

Using GPS technology to track hitchhiker activity in Northern BC

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Abstract: Understanding the demographics of hitchhiking can help inform agencies involved in hitchhiking risk and crime prevention to make evidence-based decisions. Using dash-mounted GPS devices designed specifically for this purpose, we partnered with five courier companies to collect temporal and spatial data on hitchhiking activity in northern British Columbia between June 2012 and October 2014. Data collected were: location, time of day, gender, and whether or not the hitchhiker was alone (or in a pair or group). Some citizen science GPS data were also gathered (February to November 2012), along with hitchhiker interview information collected by local highway patrol officers. A total of 775 records revealed that the largest number of hitchhikers in northern British Columbia were First Nations and male between 20 and 49 years of age. Our data suggest that most hitchhikers traveled alone, in the summer, and in the early evening hours. Findings from our study have been mapped and provided to the local Office of the Highway Patrol for risk and crime prevention purposes.

Keywords: Bus, First Nations, GIS, Highway of Tears, Highway Patrol, Mapping

Introduction

The phenomenon of hitchhiking is poorly represented in the peer-reviewed literature (Chesters and Smith 2001). The literature that exists in North America provides little quantitative information (Compagni Portis 2015), and few data other than anecdotal accounts have been recorded on where hitchhiking hotspots are located and/or the characteristics of hitchhikers in northern British Columbia (BC), Canada. The prominence of hitchhiking in the literature has declined since the 1970s along with the decline in the popularity of hitchhiking (Compagni Portis 2015). This decline in literature has created a knowledge gap that

makes it difficult to pinpoint or analyze hitchhiking trends, which would be useful in addressing violence against hitchhikers and for hitchhiking mitigation campaigns. To date, a single report appears to be the only existing study throughout all North America that broadly characterizes hitchhiking. This report from the California Highway Patrol (1974) found that in 71.7% of major crimes related to hitchhiking, the hitchhiker and not the driver, was the victim of foul play, although drivers can also be targeted by hitchhikers. Although hitchhikers, rather than drivers, generally face a disproportionate level of danger, British Columbia's laws that relate to pedestrians

and solicitation on roadways address collision mitigation and driver safety, rather than the safety of hitchhikers. In comparison with other parts of Canada, Ontario has similar laws to British Columbia: both provinces disallow pedestrians from freeways or restrict pedestrians to the shoulder of certain categories of highways while limiting solicitation to obtain a ride to commercial passenger vehicles only (Highway Traffic Act 1990, Motor Vehicle Act 1996, Safe Streets Act 2004). British Columbia's neighbouring province of Alberta, in contrast, does not appear to have any language in its Traffic Safety Act (2000) to restrict pedestrian activity. Overall, data collected on hitchhiker activity could be a valuable tool for prevention of related violent crimes and could also inform legislation and hitchhiking mitigation campaigns.

The objective of this project was to determine spatial and temporal trends in hitchhiker activity and characterize the types of hitchhikers traveling throughout northern BC (i.e., generate trends to help us better understand the "who, what, when, and where" of hitchhiking). Our prediction was that hitchhiking activities would be concentrated in geography and time (season and time of day) and that our data could help to elucidate patterns needed to mitigate undesirable consequences of hitchhiking. Because little is known about the proportion of males to females and solo to group hitchhiking (Greenley and Rice 1974), we sought to describe patterns endemic to northern BC.

Background

Hitchhiking is a common method of travel that has been used for decades throughout much of North America (Schlebecker 1958, Mahood 2018). It is often the only option available for people living in small, remote communities where public transportation is rare or non-existent (Morton 2016) and other forms of ride-sharing do not exist (Mote and Whitestone 2011). Many people hitchhike to obtain basic needs and services that are not available in smaller communities, such as attending medical or dental appointments, buying groceries, and filling prescriptions. Hitchhiking is a high-risk activity (Miller 1973) that is believed to have played a part in the disappearance of young females across Canada (Mahood 2016) and women from northern British Columbia along what has come to be known as the Highway of Tears (Harper 2006, Leidli T'enneh First Nation et al. 2006). This Highway mostly comprises a 724-km stretch of the Yellowhead Highway 16 between Prince George and Prince Rupert, although some of the victims associated with this phenomenon were also found near Highway 5, which runs from Tete Jaune Cache to Hope, British Columbia, and Highway 97 which runs from Dawson Creek to the United States border near Osoyoos.

