Automated Vehicles in the Greater Toronto and Hamilton Area: Overview from a 2016 Consumer Survey

Part C: Survey Instrument

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Prepared for Metrolinx and the City of Toronto
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TRANSFORM

Acknowledgements

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1.0 Survey Instrument Overview

This report presents the survey instrument conducted in November 2016 on the topic of autonomous vehicles. This survey produced the results for the discussion in *Part A: Summary and Discussion* and *Part B: Data Overview.*

2.0 Survey and Consent Forms

[SCREEN #1 UPON RECEIVING SOLICITATION EMAIL AND SELECTING LINK INDICATING INTEREST IN PARTICIPATING IN A GENERIC SURVEY]

Professor Matthias Sweet, and graduate student, Kailey Laidlaw, of the School of Urban and Regional Planning, are conducting a survey on residents' perceptions of automated vehicles (driverless cars) and what this new technology may mean for how our cities function. This travel survey is jointly funded by Metrolinx and the City of Toronto and it informs ongoing transportation planning efforts.

[SCREEN 2]
What will happen during the study?
You will be asked a series of questions which are either multiple choice or with a fixed numerical answer. Questions cover the following broad topics:

- *commuting experiences and auto ownership,*
- *characteristics of your household,*
- *attitudes towards travel,*
- *your living arrangements, and*
- *attitudes towards automated vehicles.*

[SCREEN 3]
This survey will take approximately 20 minutes. We hope that you answer all questions, as this survey plays a key role in preparing the Greater Toronto-Hamilton Area for automated vehicles. Upon finishing the survey, you will be given the option of contacting us should you be interested in participating in possible future in-person focus groups on the topic of automated vehicles. The survey is administered by Research Now (www.researchnow.com) who does not have legal rights to retain this data; all data processing or storage will occur in Canada.

[SCREEN 4]
Are there any risks to doing this study?
It is not likely that there will be any harm or discomforts from participating in this survey. The survey will not ask you to provide personal identifiers (e.g. your name, your social insurance number) and we do not have a master list of potential survey participants. However, the survey will ask you to respond to several demographic questions, which taken together, may be a unique combination of answers. Nevertheless, as the study team has no master list of potential survey participants and their detailed characteristics, we cannot identify you even if your combination of survey answers is unique.

[SCREEN 5]
Are there any benefits to doing this study?
This research will provide valuable information for transportation planning researchers to better understand how automated vehicles are likely to influence society.
This research will inform the City of Toronto and Metrolinx, the project funders, in better anticipating and preparing for automated vehicles in the region.

[SCREEN 6]
Who will know what I said or did in the study?
Questions we are asking you do not contain uniquely-identifiable information and we are not collecting computer IP addresses, so we cannot track you individually in the dataset and this survey is confidential. The survey results will be managed by the Principal Investigator, Professor Matthias Sweet, and his research team and the data will only be available to the study team and the funders. Data will be stored indefinitely on secured computers in Professor Sweet's research lab (www.transformlab.ryerson.ca).

[SCREEN 7]
How do I find out what was learned in this study?
For updates and information about the study findings, please visit (www.transformlab.ryerson.ca/projects/). Findings are expected to be made public in the Summer of 2017.

Questions about the Study:
If you have questions or need more information about the study itself, please contact the Principal Investigator, Matthias Sweet of Ryerson University, at:

Matthias Sweet, Assistant Professor
Ryerson University School of Urban and Regional Planning
matthiassweet@ryerson.ca
416-979-5000 ext. 6774

[SCREEN 8]
This study has been reviewed by the Ryerson University Research Ethics Board and received ethics clearance. If you have any questions about your rights or treatment as a research participant in this study, please contact the Ryerson University Research Ethics Board at rebchair@ryerson.ca (416) 979-5042.

[SCREEN 9]

CONSENT

- *I have read the information presented above about a study being conducted by Ryerson University's School of Urban and Regional Planning and funded by Metrolinx and the City of Toronto.*
- *I have had the opportunity to ask questions about my involvement in this study and to receive additional details I requested.*
- *I understand that if I agree to participate in this study, I may withdraw from the study at any time by exiting the online survey. Participation in this research is completely voluntary. However, because the survey is anonymous, once you click the submit button at the end of the survey the researchers will not be able to determine which survey answers belong to you so your information cannot be withdrawn after that point. By consenting to participate you are not waiving any of your legal rights as a research participant.*
- *By selecting the survey link below, I agree to participate in the study.*
- *If you are interested in participating, the following link will take you to the survey:* **[INSERT SURVEY LINK HERE]**

0%

Please login to see additional testing features

Professor Matthias Sweet, and graduate student, Kailey Laidlaw, of the School of Urban and Regional Planning, are conducting a survey on residents' perceptions of automated vehicles (driverless cars) and what this new technology may mean for how our cities function. This travel survey is jointly funded by Metrolinx and the City of Toronto and it informs ongoing transportation planning efforts.

Continue »

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What will happen during the study?

You will be asked a series of questions which are either multiple choice or with a fixed numerical answer. Questions cover the following broad topics:

- *commuting experiences and auto ownership,*
- *characteristics of your household,*
- *attitudes towards travel,*
- *your living arrangements, and*
- *attitudes towards automated vehicles.*

Continue »

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This survey will take approximately 20-25 minutes. We hope that you answer all questions, as this survey plays a key role in preparing the Greater Toronto-Hamilton Area for automated vehicles. Upon finishing the survey, you will be given the option of contacting us should you be interested in participating in possible future in-person focus groups on the topic of automated vehicles. The survey is administered by Research Now (www.researchnow.com) who does not have legal rights to retain this data; all data processing or storage will occur in Canada.

Continue »

25%

Are there any risks to doing this study?

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Continue »

37%

Are there any benefits to doing this study?

This research will provide valuable information for transportation planning researchers to better understand how automated vehicles are likely to influence society.

This research will inform the City of Toronto and Metrolinx, the project funders, in better anticipating and preparing for automated vehicles in the region.

Continue »

50%

Who will know what I said or did in the study?

Questions we are asking you do not contain uniquely-identifiable information and we are not collecting computer IP addresses, so we cannot track you individually in the dataset and this survey is confidential. The survey results will be managed by the Principal Investigator, Professor Matthias Sweet, and his research team and the data will only be available to the study team and the funders. Data will be stored indefinitely on secured computers in Professor Sweet's research lab (www.transformlab.ryerson.ca).

Continue »

62%

How do I find out what was learned in this study?

For updates and information about the study findings, please visit (www.transformlab.ryerson.ca/projects/). Findings are expected to be made public in the Summer of 2017.

Questions about the Study:

If you have questions or need more information about the study itself, please contact the Principal Investigator, Matthias Sweet of Ryerson University, at:

Matthias Sweet, Assistant Professor

Ryerson University School of Urban and Regional Planning

matthiassweet@ryerson.ca

416-979-5000 ext. 6774

Continue »

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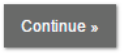

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- *By selecting the survey link below, I agree to participate in the study.*

- *If you are interested in participating, the following link will take you to the survey: Survey Link*

3.0 Background Information

3.1 Individual Information

1. My age is (in years): ____[RN: termination point: only include 18-75]

2. My current place of residence is:

The first three digits of your postal code are (i.e. A#A - no spaces in between) _____
[RN: The FSA question is asked alone and in isolation without the other two below. Upon entering the three digits of the FSA, two actions are possible:

a. If an FSA is in Table Q (also attached in excel), then the participant is prompted with either:]

Your response indicates that you reside in _____ [from m:m table]
Or
Your response indicates that you reside in either _____ or _____
Or
Your response indicates that you reside in either _____ or _____ or _____

c. [Then the respondent is prompted with:]
Is this true? *Yes* *No*

d. [If they select no, they are terminated.

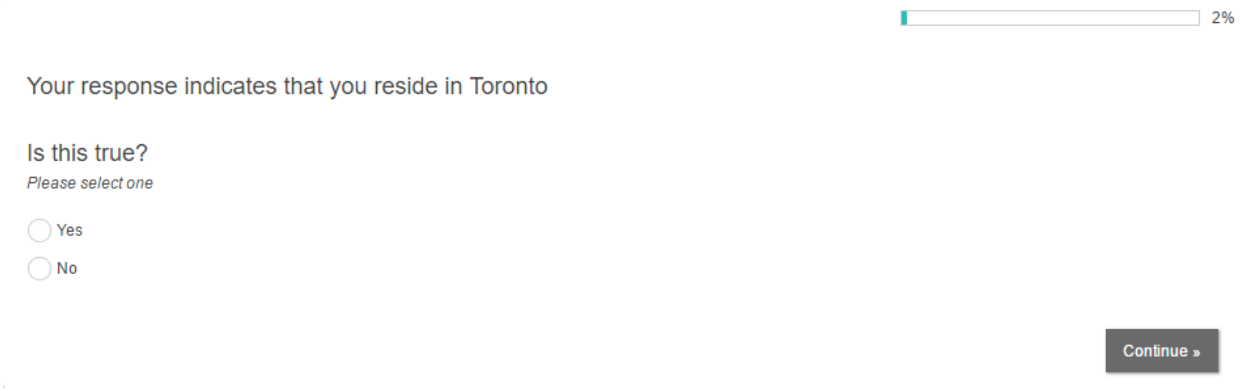
e. If they respond "yes", and only one region is identified in the table (Q), then the respondent is done with the location questions and is eligible based on the locational requirement. >**NON-TERMINATION LOGIC.**

f. If they respond "yes," and two or three regions are identified in table (Q), then the 2 or 3 regions are highlighted and clickable and the participant is further prompted with:]
Please select in which region/city you reside from above.

g. [Then the names of the regions (the underlined component above) are highlighted and additional text reads below]

Please select the city or region in which you reside.

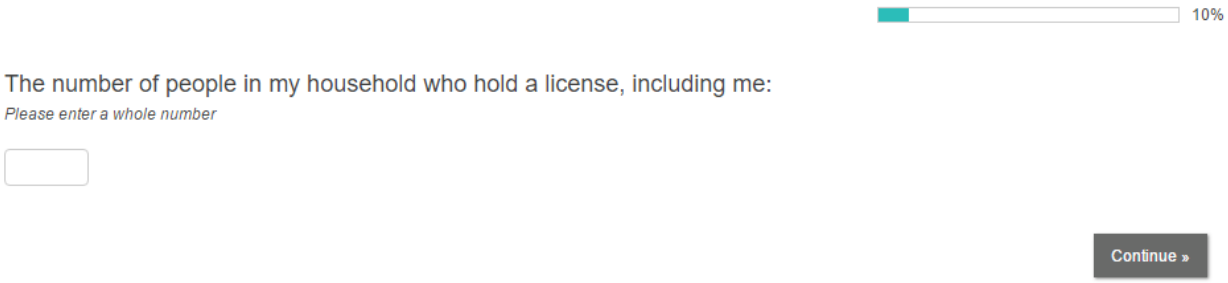
ii. [Upon selecting the city/region in which they reside, the respondent is done with the location questions and is eligible for the survey based on locational requirements > **NON-TERMINATION LOGIC.]**



3. I self-identify as:
   Female
   Male
   Other

4. I currently hold a driver's license
   Yes
   No

5. The number of people in my household who hold a license, including me:
   __ [fill in, numerical 0:99]



6. I regularly carry a smartphone (e.g. an iPhone, Blackberry, Android, etc.)
   Yes
   No
   Unsure

7. I have a physical disability which influences my ability to go places.
   * Strongly disagree *Disagree * Neither disagree or agree * Agree *Strongly agree

