age range 14–15 years), four focus groups were held at School 2 (13 boys, 11 girls; age range 13–15 years) and one focus group was held at School 3 (2 boys, 4 girls; age range 12–14). Focus group discussions ranged in length from 36 to 66 min (mean of 46 min across schools). A semi-structured interview guide (Table 2) was developed to understand the barriers and facilitators to using the greenway. To capture this information participants were asked to describe their neighbourhood and experiences using (or reasons for not using) the greenway for active transport, recreational physical activity and/or socializing with friends. Participants were also asked what they liked/didn't like about the greenway and what features they might add/remove to improve the greenway to facilitate active transport, recreational physical activity and socializing with friends. We classified participants as frequent, infrequent or non-users based on the language participants used to describe their greenway experiences (Table 3). Following each focus group, participants were provided a $10 gift card as a thank you for their time.

Table 1
School population and neighbourhood, school and greenway characteristics within school catchments where we recruited participants for our study.

	School 1	School 2	School 3
School Population	1360	1202	1276
Neighbourhood WalkScore® (/100)	94 "walker's paradise"	82 "very walkable"	70 "very walkable"
Neighbourhood BikeScore® (/100)	99 "biker's paradise"	59 "bikeable"	74 "very bikeable"
Average annual household income (CAD)	55,187	77,217	69,041
Population density (km^2)	8628	3736	3674
Length of greenway within school catchment (km)	1.8	1.3	3.6
Greenway composition and width (m) within each catchment	*Northern section* -4 m asphalt path (2.5-m cycling; 1.5-m walking) with white delineating line -2 m bark mulch path. -Separation between asphalt and bark mulch paths: 0.5–1.5 m. (Fig. 2) *Southern Section*-5m asphalt path (2.5-m cycling, 2.5 m walking) with white delineating line	5 m asphalt path (2.5-m cycling, 2.5 m walking) with white delineating line. (Fig. 3)	5 m asphalt path (2.5-m cycling, 2.5 m walking) with white delineating line or grass separation between cycling and walking paths (0.5–1.0 m). (Fig. 4)

Table 2
Semi-structured interview guide.

Moderator defines and describes what a neighbourhood is.
1. How would you describe your neighbourhood?
   Probe: What do you like about your neighbourhood?
2. What do you know about the Arbutus Greenway?
3. Tell me about a time you used the Arbutus Greenway.
   Probe: What do you like/disklike about the Greenway?
4. Tell me why you have not used the Greenway.
   Probe: What might be changed or added along the Greenway to make it more appealing?

Moderator defines and describes active travel and non-active travel
5. Can you tell me a few destinations that you travel to in a typical week and how you get there?
6. **Is the Greenway an option to travel to any of those places? If yes, why do you use it? If no, why not?** Probe: Do you ever use the Greenway for travel other places? Why or why not?
7. Tell me how you usually travel to/from school?
   Probe: Do you ever use the greenway to travel to/from school? Why or why not?
8. Tell me about a place in your neighbourhood where you like to go to hang out?
   Probe: What do you do there? What do you like about that place? How do you get to there?
9. Tell me about a place in your neighbourhood where you like to go to hang out with friends (or family)? *Probe: What do you do there? How do you get to there? Do you use the Greenway to get there? Why or why not? If not, have you considered using the Greenway to get there?*
10. Suppose you were able to add/remove a feature to the Arbutus Greenway, what would you add/remove? Why is that important to you?

Table 3
Participant comments that support classification as frequent-, infrequent- or non-user of the greenway.

Classification	Quantified greenway experience quotes
Frequent-user	*"Like, maybe 20 times."* *"I definitely use it pretty regularly, like, almost every day to walk my dog."* *"Almost every day last year I was skateboarding down it."*
Infrequent- user	*"I've only used it once or twice – to go from here to [the] park."* *"I've walked along it a couple of times."*
Non-user	*"I don't remember using the greenway."* *"No, I haven't used it after that (one experience)."*

Participants were asked to complete a demographics questionnaire from which we obtained current grade, age, sex and postal code. We used postal codes to geocode participants' home locations [Geographic Information System (GIS); ArcGIS v. 10.5; Esri Inc., CA] and calculate the shortest travel distance between home and the greenway and home and school (Can Map Street files 2011; DMTI Spatial).