Methods

Partner and Citizen Science Data

We worked with Persentech Industries (Winnipeg, Manitoba) to design and develop a mobile GPS device that could be easily used by drivers to record various types of hitchhikers at the push of a button. We helped design units (referred to here as

Otto Hitchhiker® units) that were used to gather data from courier and trucking companies that travel highways throughout northern British Columbia. Vehicles were equipped with Otto Hitchhiker® units recording date, time, and location of the hitchhiker sighting with the driver pressing one of five buttons: Female (Single), Male (Single), Unknown (gender; Single), Couple (gender irrelevant), or Group (gender irrelevant) (Figure 1).



Figure 1. Persentech Otto Hitchhiker units modified to gather information on hitchhikers by pressing Group, Couple, Unknown, Female, or Male buttons. A red error button was later added.

To conduct the work, we partnered with five courier companies—Valhalla Transport (route: Prince George to Prince Rupert), BNS Transport (Prince George to Fort St. James), LTC Transport (100 Mile House to Prince George), Rosenau Transport (Prince

George to Fort St. John, Prince George to Quesnel), and Two Rivers Transport (hotshot service in/around Prince George) who helped us collect data from 2012 to 2014 along two major highway routes bisecting Prince George, BC. Our goal was to collect hitchhiker data that would be of use to the BC Highway Patrol for ongoing highway safety and violent crime prevention measures.

These data were vetted and compiled at the University of Northern British Columbia to determine the proportion of each type of hitchhiker and the times of year and day that hitchhikers were seen. In addition, maps were generated using Google Fusion Tables to give a spatial representation of hitchhikers according to time of year and type of hitchhiker. The mapped data portray records from June 1, 2012 to October 20, 2014, but have been kept confidential (and jittered in our maps below; see methods) as locations of hitchhikers are seen as particularly sensitive information. The majority of vehicles (but not all) outfitted with our Otto Hitchhiker units had regular schedules, traveling through certain cities at specific times; consequently, we were not able to ascertain if there were any time-of-day peaks in hitchhiking in specific locations, and can only judge times on a broad scale. To this end, sighting data reported here should not be interpreted beyond the scheduling constraints of the vehicles and their drivers operating the units, although we contend that our findings such as season of hitchhiking and composition of hitchhikers (male vs. female) should not be

influenced by courier scheduling constraints.

Because Otto Hitchhiker units were added and removed from routes by couriers at various times according to scheduling requirements, the number of hitchhikers at some times of year could not be accurately compared when all of the data were compiled. To control for these fluctuations, we analyzed the yearly trend of hitchhiking sightings within Otto units. We focused on the three longest running units: Units 1 and 2, which traveled from Prince George to Prince Rupert; and Unit 4, which traveled from Prince George to Fort St. James.

In addition to data collected by our partner vehicles, a citizen science aspect of our project which employed the use of personal GPS devices, provided us with opportunistic GPS data with the type, day, and time of hitchhiker sightings from north central BC during the same years. These data were not restricted to main travel routes, and locations were considered to represent a general area rather than a specific location (because of the time required to gain a GPS signal using handheld devices). Citizen science data were vetted by the same standards as the Otto Hitchhiker unit data, but due to the clarity of submitted records, no data needed to be removed.

RCMP Data

One hundred twenty-six records were collected between February 1, 2012, and November 17, 2012, from RCMP street checks that allowed us to compare time and type of hitchhiker with our GPS data, as well as analyze age and ethnic background. The

type of hitchhiker recorded by RCMP members were either male or female, so we investigated time, location, and officer notes to determine which individual records were actually people traveling in couples or groups. Due to our subsequent combination of records, some analyses may not sum to 126 records. Unknown genders were not an issue as highway patrol officers stopped and spoke with each hitchhiker. It is important to note that RCMP data represent the number of hitchhikers seen at a particular day and time, as opposed to the GPS data which represent number of sightings and could include multiple people. This was a minor issue when there were few RCMP sightings of couples or groups, but should be considered when there were several sightings. To determine the age distribution of hitchhikers we divided age into general categories of 0-19, 20-29, 30-39, 40-49, 50-59, and 60+. Ethnic background was categorized into three main groups: First Nations, Caucasian, and Other. The "Other" category represented Asian, Black, Hispanic, and unknown.