8. The highest level of education I have attained is:

Did not complete high school

High school Diploma or Equivalent

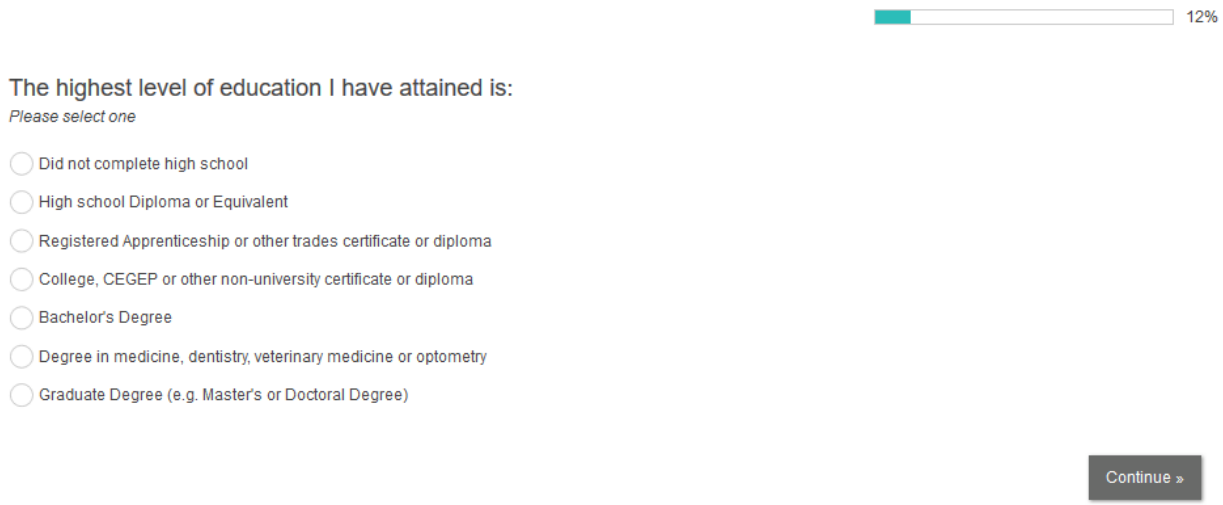
Registered Apprenticeship or other trades certificate or diploma

College, CEGEP or other non-university certificate or diploma

Bachelor's Degree

Degree in medicine, dentistry, veterinary medicine or optometry

Graduate Degree (e.g. Master's or Doctoral Degree)



3.2 Individual Preferences

Please indicate the degree to which you agree or disagree with the following statements.

9. I always plan things in advance.
   * Strongly Agree * Agree * Neither agree or disagree *Disagree * Strongly Disagree

10. I'm very protective of my personal space.
    * Strongly Agree * Agree * Neither agree or disagree *Disagree * Strongly Disagree

11. I like to be in control.
    * Strongly Agree * Agree * Neither agree or disagree *Disagree * Strongly Disagree

12. If I'm traveling to a meeting, I allow extra time in case my trip is delayed
    * Strongly Agree * Agree * Neither agree or disagree *Disagree * Strongly Disagree

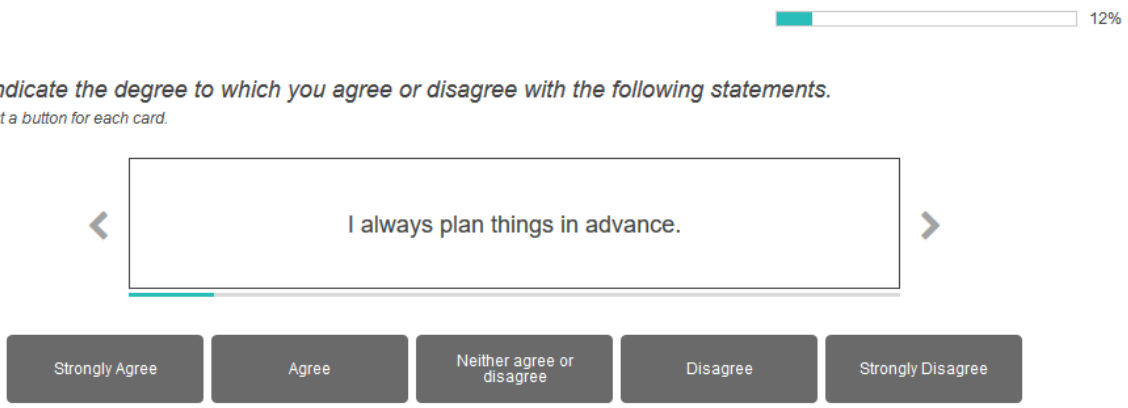
13. Driving a car gives me a sense of control
    * Strongly Agree * Agree * Neither agree or disagree *Disagree * Strongly Disagree

14. Having a car gives me a great sense of freedom
    * Strongly Agree * Agree * Neither agree or disagree *Disagree * Strongly Disagree

15. I'm often one of the first people to try out a new product
    * Strongly Agree * Agree * Neither agree or disagree *Disagree * Strongly Disagree

16. I like to work hard and play hard
    * Strongly Agree * Agree * Neither agree or disagree *Disagree * Strongly Disagree

17. I live a hectic life*
    *Strongly Agree * Agree * Neither agree or disagree *Disagree * Strongly Disagree



4.0 Employment and Commuting

[NOTE TO RESEARCH NOW: SEVERAL SUBSEQUENT QUESTIONS PIVOT OFF OF THE NEXT TWO]

18. Currently, I am:
    Not a student
    A part time student
    A full time student

19. Currently, I am:
    Employed full time
    Employed part time
    Work at home full time
    Work at home part time
    Unemployed
    Not in the labour force
    Retired
    Other

[Note, for survey programming, the following terms above need to be defined when the participant hovers over the terms: is it possible for this be defined when participant hovers over the dot not just the category?]

Full time: This category includes employed persons who usually worked 30 hours or more per week, at their main or only job.
Part time: This category includes employed persons who usually worked less than 30 hours per week, at their main or only job.
Unemployed: Were without work and had looked for work within the past four weeks
Not in the labour force: Unavailable for work or unable to work. It also includes persons who were without work and who had neither actively looked for work in the past four weeks.]

19a. Typically, I work and/or study ___ hours per week. [To be asked of those who work or are a student in Q19]

a. less than 10 hours per week
b. 10-19 hours per week
c. 20-29 hours per week
d. 30-39 hours per week
e. 40-60 hours per week
f. 60 or more hours per week

[Research Now: at this point, we need to categorize the survey participants into the following bins based on Q18 and Q19 which are relevant for future questions:

Non-workers (Those who answered {"unemployed" "not in the labour force" or "other" or "retired"} and "not a student" based on the previous three questions.)

Non-commuters: those who did one of the following:

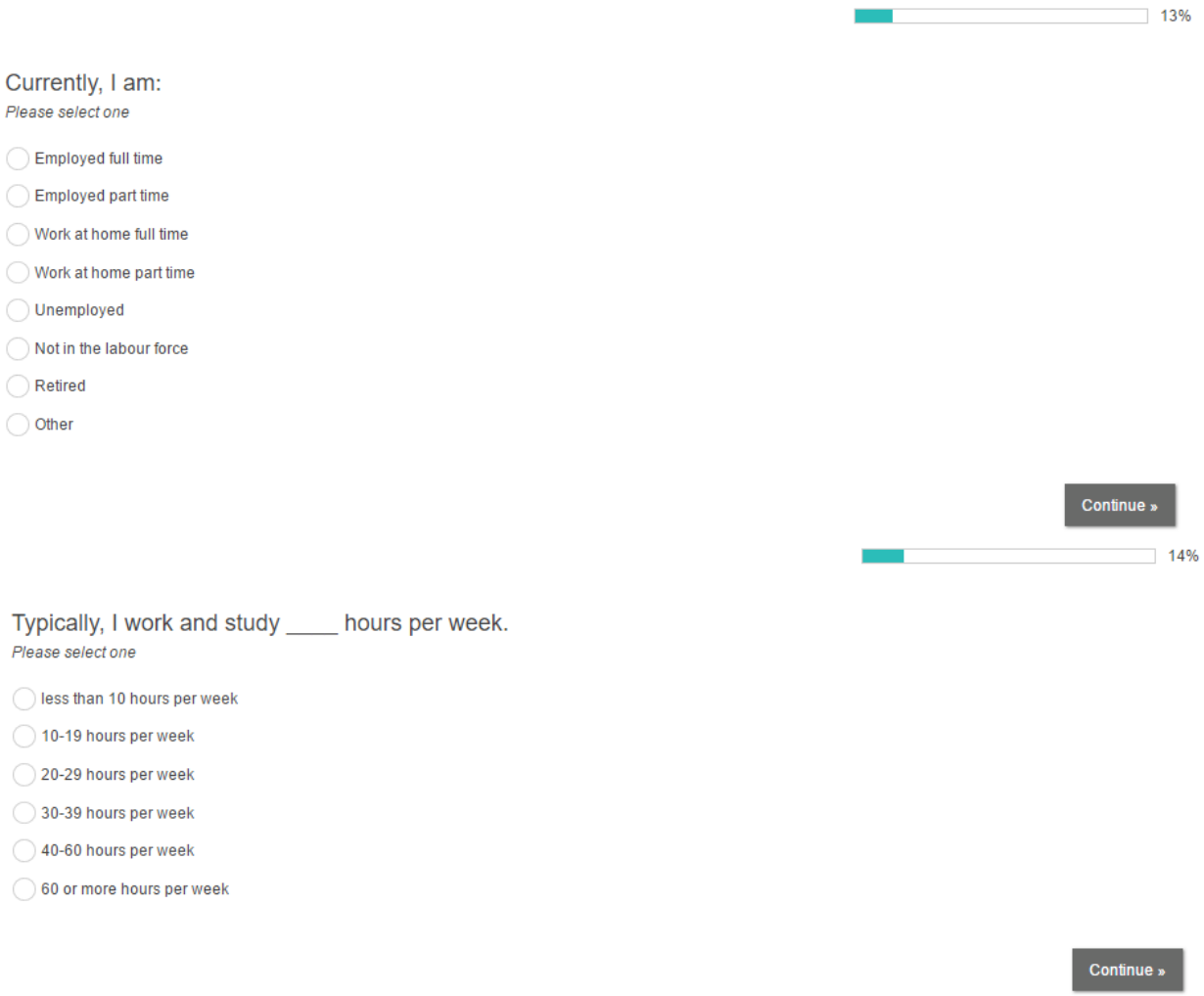
Answered "employed at home full-time" or
Answered "employed at home part-time."

Dominant Worker Commuters (Those who meet any of the following criteria):

Selected "employed full-time"
Selected "employed part-time" and {"A part-time student" or "non-student"}

Dominant Student Commuters: those who meet any of the following criteria):

Selected "student full-time"
Selected "a part-time student," not "employed full-time," and not "employed part-time."]



[following questions in this sub-section are only asked if "employed full-time" or "employed part-time" or "Work at home full time" or "Work at home part time" are selected in Q18]

4.1 Employment

[THE FOLLOWING CATEGORIES HAVE DESCRIPTIONS WHICH APPEAR WHEN YOU PUT THE CURSOR ON THE TEXT. THE DESCRIPTIONS ARE NOTED BELOW.]