3. Analysis

Audiotaped focus group interviews were transcribed verbatim using a professional transcription service (Online and Ontime, Vancouver, Canada) and verified for accuracy. Data were then uploaded into the qualitative data management program NVivo 11.0

Table 4
Characteristics of study participants.

	School 1	School 2	School 3
Number of participants	11	24	6
Grade	10	9–10	8–9
Age range (yrs)	14–16	14–16	13–15
Sex			
Boys	4 (36%)	13 (54%)	2 (33%)
Girls	7 (64%)	11 (46%)	4 (67%)
School to greenway (km)	0.8	0.2	0.4
Median km home to greenway (IQR)	1.3 (1.0)	2.0 (2.8)	1.4 (1.0)
Median km home to school (IQR)	1.2 (3.2)	3.5 (2.8)	2.1 (2.9)

SD: standard deviation; km: kilometres; IQR: interquartile range.

(QSR International, Melbourne, Australia) for data analysis and management. Prior to analysis we identified three *a priori* themes: 1) facilitators that supported greenway use, 2) barriers to greenway use and 3) suggestions for improvement.

Transcripts were coded independently by two research assistants (RA) using a four-step Framework Analysis: 1) Familiarization, 2) Thematic identification, 3) Charting, and 4) Interpretation (Pope et al., 2000; Rabiee, 2004). We describe each step below. 1) Familiarization – RAs moderated and took notes during the interview. RAs met within 1-2 hours following the focus group to listen to audio recordings, make notes regarding patterns, key issues and initial insights and to discuss observations of student behavior during the focus groups. Finalized transcripts were then uploaded into NVivo. 2) Thematic identification – the same two RAs independently developed a coding index. We sought to identify major themes from the dataset by focusing on the research objectives within the three *a priori* themes. The RAs met again after coding each transcript to compare, discuss, confirm, define and refine codes. They discussed any disagreements in coding until consensus was reached. A final coding index was applied to each transcript. All digital transcripts were coded in NVivo. 3) Charting - data were summarized by charting illustrative quotes that best exemplified the themes; quotes were entered onto a spreadsheet. 4) Interpretation – The final stage, interpretation, involved the team meeting as a group to define concepts and develop recommendations, based on the participants' experiences as described in the transcripts (Ritchie and Spencer, 1993). We ensured that the interpretation process echoed the attitudes, beliefs, and values of the participants (Srivastava and Thomson, 2009). We maintained a record of decisions made throughout data collection and analysis (Cutcliffe and Mckenna, 2004; Koch, 2006).

4. Results

4.1. Descriptive statistics

The characteristics of study participants are provided in Table 4. Of the 41 participants included in analysis, 54% were girls (n = 22). Participants were between the ages of 13 and 16 years and the proximity of their homes to the greenway ranged from 0.1 to 9.4 km (median distance 1.5 km, IQR 1.7 km).

We present our findings in accordance with the three *a priori* themes described above. **Proximity and social connectedness** emerged as the primary facilitators of greenway use. **Weather and safety** emerged as barriers to greenway use. Participants also suggested many changes that, from their perspective, would improve the greenway; this comprised a youth vision for the greenway, in future. Of the 42 participants, 9 were frequent users, 19 were infrequent users and 13 were non-users.

4.2. Barriers and facilitators to greenway use

4.2.1. Proximity

All participants commented on proximity (i.e., living close or far from the greenway) as a factor to using the greenway. Proximity was described as a barrier and a facilitator to greenway use. One student describes proximity as a facilitator.

> "So I live right by the school. I just have to cross the greenway. We (my family) use the greenway, like, if we're going out for lunch or– we use it to walk wherever we're going." (girl, School 3, grade 8, frequent user, 0.5km from home to greenway)

Living further from the greenway was described as a barrier.

> "Well, since I live so far away, like, I don't really– after school I don't really, like, choose to walk along it (the greenway)." (girl, School 3, grade 8, non-user, 1.8km from home to greenway)

Mention of proximity was embedded in discussion of places participants need to travel to and from on a regular basis including school and extra-curricular and weekend activities and the distance from their home to the greenway. For example, as some participants' activities took place further east or west of the greenway, using the greenway would have added more time to their travel.

