Multiple Linear Regression for Number of Cars per Household

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# Develop The Model

33 dependent variables from the survey were chosen:

* Q6 - How long have you been a member of a CSO
* Reasons for CS use
  + Q7\_1 - To reduce carbon footprint
  + Q7\_2 - To save money
  + Q7\_3 - For convenience
  + Q7\_4 - ‘Just in case’ you need it
  + Q7\_5 - Because there is no Uber/Lyft in town
  + Q7\_6 - Personal safety - safer than public transit
* Q8 - Have you disposed a vehicle and used CS instead
* Q9 - Without CS would you have bought or acquired a vehicle?
* Cost-related reasons for CS use
  + Q10\_1 - CS saves me money because I don’t have to own a vehicle (or another vehicle)
  + Q10\_2 - CS saves me money because it’s cheaper than using a taxi
  + Q10\_3 - I look at the cost of CS vs cost of walking or biking
  + Q10\_4 - I look at the cost of CS vs the cost of public transit
  + Q10\_5 - I rarely evaluate the cost of using CS versus the alternatives
* Q11 - Can I afford another vehicle?
* Material benefits of CS
  + Q13\_1 - Easier to meet up with friends and family
  + Q13\_2 - I go to more places in the city
  + Q13\_3 - I go to more places outside the city
  + Q13\_4 - I get ‘stuff’ done more efficiently; errands, meetings, shopping, etc
* Mental benefits of CS
  + Q14\_1 - I enjoy the freedom
  + Q14\_2 - I like not having to rely on others for a ride
  + Q14\_3 - Peace of mind knowing I have personal mobility when needed
  + Q14\_4 - I like not owning a vehicle (or another vehicle)
  + Q14\_5 - I like having different options for getting around
* Q15 - Has your CS use fallen off?
* Q23 - Age
* Q24 - Gender
* Q26 - Number of drivers per household
* Q27 - Number of vehicles per household
* Q28 - Number of children per household
* Q29 - Are you a homeowner
* Q30 - Affordability index
* Q31 - Income

Variables were chosen to be either numerical, ordinal, or binary.