20. My occupation is best characterized as[1]:
    General Office/Clerical
    Manufacturing / Construction / Trades
    Professional / Management / Technical
    Sales and Service
    Prefer not to answer

[Definitions for Research Now for purposes of programming cursor hover definitions:
General Office/Clerical. Persons who work in an office environment but do not have a specialized post-secondary education and are not managers.
Manufacturing/Construction/Trades. Jobs outside of the office which often require physical work.
Professional/Technical/Management. Jobs needing a specialized post-secondary education or management responsibility.
Sales and Service. People involved in the selling of goods or services at either the wholesale or retail level.]

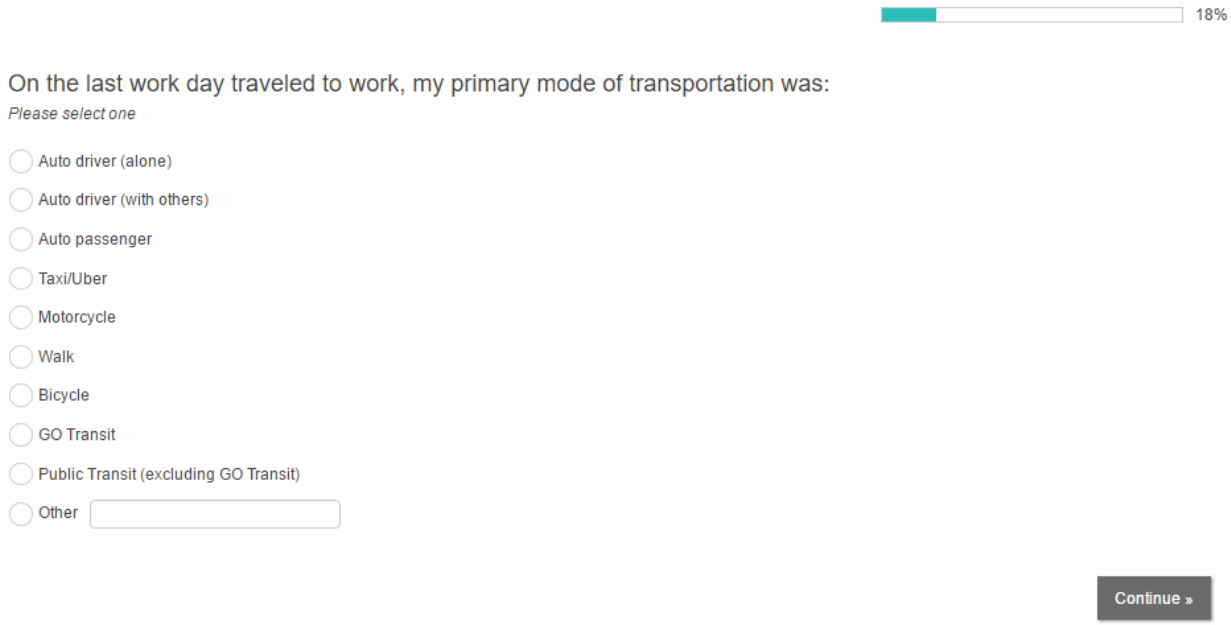
[FOR THE PURPOSES OF THE FOLLOWING QUESTIONS, THE FOLLOWING CATEGORIES DICTATE WHICH QUESTIONS ARE ASKED OF DIFFERENT PARTICIPANTS: "NON-WORKER," "DOMINANT COMMUTING WORKER," AND "NON-COMMUTER," AND "DOMINANT STUDENT"]
[Following questions are only asked of DOMINANT COMMUTING WORKERS or DOMINANT STUDENTS.]

4.2 Commuting to Work/School

[RN: THE TEXT "work/school" IS ASSIGNED AS "work" IF DOMINANT COMMUTING WORKER, but "school" if DOMINANT STUDENT. NOTE THE WORK/SCHOOL DISTINCTION SHOULD BE PROGRAMMED BASED ON IDENTITY AS EITHER "DOMINANT COMMUTING WORKER" OR "DOMINANT STUDENT

21. In a typical work/school week, I travel to work/school _____ [ranging from 0 to 7] days per week.

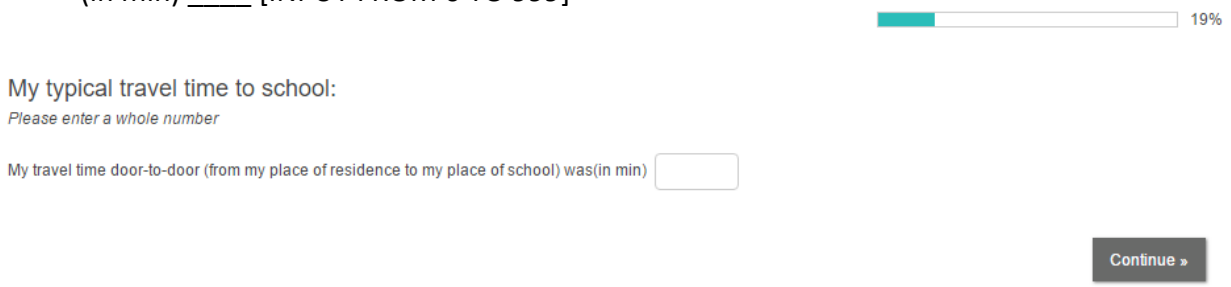
22. On the last work/school day traveled to work/school, my primary mode of transportation was:
    Auto driver (alone)
    Auto driver (with others)
    Auto passenger
    Taxi/Uber
    Motorcycle
    Walk
    Bicycle
    GO Transit
    Public Transit (excluding GO Transit)
    Other _____[enable text write-in]



23. Car parking is available for free where I usually go to work/school
    True
    False
    Unknown
    Not applicable

    [if DOMINANT COMMUTING WORKER OR DOMINANT STUDENT COMMUTER then]

24. My typical travel time to work/school:
    My travel time door-to-door (from my place of residence to my place of work/school) (in min) ____ [INPUT FROM 0 TO 999]

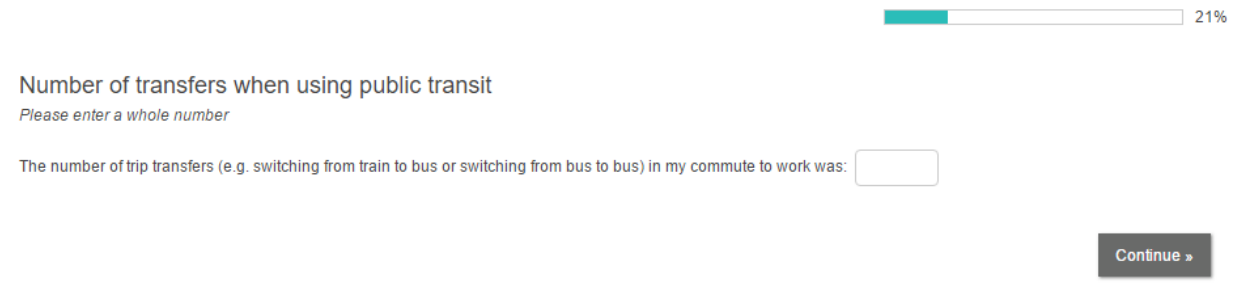


4.3 Transit Commuting

[NEW HEADER, APPLICABLE TO TRANSIT COMMUTERS ONLY]
[APPLIES ONLY TO THOSE WHO INDICATE THAT THEY ARE EMPLOYED OR STUDENTS & COMMUTE BY PUBLIC TRANSIT IN]
[IF CATEGORIZED AS DOMINANT WORKERS, THIS SHOULD BE IDENTIFIED AS "work", EVEN IF IDENTIFYING AS PART WORKER/PART STUDENT]

25. Which of the following ways of accessing transit did you use in your commute?
    Another type of transit (e.g. taking bus service to the GO train) [multi-select]
    Walking
    Cycling
    Driving
    Someone dropped me off
    Taxi/Uber
    Other ____ [ENABLE WRITE-IN]

26. Number of transfers when using public transit
    The number of trip transfers (e.g. switching from train to bus or switching from bus to bus) in my commute to work/school was: ___



4.4 Auto Commuting

[APPLIES ONLY TO THOSE WHO INDICATE THAT THEY COMMUTE BY CAR in Q26 and indicated "false" in Q23]

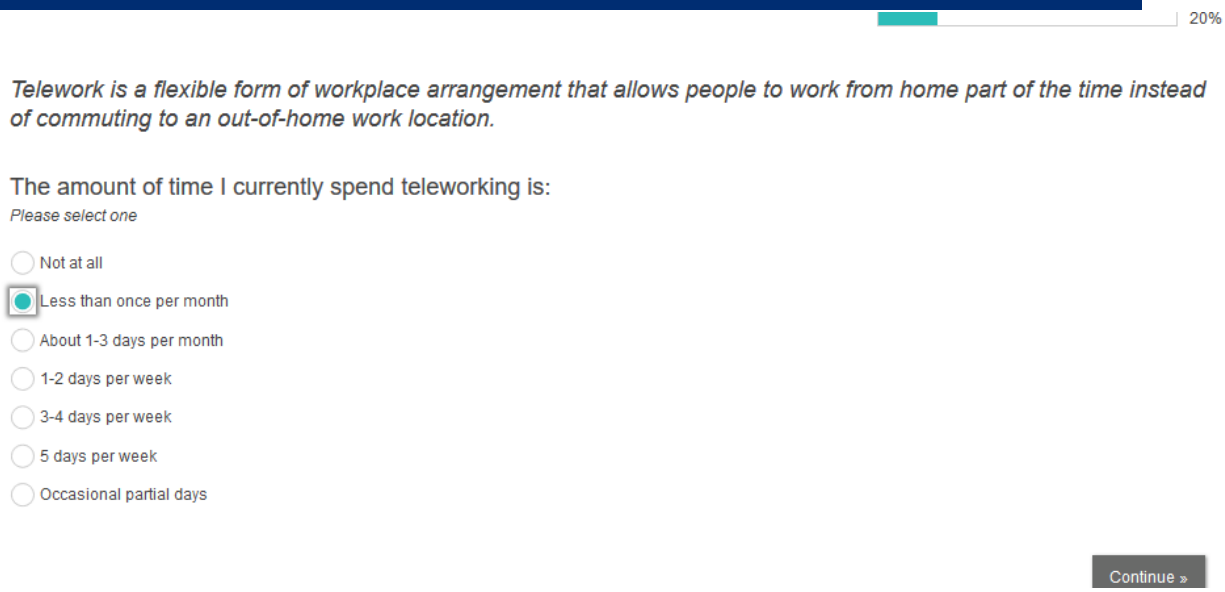
27. I typically pay $_____ [enable 0 to 99.99] per day to park at work/school.

[IF NOT THE VEHICLE DRIVER, select from rows 3,4,8,9 in Q22]

4.5 Telework

[NEW HEADER APPLICABLE TO EMPLOYED PERSONS WHO WORK OUT OF THE HOME FULL OR PART-TIME IN Q18]
Telework is a flexible form of workplace arrangement that allows people to work from home part of the time instead of commuting to an out-of-home work location.

28. The amount of time I currently spend teleworking is:
    - Not at all
    - Less than once per month
    - About 1-3 days per month
    - 1-2 days per week
    - 3-4 days per week
    - 5 days per week
    - Occasional partial days



5.0 Residence and Household

29. The dwelling unit in which I reside is best characterized as:
    House
    Apartment
    Townhouse
    Unknown
    Other [write-in]

30. Number of members in my family living at this location, including me: ___

31. Number of people under the age of 15 in my household _____

32. How frequently are you responsible for chauffeuring, dropping off, or accompanying members of your household to places or activities?