> "I go to work at Marine and Oak, but the greenway doesn't go there, so I don't take the greenway. It can kind of get you relatively close, but that would involve me having to go, like, very far right and then down and then way back left. So that would not be useful at all, it'd be counterintuitive." (boy, School 2, grade 10, non-user, 1.3km from home to greenway)

GIS data support proximity as both a major facilitator and barrier to greenway use. We compared distance between participants' homes and the greenway and participants' schools and the greenway across frequent- (n = 9), infrequent- (n = 19) and non-users (n = 13). On average, frequent users lived closest to the greenway (median 0.7 km, IQR 0.6 km) compared to infrequent users (median 2.5 km, IQR 3.3 km) and non-users (median 1.6 km, IQR 1.5 km). Interestingly, infrequent users lived further from the greenway than non-users. However, it is important to indicate that 100% of infrequent users attended the two closest schools to the greenway, and that 71% of non-users attended the furthest school. Therefore, considering students spend much of their time at or going to and from school, the school's proximity to the greenway is a major facilitator of greenway usage. A lot of participants' experience with the greenway involved using the greenway to travel to/from school or to travel from school to other places along the greenway.

4.2.2. Social connections

Almost all participants used the greenway with friends, family members or the family dog. A lot of participants used the greenway with friends, most often to go for food at lunch or after school.

> "I'd only go with my friends during and after school. Like, sometimes I wait for my friends after basketball practice and we'd go get something to eat in Kerrisdale." (boy, School 3, grade 9, frequent user, 1.4km from home to greenway)

Although going for food was the most commonly reported use with friends, participants also spoke of using the greenway with friends for recreation (bike riding, skateboarding, walking), to access public transit, to walk to sports practice after school and occasionally during school outings. Sometimes social encounters were casual and unplanned.

> "*Sometimes if I'm walking to school I'll walk a bit away from the school on the greenway to meet up with my friends and then we'd walk back down it." (boy, School 3, grade 8, frequent user, 0.4km from home to greenway)*

A few participants used the greenway with family to walk to nearby stores and parks or to walk and cycle for recreation.

> "I was with my family and, like, they wanted to go for a bike– so, like, we decided to, like, bike up to Kerrisdale and we went all the way, like, down the greenway. I think we went to the end of it." (girl, School 3, grade 8, infrequent user, 1.4km from home to greenway)

4.2.2.1. Not a "hang-out" spot. The greenway afforded opportunities for participants to interact with friends and family; however, when participants were asked what they thought about using the greenway specifically as a place to hang-out and socialize, the overall impression was that the greenway was not a hang-out spot. Most participants viewed the greenway as a means for getting to and from places and for recreational activity. Participants highlighted that seating (more benches, picnic tables), aesthetics (art work, lights) and opportunities for entertainment (food trucks, community festivals) need to be improved if the City wants youth to use the greenway socially.

> "It's not like a place to hang-out yet. It's like something that– it's like a really good trail, but that trail could be anywhere. It doesn't really stand out from other things. Whereas if you had, like, some really bold things that made it stand out, like, murals or lights or fountains or whatever, that could really help." (girl, School 1, grade 10, non-user, 2.0km from home to greenway)

4.2.3. Weather

Weather both facilitated and hindered greenway use. Participants preferred to use the greenway on *"a nice day"* that they described as "*sunny*", "*bright*", "*warm*", or more generally "*good*". Conversely, bad weather days were described as "*wet*", "*cold*", "*snowy*", "*rainy*", or more generally "*not nice.*" During bad weather or the winter season, participants preferred to take the bus, request a ride or stay home.

> "Generally I use it to get to school and like I said earlier, when the weather's nice, so it's warmer. I've biked a few times in the rain, but prefer not to. I'll use the greenway to go to school. But if it's not as nice then I'll take the bus." (boy, School 2, grade 10, frequent user, 0.6km from home to greenway)

4.2.4. Safety

Safety was a commonly described facilitator. Youth felt safer along the greenway because of the separation from vehicle traffic.

> "Sidewalks are so thin and there's always people going by and it's, like, you don't feel as safe because there's always cars going right beside you. So you feel a lot safer on the greenway." (boy, School 3, grade 9, infrequent user, 1.4km from home to greenway)

Separation between cyclists and walkers on the greenway was also perceived as a safety issue. Some participants felt the asphalt path was too narrow for both walkers and cyclists and the current white dividing line was not sufficient to safely separate users. A few participants suggested that complete separation might be a better option.