# Results

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| term | estimate | std.error | statistic | p.value | Sig. |
| (Intercept) | 0.4981445 | 0.2435213 | 2.0455891 | 0.0409393 | \* |
| Q6 | -0.0234953 | 0.0179798 | -1.3067621 | 0.1914575 |  |
| Q7\_1 | -0.0047924 | 0.0131641 | -0.3640517 | 0.7158614 |  |
| Q7\_2 | 0.0274959 | 0.0129362 | 2.1254951 | 0.0336787 | \* |
| Q7\_3 | -0.0117802 | 0.0268604 | -0.4385708 | 0.6610242 |  |
| Q7\_4 | 0.0435445 | 0.0109933 | 3.9610159 | 0.0000775 | \*\*\* |
| Q7\_5 | 0.0138463 | 0.0109130 | 1.2687881 | 0.2046777 |  |
| Q7\_6 | 0.0495837 | 0.0122110 | 4.0605601 | 0.0000510 | \*\*\* |
| Q8 | 0.0749231 | 0.0383533 | 1.9535002 | 0.0509123 | . |
| Q9 | -0.0912904 | 0.0342926 | -2.6621017 | 0.0078333 | \*\* |
| Q10\_1 | -0.1187569 | 0.0132421 | -8.9681372 | 0.0000000 | \*\*\* |
| Q10\_2 | 0.0290069 | 0.0172420 | 1.6823407 | 0.0926731 | . |
| Q10\_3 | -0.0204464 | 0.0118551 | -1.7246930 | 0.0847514 | . |
| Q10\_4 | 0.0123653 | 0.0130594 | 0.9468524 | 0.3438388 |  |
| Q10\_5 | 0.0373704 | 0.0125846 | 2.9695357 | 0.0030212 | \*\* |
| Q11 | -0.0042361 | 0.0376565 | -0.1124934 | 0.9104445 |  |
| Q13\_1 | 0.0197655 | 0.0143461 | 1.3777576 | 0.1684463 |  |
| Q13\_2 | 0.0040465 | 0.0137672 | 0.2939227 | 0.7688502 |  |
| Q13\_3 | -0.0638720 | 0.0118592 | -5.3858430 | 0.0000001 | \*\*\* |
| Q13\_4 | -0.0642056 | 0.0138663 | -4.6303429 | 0.0000039 | \*\*\* |
| Q14\_1 | 0.0029636 | 0.0201348 | 0.1471875 | 0.8830002 |  |
| Q14\_2 | -0.0065449 | 0.0159114 | -0.4113331 | 0.6808764 |  |
| Q14\_3 | 0.0144001 | 0.0207512 | 0.6939423 | 0.4878063 |  |
| Q14\_4 | -0.0514668 | 0.0113638 | -4.5290173 | 0.0000063 | \*\*\* |
| Q14\_5 | 0.0624711 | 0.0229760 | 2.7189689 | 0.0066103 | \*\* |
| Q15 | -0.0702900 | 0.0361061 | -1.9467644 | 0.0517156 | . |
| Q23 | 0.0195239 | 0.0165925 | 1.1766648 | 0.2394821 |  |
| Q24 | -0.0841059 | 0.0287892 | -2.9214359 | 0.0035268 | \*\* |
| Q26\_1\_TEXT | 0.5176322 | 0.0176093 | 29.3953323 | 0.0000000 | \*\*\* |
| Q28 | 0.0427344 | 0.0249494 | 1.7128414 | 0.0869108 | . |
| Q29 | -0.1603582 | 0.0402112 | -3.9879012 | 0.0000693 | \*\*\* |
| Q30 | -0.0526425 | 0.0238598 | -2.2063226 | 0.0274850 | \* |
| Q31 | 0.0234144 | 0.0127596 | 1.8350423 | 0.0666614 | . |

After doing this analysis, these are the variables that have explanatory power (at an ) over type of CS usage:

* Q6 - How long have you been a member of a CSO
  + Correlation between people being members for longer periods of time and having fewer cars
* Q7\_2 - To save money
  + Correlation between people agreeing and having more cars
* Q7\_4 - ‘Just in case’ you need it
  + *STRONG* correlation between people agreeing and having more cars
* Q7\_6 - Personal safety - safer than public transit
  + *STRONG* correlation between people agreeing and having more cars
* Q9 - Without CS would you have bought or acquired a vehicle?
  + 2=no, 1=yes.
  + Correlation between people agreeing and having more cars
* Q10\_1 - CS saves me money because I don’t have to own a vehicle (or another vehicle)
  + Correlation between people agreeing and having fewer cars
* Q10\_5 - I rarely evaluate the cost of using CS versus the alternatives
  + Correlation between people agreeing and having more cars
* Q11 - Can I afford another vehicle?
  + 2=no, 1=yes.
  + Correlation between people agreeing and having more cars (woo hoo)
* Q13\_3 - I go to more places outside the city
  + *STRONG* correlation between people agreeing and having fewer cars
* Q13\_4 - I get ‘stuff’ done more efficiently; errands, meetings, shopping, etc
  + *STRONG* correlation between people agreeing and having fewer cars
* Q14\_4 - I like not owning a vehicle (or another vehicle)
  + *STRONG* correlation between people agreeing and haing fewer cars
* Q23 - Age
  + Correlation between people being older and using two-way over both
* Q24 - Gender
  + 2=female, 1=male.
  + Correlation between people being male and having more cars
* Q26 - Number of drivers per household
  + *STRONG* correlation between there more drivers per household and having more cars (woo hoo)
* Q29 - Are you a homeowner
  + 2=no, 1=yes
  + *STRONG* correlation between being a homeowner and having more cars
* Q30 - Affordability index
  + Correlation between finding Vancouver more affordable and having more cars