    *Never * 1-2 times per week * 3-6 times per week * 7 or more times per week

33. There are a total of _____ [between 0 and 99] employed persons in my household (including me).

34. There are a total of _____ [between 0 and 99] post-secondary students in my household (including me).

[note to Research Now: provide a hover box over "post-secondary" which defines post-secondary as "any education beyond High School, including college, university, technical schools, etc." Also emphasize the font such that individuals know that by highlighting the term they can identify the definition.]

35. My usual place of work is located in: [ASKED IF INDIVIDUAL IS BOTH EMPLOYED AND WORKED OUT OF HOME FROM Q18]
    City/Town _____

    The first three digits of your work's postal code are (i.e. A#A - no spaces in between)
    _____

    Q35. [RN: Add the following text and a live clickable link which is populated with a link to the url "maps.google.ca"].

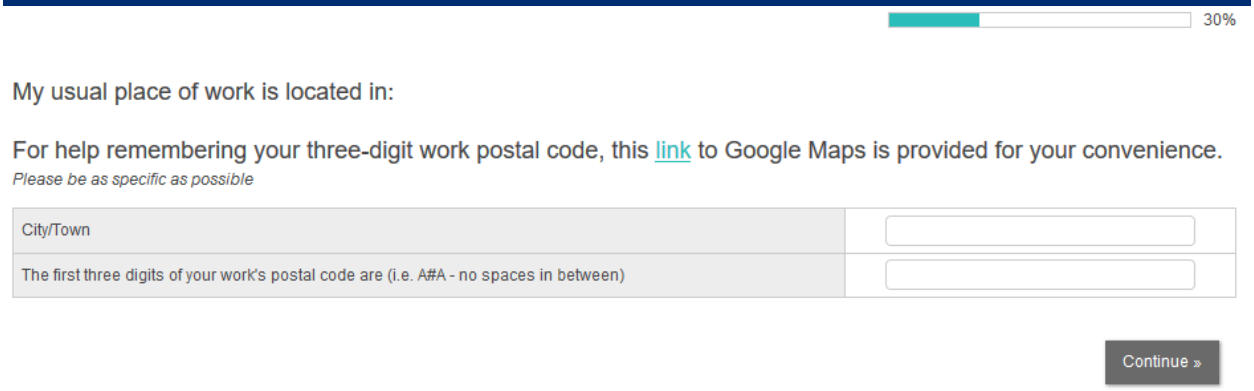
36. For help remembering your three-digit work postal code, this [link] to Google Maps is provided for your convenience.

37. My primary place of school is located in: [ASKED IF INDIVIDUAL IS A FULL OR PART-TIME STUDENT IN Q19]

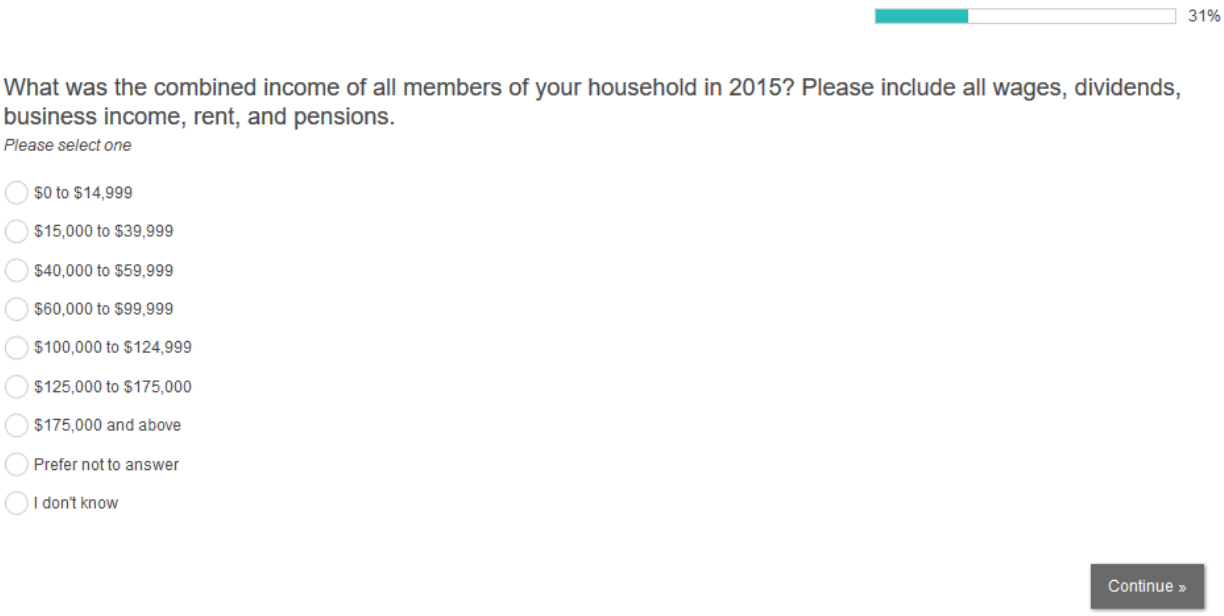
    City/Town _____
    The first three digits of your school's postal code is (i.e. A#A - no spaces in between)
    _____

    Q37. [RN: Add the following text and a live clickable link which is populated with a link to the url "maps.google.ca"].

    For help remembering your three-digit work postal code, this [link] to Google Maps is provided for your convenience.



38. What was the combined income of all members of your household in 2015? Please include all wages, dividends, business income, rent, and pensions.
    $0 to $14,999
    $15,000 to $39,999
    $40,000 to $59,999
    $60,000 to $99,999
    $100,000 to $124,999
    $125,000 to $175,000
    $175,000 and above
    Prefer not to answer
    I don't know



6.0 Vehicle Ownership

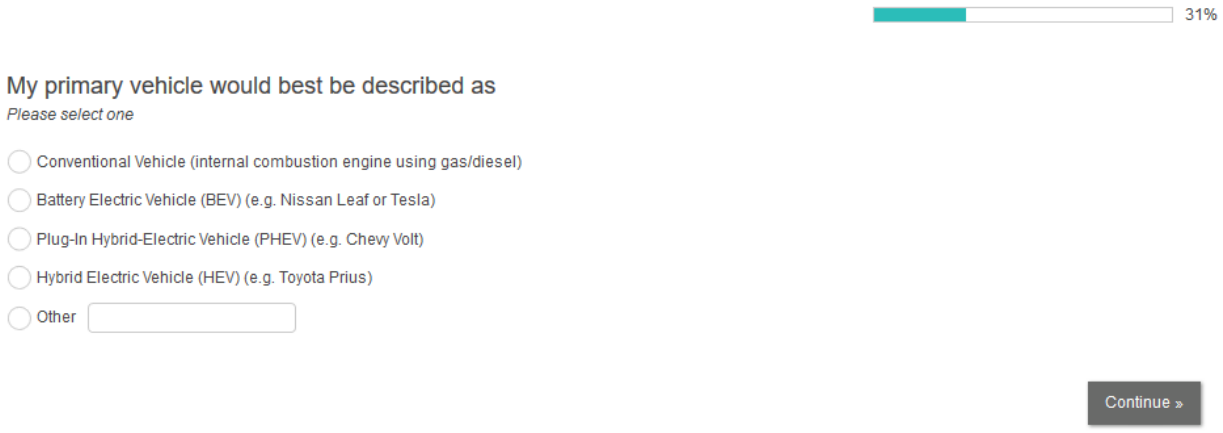
39. I, or a member of my household own(s) a vehicle where I live
    Yes
    No

40. The number of vehicles available for me to use in my household is ____. [0 to 9]
    [ASKED OF THOSE WHO HAVE ONE OR MORE VEHICLES IN HOUSEHOLD ("Yes") in Q46]

41. Approximately how far did you travel yesterday in a personal vehicle as either an auto passenger or driver?
    _____ (in kilometers) [ENABLE INTEGER BETWEEN 0 AND 999]

[FOLLOWING SECTION QUESTION ARE ASKED OF AUTO OWNERS BASED ON Q47]

42. My primary vehicle would best be described as
    Conventional Vehicle (internal combustion engine using gas/diesel)
    Battery Electric Vehicle (BEV) (e.g. Nissan Leaf or Tesla)
    Plug-In Hybrid-Electric Vehicle (PHEV) (e.g. Chevy Volt)
    Hybrid Electric Vehicle (HEV) (e.g. Toyota Prius)
    Other _____



43. Type of vehicles I, or members of my household own (enter the number of vehicles in each class; leave blank if zero) [integer 0 to >5; 0 should be the default]
    Small (i.e. Toyota Yaris, Chevrolet Cobalt) _____
    Medium (i.e. Pontiac G6 or Ford Taurus) _____
    Large (pick-up truck, minivan, or sports utility vehicle) _____
    Other

[IF ONLY ONE VEHICLE IS CHOSEN IN Q53]

44. How much did this vehicle cost you when you or your household purchased it?
    less than $15,000
    $15,000 - $30,000
    $30,000 - $45,000
    $45,000-$60,000
    more than $60,000
    Move question 53a directly after Q49.

    [IF MORE THAN ONE VEHICLE IS CHOSEN IN Q53]

45. How much did you pay for the most recent of these vehicles when you purchased it?
    less than $15,000
    $15,000 - $30,000
    $30,000 - $45,000
    $45,000-$60,000
    more than $60,000

[NEXT QUESTION IF RESPONDENT'S HOUSEHOLD DOES HAVE A CAR in Q53]

46. I am proud of my car.
    * Strongly Agree * Agree * Neither agree or disagree *Disagree * Strongly Disagree

47. In my lifetime, I have been in approximately _____ [numerical between 0 and 99] vehicle collisions while driving and _____ [numerical between 0 and 99] vehicle collisions as a passenger.

48. Are you a member of any of the following car share programs? Please select all that apply.

Car sharing is a type of self-service car rental where designated cars are available to be rented by members on an as-needed basis, typically for a short period of time.

___ I'm not a member of any car share program
___ I'm a member of ZipCar
___ I'm a member of car2go
___ I'm a member of Autoshare
___ I'm a member of another car share program: _____ [enable write-in]

7.0 Recent Daily Travel

The following section asks you questions about your travel yesterday.

49. Yesterday I took approximately _____ [ALLOW CONTINUOUS INTEGER INPUT from 0 to 99] distinct trips (e.g. from home to work, from work to lunch, etc.).

50. Yesterday, I used public transit (e.g. bus, subway, train, or streetcar)
    Yes
    No

51. Yesterday, I walked or used a bicycle
    Yes
    No

    [ask only if individual indicates >1 in Q.47]

52. Yesterday, I used a personal vehicle (e.g. car, van, truck, SUV)
    Yes
    No

53. In the past 30 days, how often have you used each of the following car share or ride share services? [INSERT A TABLE WITH BUTTONS WHICH THE PARTICIPANTS CAN CLICK.]