Vetting

Data vetting was completed using driver input and data analysis with Microsoft Excel 2007. GPS units were equipped with an error button which allowed drivers to inform us if they accidentally pressed an incorrect button. Any record occurring in the minute previous to an error message was therefore deleted. Multiple records that were the same (duplicates) were assumed to be the result of a button sticking and all but one of such records were deleted. Records that occurred at the

exact same time and location but were different types were assumed to be from accidentally pressing more than one button at the same time; in these cases, only one record was retained and the hitchhiker type was changed to unknown. Finally, some records occurred in a series where many buttons were pressed at the same time or within a few seconds of each other, which is unlikely given the driver was instructed to just hit “group” if multiple hitchhikers were in the same place. When this pattern occurred all records were deleted, assuming something was accidentally placed on the keypad, causing multiple buttons to be pressed. After vetting was completed, 775 GPS records were available for analysis.

Results

Mapping hitchhiker locations

Our results show that hitchhiking occurs throughout northern BC on the Highway of Tears as well as other numbered highways. Prince George may be a particularly large hub for hitchhikers, although couriers travelled in and out of Prince George more than other northern cities (Figure 2). The towns and cities of Vanderhoof, Smithers, Terrace, and Prince Rupert also appear to be used more often by the hitchhiking community than smaller centres such as Fort St. James and Fraser Lake (Figure 2). Although proportions varied slightly by location (Figure 2), GPS records for the proportion of types of hitchhikers of the 775 records we recorded revealed that the majority of hitchhikers were single males (73%), 14% of hitchhikers were single females, and 4% of hitchhikers were

traveling alone, with gender unable to be determined. There were fewer incidents of hitchhikers traveling together: 8% of hitchhiker sightings were couples and only 1% of the sightings were groups. This pattern was consistent throughout the year, with males comprising the largest number of hitchhiker sightings regardless of season.

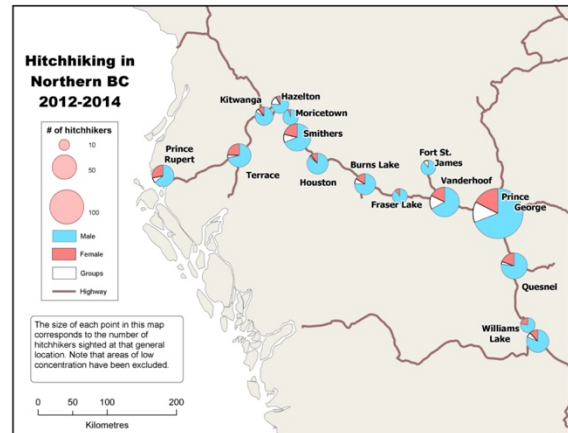


Figure 2. Variations in the proportion of hitchhikers made up of males, females, and groups recorded at various locations along the Highway of Tears (Highway 16 –shown between Prince Rupert and Prince George) and other numbered highways in northern BC as obtained by Otto Hitchhiker units between June 2, 2012 and October 20, 2014.

How hitchhikers distributed themselves to obtain rides also varied within cities, as depicted for Prince George in Figure 3.

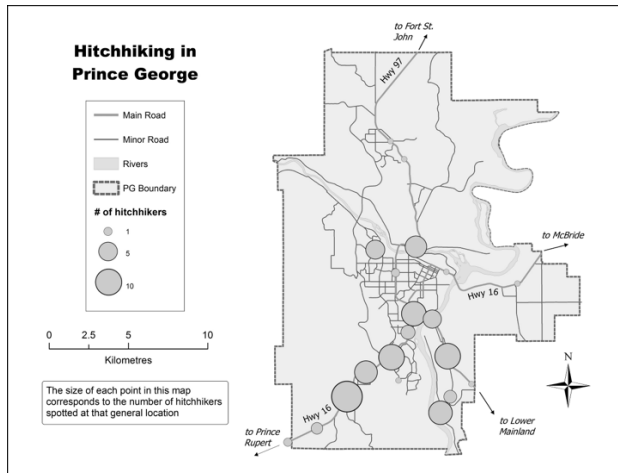


Figure 3. Distribution of hitchhiker sightings within the city of Prince George, British Columbia as obtained by Otto Hitchhiker units between June 2, 2012 and October 20, 2014. Note: Locations shown here have been jittered to obscure the actual locations.

Partner and Citizen Science Data

The number of hitchhiker sightings was lowest during the winter for both the compiled data (Figure 4) and the three longest-running units: the two units traveling from Prince George to Prince Rupert rarely reported hitchhiker sightings during December and January, and the unit traveling from Prince George to Fort St. James reported only a few sightings in winter.