> "You have people, like, coming onto the bike area and then, like, just intertwining. Maybe if the bike paths were wider. Or, like, a fence or something that'll separate the two might be safer and more convenient for people." (boy, School 1, grade 10, non-user, 4.5km from home to greenway)

Inadequate lighting on the greenway was commonly highlighted as a safety issue. At the time of our focus groups no lighting was installed along the greenway. We also conducted our focus groups in the fall when fewer hours of daylight likely influenced greenway use. A few participants who walked the greenway at night explained that they almost tripped because they couldn't clearly see where

they were going. However, most participants avoided the greenway when dark for personal safety reasons.

> "Like, some of the areas, there's no lighting. So you can't really safely walk along there at night, especially, like, when I'm a young girl. So it's kind of unsafe." (girl, School 1, grade 10, frequent user, 0.8km from home to greenway)

Dense vegetation along a few sections of the greenway reduced ambient building light and moonlight and made those sections ever darker. A few participants described feeling unsafe in these areas.

> "*Especially when you're, like, surrounded by, like, all the, like, shrubs and, like, bushes and trees and stuff. And you're just kind of like on, like, this tiny, like, pitch-black path. And you're, like, hearing stuff in the trees." (girl, School 2, grade 9, infrequent user, 2.5km from home to greenway)*

4.3. A youth 'vision' for the greenway

Overall, participants supported greenway development, but provided a number of ideas that captured their vision of how the greenway could be improved. Some participants stated they had no desire to walk along the greenway unless there was something else to do or see along the way. To "bring the community together" and get people using the greenway some participants recommended hosting various events along it (i.e. block parties, farmers' markets). Interactive activities such as outdoor gyms, water parks, activity spaces and more bike rentals would provide additional entertainment. Trail amenities such as maps, historical markers, distance markers, water fountains, phone charging stations and Wi-Fi hotspots were suggested to make the greenway more useable and interesting. Installing features such as "cool architecture or art pieces," murals, fairy lights and holiday-themed decorations would also make the greenway more aesthetically pleasing. Most participants enjoyed looking at the surrounding trees and flowers and views of the ocean and mountains. However, some participants also felt that certain areas along the greenway looked too "industrial," and suggested that the greenway should be "greener" in those areas.

It was clear from participants' comments that attractive food options on or around the greenway were closely linked with a social milieu that would promote greenway use. A few participants floated the idea of having food trucks along the greenway, which would potentially attract a lot of people, especially students during lunch hour. Finally, a few participants described using the benches currently installed on the greenway. However, most thought that group seating areas (i.e. picnic tables) to eat and socialize with friends would be a welcome addition to greenway infrastructure.

5. Discussion

We extend the existing literature through our focus on why youth *use or don't use* an urban greenway. To our knowledge, this is the first study to explore factors that facilitate or inhibit youth engagement in active transport, recreational physical activity and social interactions along an urban greenway. We identified proximity, social connections, weather and safety as factors that influenced engagement with, and perceptions of, the greenway. Youth also shared their vision as to how the greenway could be improved to attract more adolescent users.

Similar to adult focused studies of urban greenway use (Abildso et al., 2007; Akpinar, 2016; Wolch et al., 2010; Wolff-Hughes et al., 2014; Frank et al., 2019a), adolescents who lived closer to the greenway reported using the greenway more frequently. It is therefore not surprising that school proximity also appeared to positively influence greenway usage. However, greenway use may be influenced more by land-use mix surrounding a particular portion of the greenway, more so than proximity to it. For example, using global positioning system (GPS) and GIS technology, Coutts (2008) found that areas along a multi-use urban greenway with high land-use mixture had more overall users than areas with higher surrounding population density. Youth in our study emphasized the need for high-land use mixture along the greenway. Greenways that provide easy access to destinations such as restaurants, cafes, parks and places with aesthetically pleasing surroundings are more likely to entice users (Frank et al., 2005, 2019b; Rodriguez et al., 2015). Therefore, higher land-use mix may entice youth living further away to use the greenway.

Well-designed greenways can bring communities together and facilitate social connections, enhancing the quality of life and well-being of greenway users (Coutts and Miles, 2011; Dinnie et al., 2013; Boniface et al., 2015). Youth in our study primarily perceived the greenway as a means to travel to or from destinations or to exercise, not as a place for socializing. However, although participants may not have purposefully used the greenway to socialize, the greenway facilitated social events and both planned (active transport and exercising with friends and family) and unplanned (bumping into a friend while using the greenway) encounters. Lee (1999) found that 80% of social encounters along a suburban greenway elicited positive emotional responses. Thus greenways may be effective methods to promote positive social interactions among users.