	I never do this.	I do this, but not in the past 30 days	1-3 times in the last 30 days	1 day / week	2-4 days / week	5 days / week	6-7 days / week
Used car2go car share							
Used other car share							
Used Uber ride share							
Used taxi							
Used a bike share program (e.g. *Bike Share Toronto*)							

[Note to Research Now: when hovering over "Uber" the participant should see the text: Uber refers to either Uber X or Uber Pool, but does not refer to Uber Eats."
[FOLLOWING QUESTION ONLY ASKED IF PARTICIPANT INDICATES THAT THEY HAVE USED UBER or TAXIS FROM ABOVE. If both Q64r3 and Q64r4 are 1, then Q64a should not be asked]

In the past 30 days, how often have you used each of the following car share or ride share services?
Please select one in each row

	I never do this.	I do this, but not in the past 30 days	1-3 times in the last 30 days	1 day / week	2-4 days / week	5 days / week	6-7 days / week
Used car2go car share	○	○	○	○	○	○	○
Used other car share	○	○	○	○	○	○	○
Used **Uber** ride share	○	○	○	○	○	○	○
Used taxi	○	○	○	○	○	○	○
Used a bike share program (*e.g. Bike Share Toronto*)	○	○	○	○	○	○	○

Continue »

54. I primarily use Uber or taxis for the following trip types [MULTI-SELECT]:
    Entertainment or recreation
    Facilitating a passenger (e.g. giving somebody else a ride)
    Shopping or errands
    Work [paid employment] /School [university, college, or trade program]
    Other _____ [ENABLE WRITE-IN].

[RN:FOLLOWING QUESTION ONLY ASKED IF PARTICIPANT INDICATES THAT THEY HAVE USED ONE OF THE FOUR CAR SHARE OPTIONS IN **Q64 Columns 2-7**. If Q58r1, Q64r1, and Q64r2 are all 1, then Q64b should not be asked.

55. I primarily use car share services for the following trip types [MULTI-SELECT]:
    Entertainment or recreation
    Facilitating a passenger (e.g. giving somebody else a ride)
    Shopping or errands
    Work [paid employment] /School [university, college, or trade program]
    Other _____ [ENABLE WRITE-IN].

8.0 General Information and Views

[INSTRUCTIONS]
In this section, we would like to ask about your views regarding your travel and housing

56. I have heard of the Google car before today
    Yes
    No
    Unsure

57. I have heard of driverless cars before today
    Yes
    No
    Unsure

9.0 Automated Vehicle Opinions and Choices

In this survey, we are interested in your preferences and opinions related to automated vehicles. Automated vehicles are cars which are equipped with technologies which reduce or eliminate the need for a human driver.

Some automated cars can make driving easier or safer but would still require a human driver. These vehicles include driver assistance technologies, such as:
automatic parallel parking,
vehicle communications to identify upcoming road conditions,
adaptive cruise control, and
automatic braking.

Other automated vehicles are driverless cars which can navigate the streets with no need for a human driver.
These vehicles currently look like conventional cars.
http://cogeng.cafe24.com/wp/wp-content/uploads/2016/01/google.jpg
[SHOW PICTURE]

Some driverless buses have also been designed and developed.
https://i.ytimg.com/vi/fEOT2sEps6Y/hqdefault.jpg
[SHOW PICTURE]

[next screen. Each of the following lines should be one click.]
Automated vehicles may improve the safety of travel.
*Car collisions resulted in almost 2,000 fatalities and more than 10,000 serious injuries in Canada in 2013 (Transport Canada, 2013**[2]**).*

*Over 90% of car collisions can be attributed to human error, such as drunk or distracted driving **[3]**.*

*Google reported its first car collision caused by one of their driverless vehicles in February 2016. At that time Google's driverless vehicles had traveled more than 1.5 million kilometers with no human at the wheel **[4]**.*

[next screen]

Driverless and automated cars could play several possible roles in passenger travel in the future. [Each of the following possibilities should be prompted on the same screen but on separate clicks.]

Possibility A. Private ownership

Privately-owned driverless and automated cars may primarily be purchased by individuals and used as they wish.

Possibility B. Shared use

Shared driverless cars may primarily be used as fleets of roaming taxis which can be hailed or scheduled electronically. "Shared," means anybody can use them for a fare, not that you must share a ride with someone else.

Possibility C. Private and shared use

Both privately-owned and shared driverless cars could become common.

Possibility D. No future for driverless cars

Both privately-owned and shared driverless cars could play a very small or non-existent roles in the future of transportation.

[next screen]

The next questions are designed to explore

a) your general interest in automated or driverless vehicles and

b) your interest based specifically on the shared or privately-held ownership models.

[QUESTIONS RESUME]

42%

In this survey, we are interested in your preferences and opinions related to automated vehicles. Automated vehicles are cars which are equipped with technologies which reduce or eliminate the need for a human driver.

Some automated cars can make driving easier or safer but would still require a human driver. These vehicles include driver assistance technologies, such as:

automatic parallel parking,
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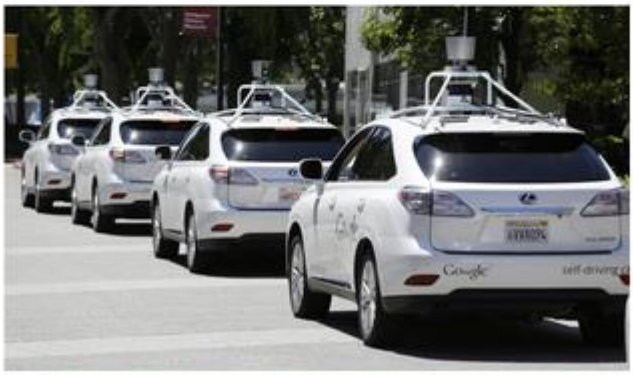
adaptive cruise control, and
automatic braking.

Other automated vehicles are driverless cars which can navigate the streets with no need for a human driver.

These vehicles currently look like conventional cars.



http://cogeng.cafe24.com/wp/wp-content/uploads/2016/01/google.jpg

Some driverless buses have also been designed and developed.

https://i.ytimg.com/vi/fEOT2sEps8Y/hqdefault.jpg

Continue »

43%

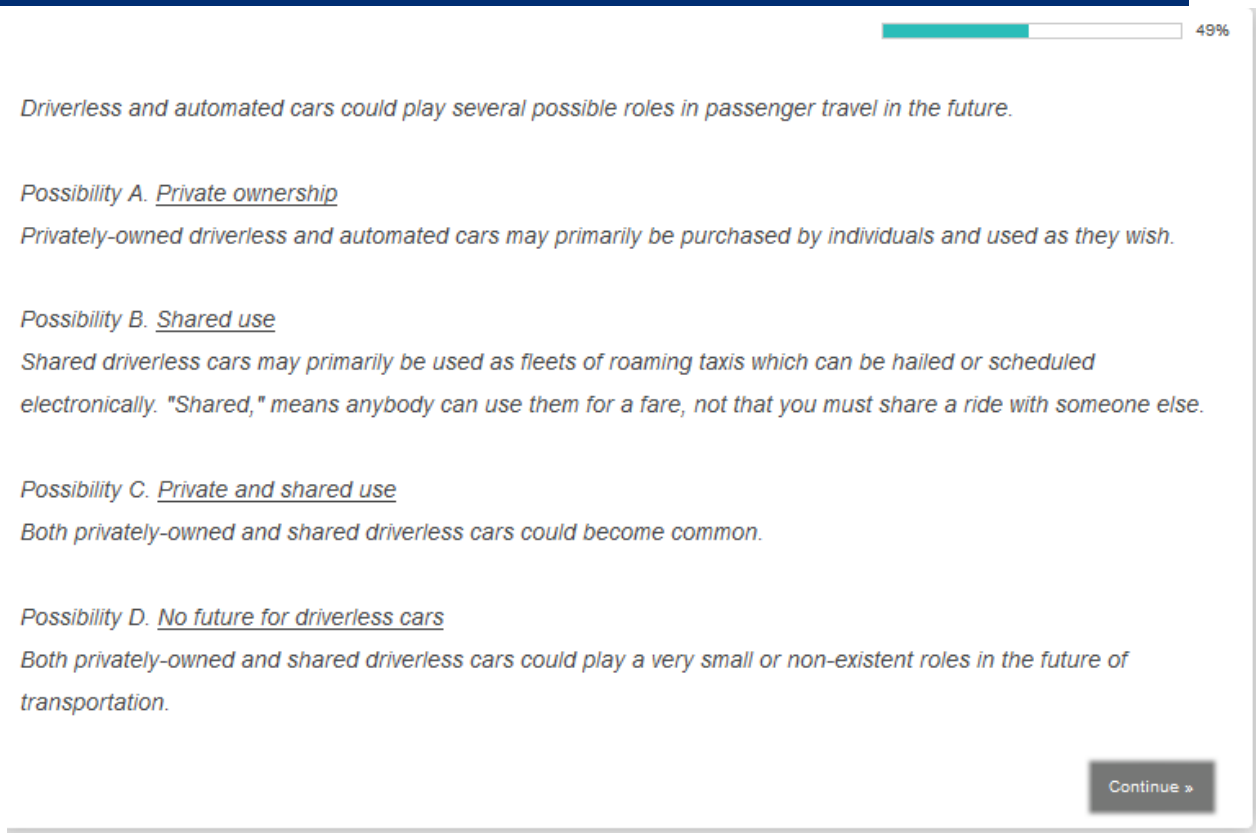
Automated vehicles may improve the safety of travel.

Car collisions resulted in almost 2,000 fatalities and more than 10,000 serious injuries in Canada in 2013 (Transport Canada, 2013).

Over 90% of car collisions can be attributed to human error, such as drunk or distracted driving.

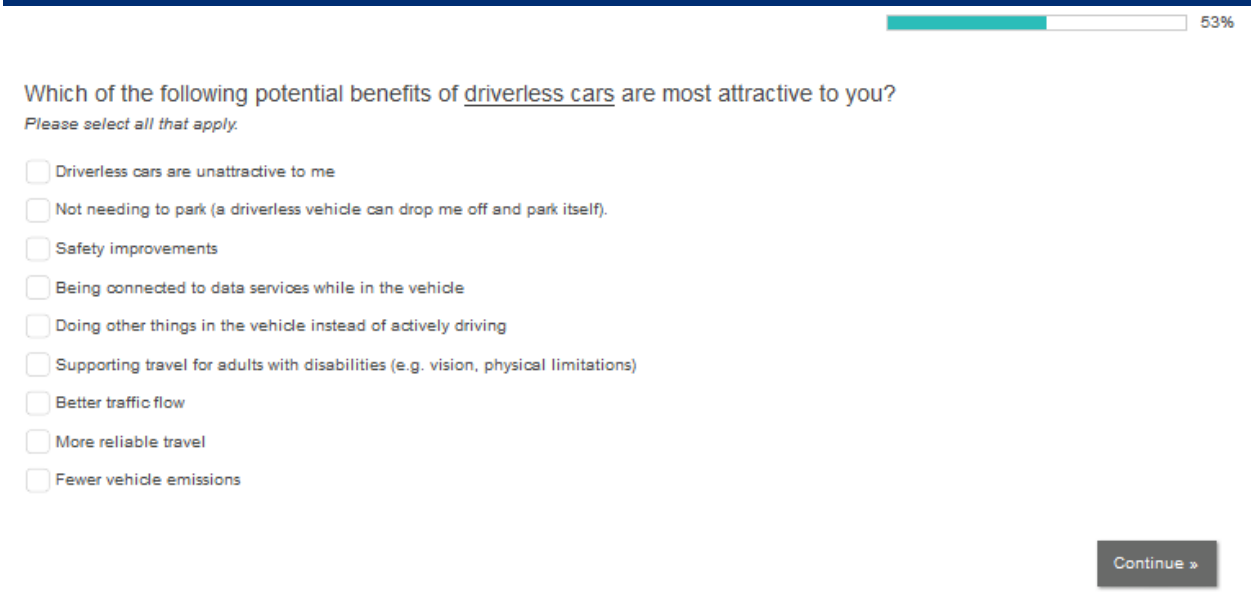
Google reported its first car collision caused by one of their driverless vehicles in February 2016. At that time Google's driverless vehicles had traveled more than 1.5 million kilometers with no human at the wheel.