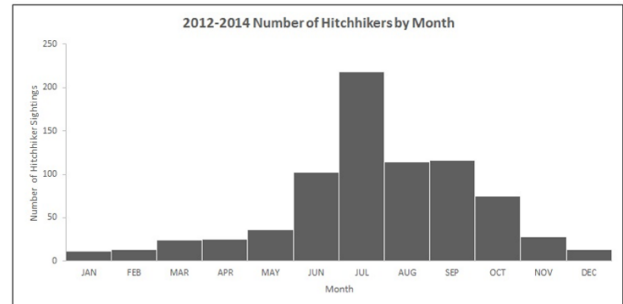


Figure 4. The number of hitchhiker sightings in northern BC obtained from all Otto Hitchhiker units by month from June 1, 2012 to October 20, 2014.

There was a peak in hitchhiker sightings from approximately 2:00 p.m. to 8:00 p.m. (Figure 5), which coincided with when we expected evening traffic flow to be the highest. Hitchhiker sightings dropped sharply at approximately 9:00 p.m. and continued to be low through the early morning hours until approximately 9:00 a.m.

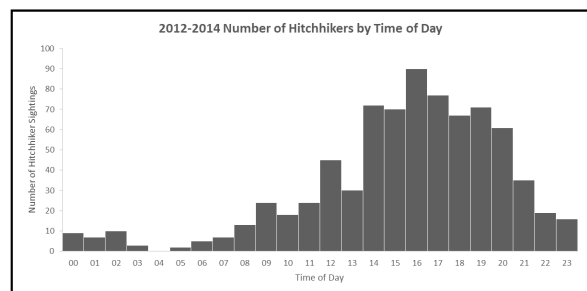


Figure 5. The number of hitchhiker sightings obtained from all Otto Hitchhiker units according to time of day from June 1, 2012 to October 20, 2014 in northern British Columbia. Time of Day axis reflects a 24-hour clock. For example, 00 includes sightings from 00:00-00:59, 01 from 01:00-01:59, etc.

RCMP Data

Data provided from RCMP street checks in 2012 showed a similar trend to our Otto data - hitchhikers were comprised of 68.5% males, 17.1% females, and 14.4% couples. Time of day was also similar to our Otto data with the majority of hitchhikers being

seen at night and fewer hitchhikers being on the road during early morning hours (Figure 6).

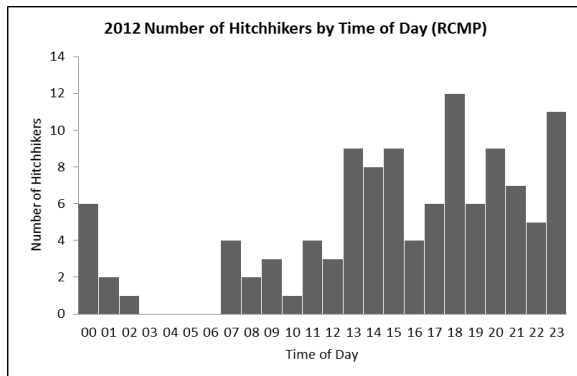


Figure 6. The number of hitchhikers according to time of day from February 1, 2012 to November 17, 2012 provided by British Columbia RCMP street check records. Time of Day axis reflects a 24-hour clock. For example, 00 includes sightings from 00:00-00:59, 01 from 01:00-01:59, etc.

Hitchhiker age was diverse with the largest number of hitchhikers in the 20-49 year old range, and a slight peak of 28% in the 40-49 year range (Figure 8). Age groups of 20-29 and 30-39 were slightly lower, with 21% and 22% of hitchhikers, respectively (Figure 8). The 0-19, 50-59, and 60+ age groups, comprised only 6%, 15%, and 8% of hitchhikers, respectively (Figure 7). Hitchhikers were 61% First Nations, 25% Caucasian, and 14% Other.

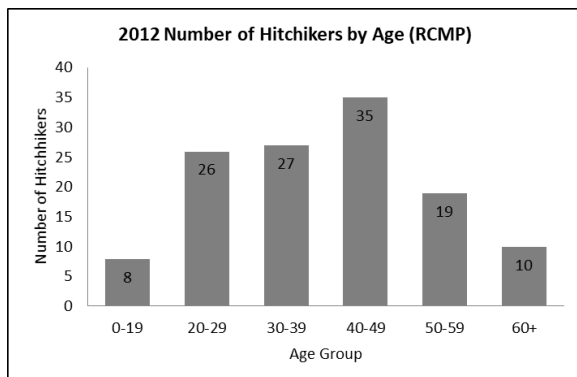


Figure 7. The number of hitchhiker sightings in each age group according to RCMP street checks in

Northern British Columbia from February 1, 2012 to November 17, 2012.