Participants identified path separation as a barrier to greenway use. At the time of our study, a white line separated cyclists from pedestrians. Although the white line was clearly marked and accompanied by cycling and walking images, some participants still felt unsafe due to risk of collisions with cyclists. Cyclists have been shown to travel faster on shared paths with center lines and visual segregation as compared with paths without markings (Boufous et al., 2018). This is likely due to cyclists' increased perceptions of safety when traveling on segregated paths. A few participants suggested that a physical barrier might be safer. As it can be challenging to design a greenway that accounts for all potential users' apprehensions, additional promotional campaigns and on-path signage may be required to further educate different user groups and improve safety.

Adolescents also perceived inadequate lighting along the greenway as a barrier to greenway use. Too few lampposts and dense vegetation in narrow sections made participants feel unsafe using the greenway in the evenings and at night. Street lighting

improvements along pedestrian paths can increase pedestrian street use in the evenings and reduce users' fear of crime (Painter, 1996). As greenway construction is currently ongoing, it is likely that the City will improve lighting along the greenway over the next few years.

Unsurprisingly, weather both facilitated and hindered greenway usage among adolescents. Participants primarily described using the greenway for active transport, recreational physical activity and for socializing with family and friends when the weather was nice. When participants perceived weather as bad they avoided the greenway. Previous longitudinal studies that utilized infra-red trail counters over multiple seasons found that daily temperature, relative humidity, precipitation and wind speeds significantly affected greenway usage on a daily basis (Burchfield et al., 2012; Wolff and Fitzhugh, 2011). Considering Vancouver receives 167 days (1198 mm) of rain per year (46% of days/year) inclement weather is unavoidable (Environment And Climate Change Canada, 2019). Thus, city planners may need to develop educational campaigns that include strategies to promote 'all weather' active transport and recreational physical activity along this urban greenway.

As an often underrepresented minority, youth provide their own unique perspectives and highlight their specific needs and vulnerabilities (Chawla, 2002; Rigolon, 2011). Youth in our study provided insight into their experiences with the Arbutus Greenway. They described ways to further engage youth with the greenway such as hosting community events, allowing access for food trucks and by installing picnic tables. The participation of youth in the design and continued development of the greenway is significant since the outcome will result in a long-lasting physical change to the built environment (Hart, 1992). A greenway on its own has no value – the users impart value. The value established between the individual or collective users is established through interactions (SIME, 1986). Non-users in our study stated that they had no desire to use the greenway. This is likely because they did not see the greenway as having value to them. If cities seek to entice youth to use greenways it is necessary to engage them as active stakeholders to allow them the opportunity to create something of value to them (Rigolon, 2011).

We note several limitations of our study. First, we recruited a convenience sample of students attending secondary schools within close proximity of a greenway in Vancouver, BC and therefore, our findings may not be generalizable to other cities and greenways. Second, our focus groups included only 1% of students from the total student population across the three schools. However, this sample size is comparable with other qualitative studies that investigated youth perceptions (Smith et al., 2015; Ward et al., 2015; Hinckson, 2016). Third, focus groups were conducted during Temporary Path Construction Phase, therefore it is possible that participants view this version of the greenway differently than they would the completed version. However, it is important to recognize these early barriers as greenway construction can span many years. While some degree of bias is inevitable, our results reaffirm findings from the current literature and contribute to the knowledge of youths' perceptions of an urban greenway.

6. Conclusion

To our knowledge, this is one of the first studies to describe factors that facilitate and hinder youth engagement with an urban greenway. Perceptions and engagement of the greenway varied based on home and school proximity to the greenway, with those living or attending schools closer to the greenway more likely to use it. Bad weather and safety concerns were viewed as hinderances to greenway engagement. In addition, many youth found that the places they wanted to go were not along the greenway. They also weren't interested in using the greenway recreationally or to hang out with their friends. In essence, they didn't see the greenway as having much value to them.

Children and youth are often underrepresented in municipal decision-making processes, despite the fact that they are able to contribute their own unique perspectives. To help youth establish social and emotional connections and find value in local greenways (or other municipal developments), it is necessary for city planners to engage youth in the decision-making process. Our study participants contributed valuable ideas to foster youth active transport, recreational physical activity and socialization along the greenway.

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