Continue »



58. Which of the following potential benefits of driverless cars are most attractive to you? Select all that apply. [please make this multi-select]

Driverless cars are unattractive to me
Not needing to park (a driverless vehicle can drop me off and park itself).
Safety improvements
Being connected to data services while in the vehicle
Doing other things in the vehicle instead of actively driving
Supporting travel for adults with disabilities (e.g. vision, physical limitations)
Better traffic flow
More reliable travel
Fewer vehicle emissions



59. Would you be interested in using a driverless car on a regular basis?
    Very interested
    Somewhat interested
    Unsure
    Somewhat uninterested
    Very uninterested

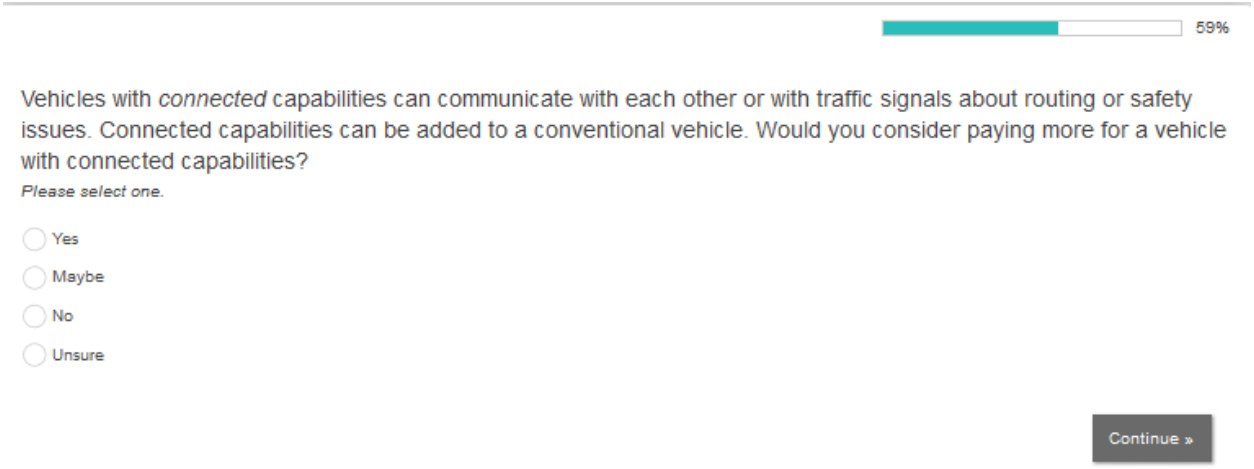
60. When would you consider purchasing a driverless car?
    I would not purchase a driverless car
    When 80% of my friends own one
    When 50% of my friends own one
    When 10% of my friends own one
    I would buy one as soon as they are available

61. If you are purchasing a new vehicle, how much more would you be willing to pay for it to be available as a fully driverless car as opposed to a conventional car ? [ASKED IF EXISTING VEHICLE OWNERS IN Q46]

62. I would not buy a driverless car
    Less than $1000
    $1000-$4999
    $5,000 to $9,999
    $10,000 to $14,999
    More than $15,000

63. Vehicles with *connected* capabilities can communicate with each other or with traffic signals about routing or safety issues. Connected capabilities can be added to a conventional vehicle. Would you consider paying more for a vehicle with connected capabilities?

    Yes
    Maybe
    No
    Unsure

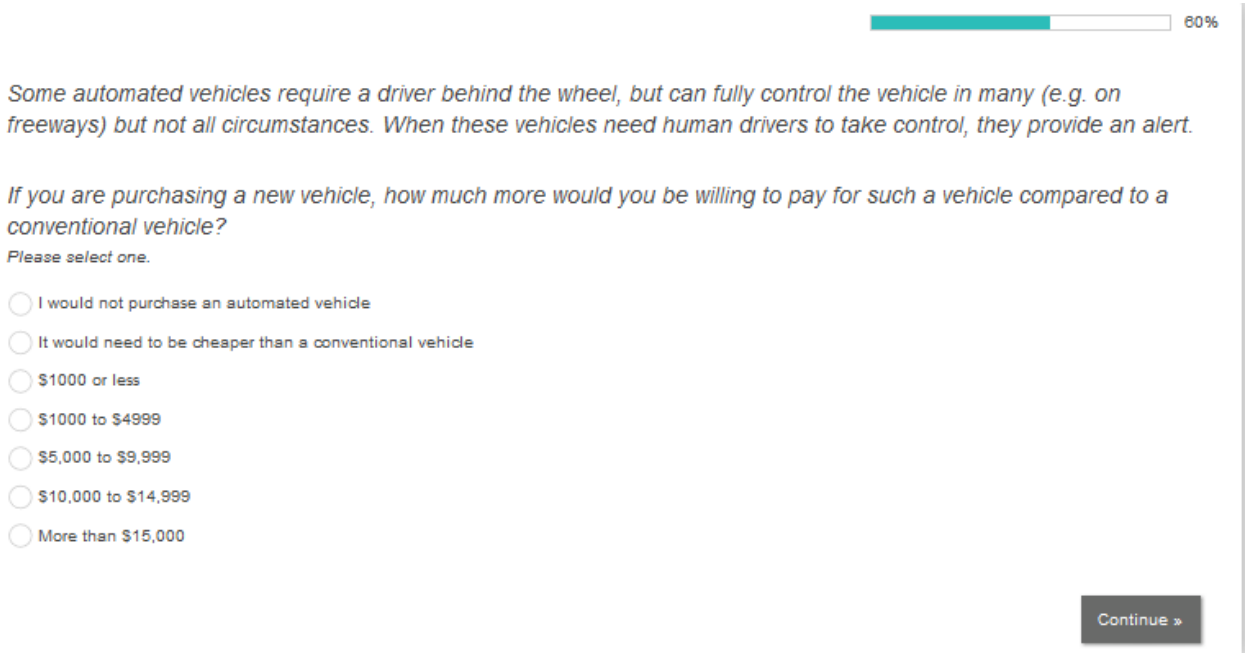


[Provide instructions.]

64. *Some automated vehicles require a driver behind the wheel, but can fully control the vehicle in many (e.g. on freeways) but not all circumstances. When these vehicles need human drivers to take control, they provide an alert.*

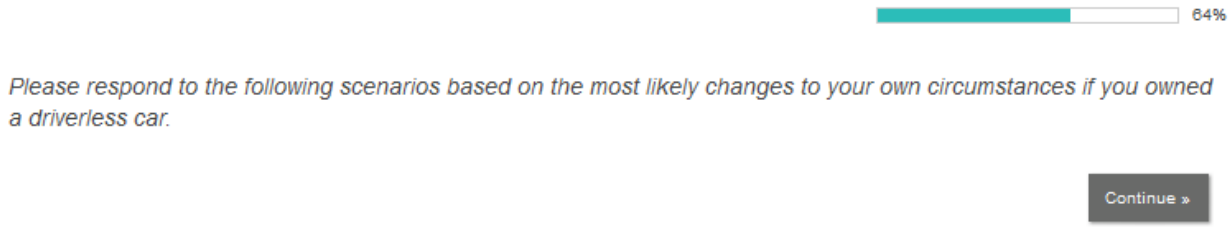
If you are purchasing a new vehicle, how much more would you be willing to pay for such a vehicle compared to a conventional vehicle? [ASKED OF EXISTING VEHICLE OWNERS]

I would not purchase an automated vehicle
It would need to be cheaper than a conventional vehicle
$1000 or less
$1000 to $4999
$5,000 to $9,999
$10,000 to $14,999
More than $15,000



10.0 Prospective Travel and Location Choices

[INSTRUCT THE SURVEY PARTICIPANTS]
Please respond to the following scenarios based on the most likely changes to your own circumstances if you owned a driverless car.

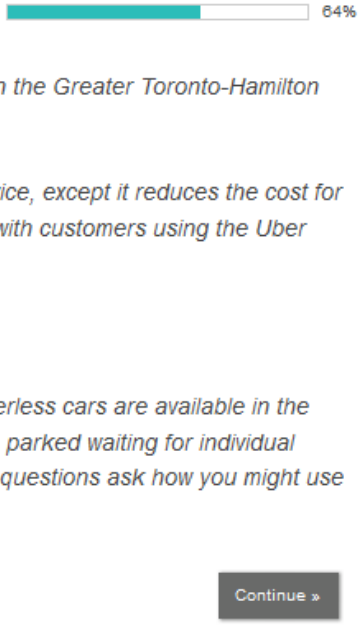


65. Suppose using a driverless vehicle does not enable you to go faster but enables you to now use that travel time for other activities while traveling. Would you be likely to travel further to work (e.g. for a better job or less expensive housing)?
    Yes
    No
    Unsure

66. Suppose using a driverless vehicle increases your commuting speed by 25% and also enables you to now use that time commuting for other activities while traveling. Would you be likely to travel further to work (e.g. for a better job or less expensive housing)?
    Yes
    No
    Unsure

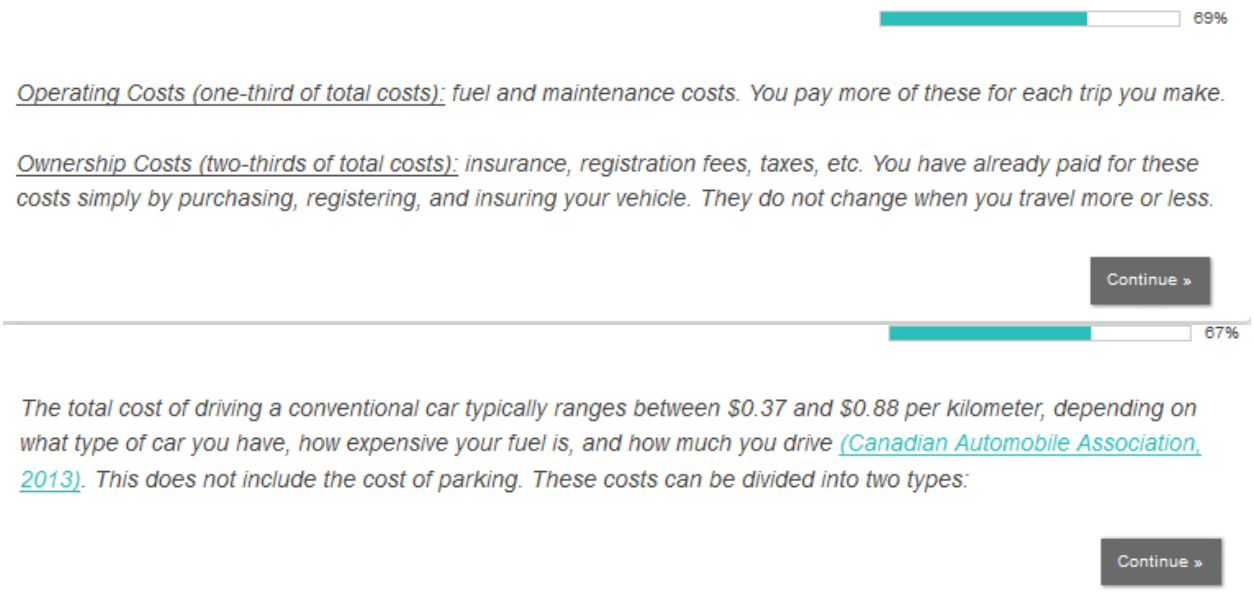
Shared driverless cars may operate very similarly to Uber, which already operates in the Greater Toronto-Hamilton Area.
Uber has emerged as a technology-enabled mobility service which is like a taxi service, except it reduces the cost for users to find potential ride services to their destinations. Uber drivers are matched with customers using the Uber smartphone app.