Discussion

An overwhelming majority of northern BC hitchhikers, both male and female, appear to travel alone. It is presumably considered safer to hitchhike with at least one other person, however, a driver may not pick up two or more hitchhikers for safety concerns or because there are too few seats in the vehicle. Although much interest in the hitchhiking phenomenon has focused on female hitchhikers, our results show that females (comprising 50.4% of the BC population; Statistics Canada 2011) actually represent a much smaller proportion of hitchhikers than males. These results are consistent with a California Highway Patrol (1974) report showing that only ~9-12% of hitchhikers were female. However, if circumstances for our study are similar to the 1974 study which showed female hitchhikers to be seven to ten times more likely than males to be victims of crime, attention should be disproportionately focused on understanding female hitchhiker behaviour and keeping them safe. In addition, the 1974 study also revealed that 80% of crimes against female hitchhikers were sex-related. Although it is less publicized, males are also at risk of becoming victims of criminal activity. As a result, both males and females should be considered by hitchhiking mitigation campaigns used by the RCMP and government officials to discourage hitchhiking through the use of roadside discussions, signage, and literature.

As anticipated, hitchhiker sightings were most frequent during summer months. Although sightings were distributed along highways, hotspots in certain communities were identified; this indicates campaigns to reduce hitchhiking should be designed for spring and summer release and focused in certain locations. Some hitchhiking did continue into winter, despite less agreeable weather conditions (e.g., Prince George to Fort St. James).

The majority of transport trucks equipped with Otto Hitchhiker units traveled during the day, so it is possible that early morning hitchhikers were under-represented because the vehicles did not travel during this time. It is also possible, however, that hitchhikers chose to travel when they were most likely to get picked up (i.e., when traffic flow was highest), in which case few hitchhikers would travel at night when traffic flow is typically lower. Hitchhikers may also feel more visible and safer during the day. It is interesting that RCMP time-of-day data (traveling at all times of the day) corroborate our Otto Hitchhiker (mostly daytime driving) data. Upon examining these data together, we contend that there are likely fewer hitchhikers traveling in the early morning hours.

Although the largest number of hitchhikers were in the 40-49 year age category (RCMP data), a large proportion of hitchhikers from each age group were recorded. It was expected that most hitchhikers would be younger since they are more likely to engage in risky behavior (Chesters and Smith 2001). The fact that only 6% of hitchhikers were 19 or younger may suggest

an increased awareness of the dangers of hitchhiking among the younger generation, but the widespread age of hitchhikers also suggests that the root causes for hitchhiking affect all ages.

Assuming people of all ethnic backgrounds were checked with equal regularity, First Nations appeared to be over-represented in the hitchhiking data we analyzed.

Aboriginal peoples only make up 5.4% of the British Columbia population (BC Stats 2011), and 13-30% of the Northern Interior and Northwest regions of British Columbia, respectively (Foster et al. 2011), but made up 61% of the hitchhikers interviewed by RCMP, with Caucasians making up 25% and 'Other' making up 14%. These data could be used to help inform the creation of hitchhiking mitigation campaigns and lead researchers to specific communities to determine why groups use hitchhiking for travel and what could be done to overcome these trends. More survey work and qualitative data collected with an aim to specifically disentangle the variety of reasons why people of different demographic groups are inclined to hitchhike would help to answer many of the questions surrounding this phenomenon and could be useful in mitigation planning.

Conclusion

Overall, the largest group of hitchhikers in northern British Columbia were First Nations and male, traveling alone, in the summer, and in the early evening. The largest number of hitchhikers was in the 40-49 year age range. We recommend further and expanded data collection and

continued work by organizations campaigning against hitchhiking for females, but also suggest that similar campaigns be tailored to males. Our data suggest that these campaigns should consider spring and summer promotional releases—when people are most likely to begin hitchhiking. Hitchhiking mitigation campaigns do not necessarily need to consider specific age groups because ages of hitchhikers in northern BC were widespread. Specific efforts should instead be made to address the reasons why First Nations and other people hitchhike, such as those mentioned in the Highway of Tears Symposium Recommendation Report (e.g., to visit the doctor or get groceries; Leidli T’enneh First Nation et al. 2006). We recommend that more hitchhiker data (both survey and other forms) be collected so that a more robust data set can be generated from which broader inferences can be made. Data collection efforts should also be considered as a province-wide initiative. Smartphone apps could help in

the development of a citizen science project designed to understand hitchhiking in the same way some apps have recently been designed to map the use of roadside areas by wildlife for wildlife-vehicle collision mitigation purposes.

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