Shared Driverless Vehicles
Imagine a future in which Uber-style shared (meaning, anybody can use them) driverless cars are available in the Greater Toronto-Hamilton Area. These cars would constantly be in circulation or be parked waiting for individual customers (just like taxis) and they would not have any human driver. The following questions ask how you might use such services and change how you travel.



[NEXT SCREEN]
*The total cost of driving a conventional car typically ranges between $0.37 and $0.88 per kilometer, depending on what type of car you have, how expensive your fuel is, and how much you drive (Canadian Automobile Association, 2013**[5]**). This does not include the cost of parking. These costs can be divided into two types:*

> *[After participant clicks next, both of these types appear on the same screen]*
> *<u>Operating Costs (one-third of total costs)</u>: fuel and maintenance costs. You pay more of these for each trip you make.*
>
> *<u>Ownership Costs (two-thirds of total costs)</u>: insurance, registration fees, taxes, etc. You have already paid for these costs simply by purchasing, registering, and insuring your vehicle. They do not change when you travel more or less.*

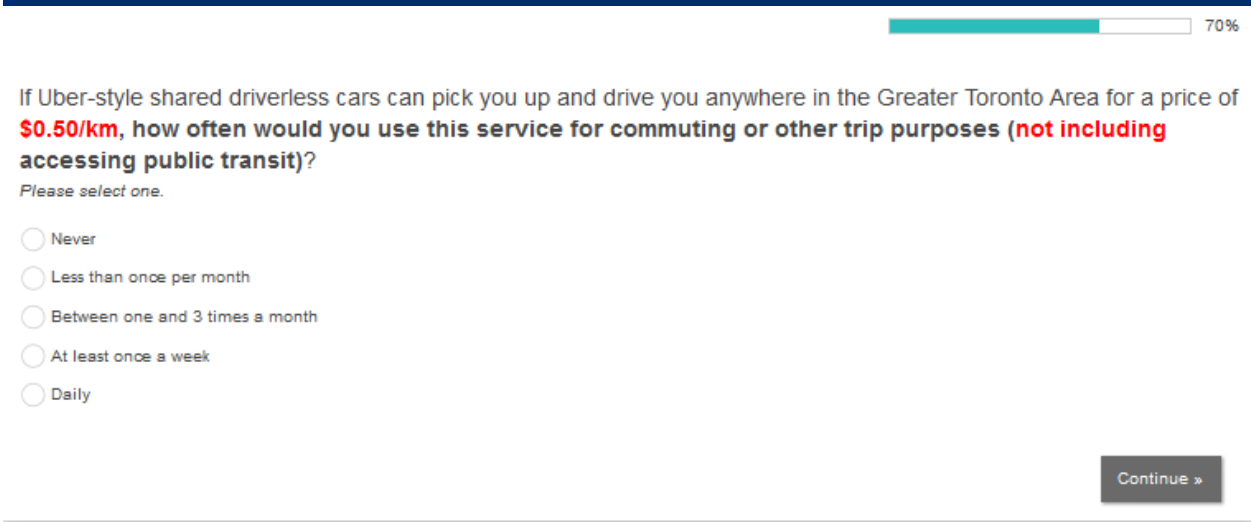


[FOLLOWING QUESTIONS ASKED OF ALL]

67. If Uber-style shared driverless cars can pick you up and drive you anywhere in the Greater Toronto Area for a price of **$0.50/km, how often would you use this service for commuting or other trip purposes (not including accessing public transit)?**

[if survey participant hovers over the parenthesis section here, the text should explain, "Here we are simply asking about door-to-door trips directly to your destination that could occur by driverless car, not (for example) trips in which you might take a driverless car to access a public transit station."]

Never
Less than once per month
Between one and 3 times a month
At least once a week
Daily



68. If Uber-style shared driverless cars can pick you up and drive you anywhere in the Greater Toronto Area for a price of **$1/km, how often would you use this service for commuting or other trip purposes (not including using accessing public transit)?**
    Never

    Less than once per month
    Between one and 3 times a month
    At least once a week
    Daily
    [RN: If Q78== Row 1 (Never), skip Q79]

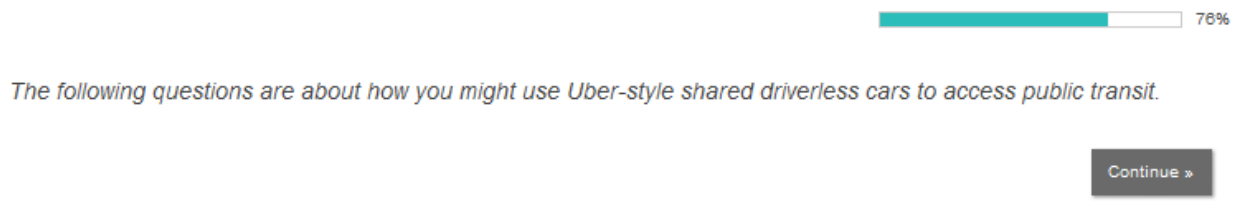
69. If Uber-style shared driverless cars can pick you up and drive you anywhere in the Greater Toronto Area for a price of **$1.50/km, how often would you use this service for commuting or other trip purposes (not including accessing public transit)?**
    Never
    Less than once per month
    Between one and 3 times a month
    At least once a week
    Daily

    [RN: If Q78== Row 1 (Never) or Q79 == Row 1 (Never), skip Q80]

70. What is the highest price of using an Uber-style shared driverless car at which you would consider either selling one of your current vehicles or not replacing one as it ages?
    I would not consider eliminating a current vehicle.
    $0.25 per kilometer
    $0.50 per kilometer
    $1.00 per kilometer
    $1.50 per kilometer

71. For what type of trips do you imagine using Uber-style shared driverless cars (independent of accessing public transit)? Select any that apply.
    Entertainment or recreation
    Facilitating a passenger (e.g. giving somebody else a ride)
    Shopping or errands
    School
    Work
    Other _____ [ENABLE WRITE-IN].
    I would not travel in an Uber-style shared driverless car

The following questions are about how you might use Uber-style shared driverless cars to access public transit.



72. If Uber-style shared driverless cars can pick you up and drive you anywhere in the Greater Toronto Area for a price of **$0.50/km**, how often would you use this service as a means of **getting to/from a public transit station (for example, a GO or TTC station)**?
    Never
    Less than once per month
    Between one and 3 times a month
    At least once a week
    Daily

73. If Uber-style shared driverless cars can pick you up and drive you anywhere in the Greater Toronto Area for a price of **$1/km**, how often would you use this service as a means of **getting to/from a public transit station (e.g. a GO or TTC station)**?
    Never

    Less than once per month
    Between one and 3 times a month
    At least once a week
    Daily

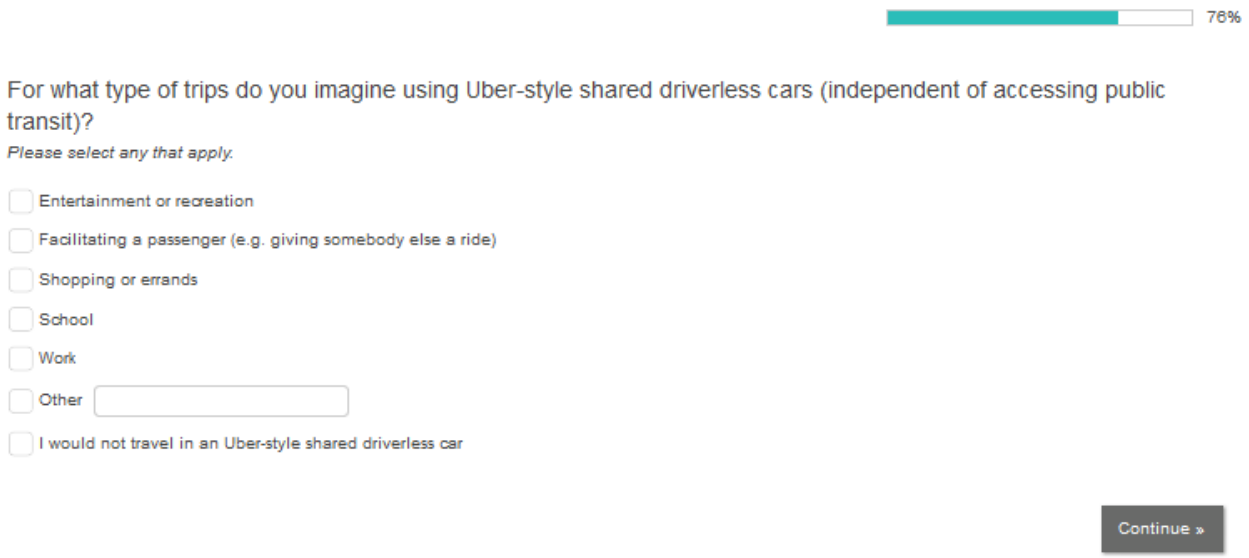
[RN: If Q83== Row 1 (Never) , skip Q84]

74. If Uber-style shared driverless cars can pick you up and drive you anywhere in the Greater Toronto Area for a price of **$1.50/km**, how often would you use this service as a means of **getting to/from a public transit station (e.g. a GO or TTC station)**?
    Never
    Less than once per month
    Between one and 3 times a month
    At least once a week
    Daily

[RN: If Q83== Row 1 (Never) or Q85 == Row 1 (Never), skip Q85]

75. Would you be willing to share a ride in an Uber-style shared driverless car with another person?
    Yes
    No
    Unsure

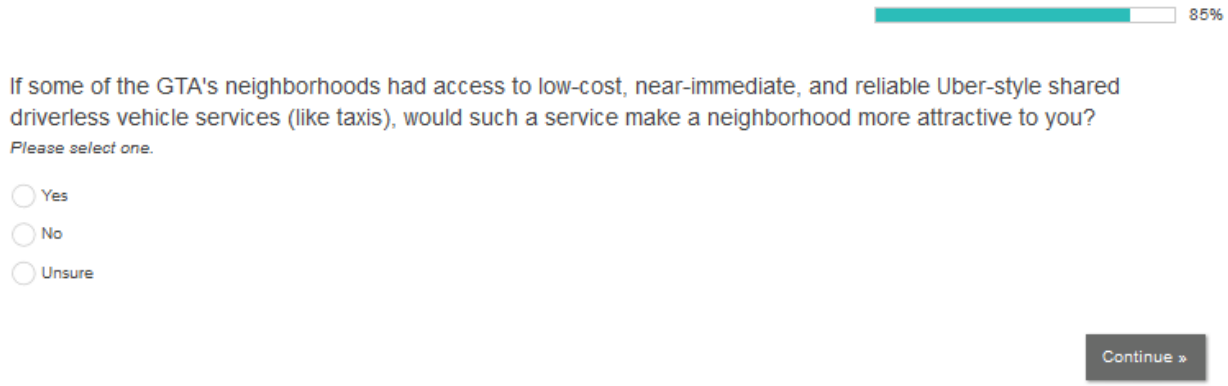
76. For what type of trips do you imagine using Uber-style shared driverless cars as a means of getting to/from a public transit station (e.g. a GO or TTC station)? Select any that apply.
    Entertainment or recreation
    Facilitating a passenger (e.g. giving somebody else a ride)
    Shopping or errands
    Work [paid employment] /School [university, college, or trade program]
    Other _____ [ENABLE WRITE-IN].
    I would not travel in an Uber-style shared driverless car



[RN: Do not ask Q77 if individual indicates "I would not buy a driverless ca]

77. If you owned a driverless car, how interested would you be in "leasing" that vehicle for a cost to others for individual trips when you do not need it?
    Very interested
    Somewhat interested
    Uninterested

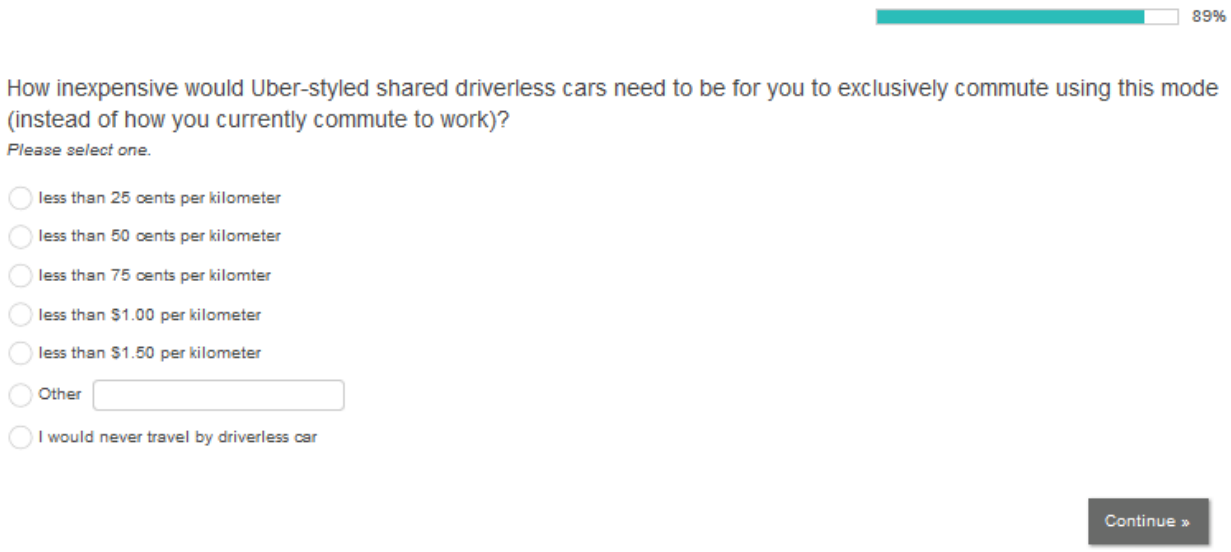
78. If some of the GTA's neighborhoods had access to low-cost, near-immediate, and reliable Uber-style shared driverless vehicle services (like taxis), would such a service make a neighborhood more attractive to you?
    Yes
    No
    Unsure



79. Would you be willing to use Uber-style shared driverless cars at a reduced price in exchange for sharing the vehicle for part of your trip with another customer?
    Yes
    Sometimes
    No
    Don't know.

80. How inexpensive would Uber-styled shared driverless cars need to be for you to exclusively commute using this mode (instead of how you currently commute to work/school)?

    less than 25 cents per kilometer
    less than 50 cents per kilometer
    less than 75 cents per kilometer
    less than $1.00 per kilometer
    less than $1.50 per kilometer
    Other ____[ENABLE WRITE-IN]
    I would never travel by driverless car



11.0 Automated Vehicles and Public Policy

81. Automated and driverless vehicles are likely to become more common in the future. How should governments respond?

Actively encourage the use of automated vehicles
Actively discourage the use of automated vehicles
Monitor the use of such vehicles and respond when necessary
Not be involved and let the market of consumers, driverless car manufacturers and service providers decide how and when these vehicles should be used
Unsure

82. Would you support investment to encourage, support, or regulate automated vehicles?

Yes [then Q97]
No (skip Q97)
Unsure (skip then Q97) [this should now be "then"]

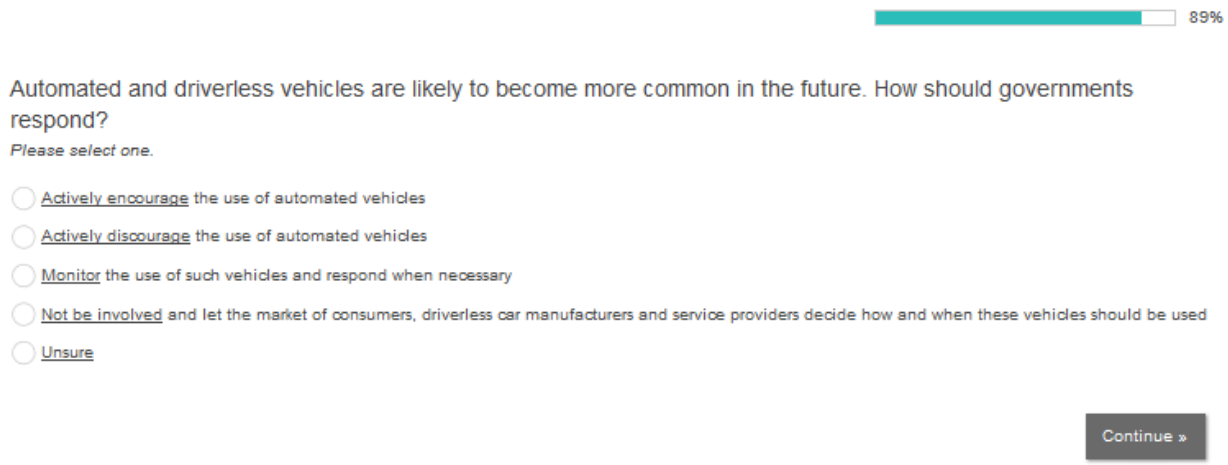
83. Should this investment be funded through additional taxes?
Yes
No
Unsure

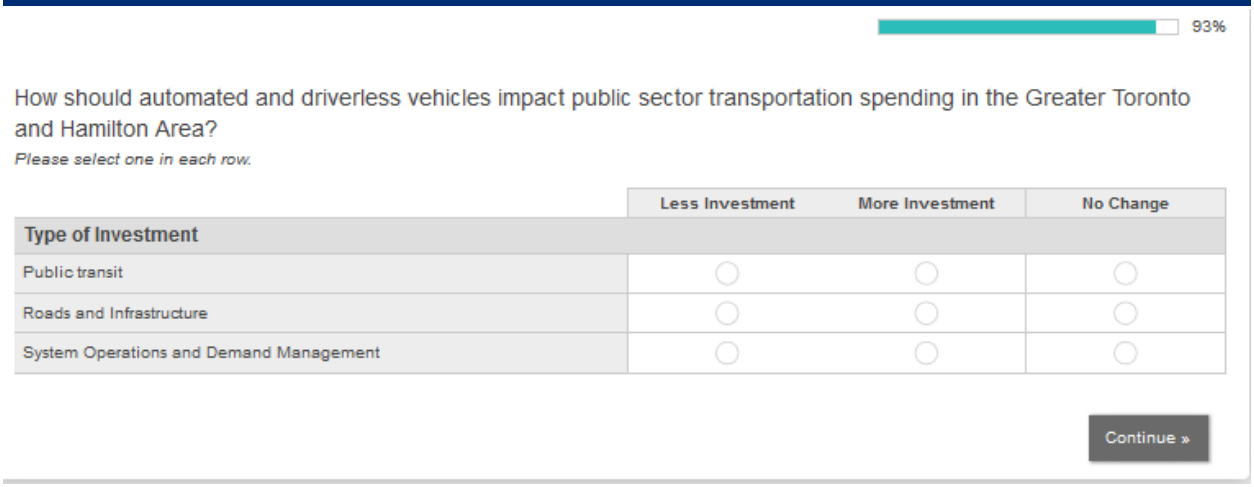
84. How should automated and driverless vehicles impact public sector transportation spending in the Greater Toronto and Hamilton Area?

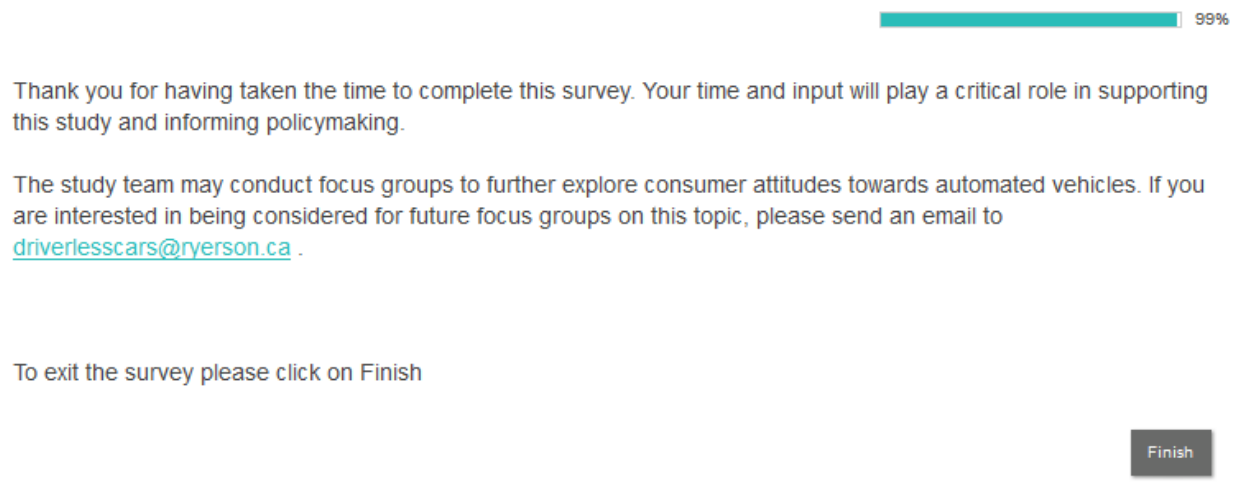
Type of Investment	**Less Investment**	**More Investment**	**No Change**
Public transit			
Roads and Infrastructure			
System Operations and Demand Management			

85. Do you expect governments to regulate how automated and driverless vehicles are used?
    Yes
    No
    Unsure

86. Should governments become "innovators" and take the lead on using driverless cars?
    Yes
    No
    Unsure







To exit the survey please click [HERE].
[final screen]
Thank you for having taken the time to complete this survey. Your time and input will play a critical role in supporting this study and informing policymaking.
The study team may conduct focus groups to further explore consumer attitudes towards automated vehicles. If you are interested in being considered for future focus groups on this topic, please send an email to driverlesscars@ryerson.ca .

---

[1] Question based on Transportation Tomorrow Survey (2011)
[2] *https://www.tc.gc.ca/media/documents/roadsafety/cmvtcs2013_eng.pdf*
[3] https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/811059
[4] https://www.wired.com/2016/02/googles-self-driving-car-may-caused-first-crash/
[5]http://www.caa.ca/wp-content/uploads/2012/06/CAA_Driving_Cost_English_2013_web.pd