Canadian Stress Levels and Work-Activity*

Chyna Hui and Marco Chau

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Abstract

This paper discusses data from The Canadian General Social Survey (GSS) which gathers data linked to how Canadians spend their personal and professional time. This paper uses original data from the survey to determine relationships between respondent stress levels and commute times and work hours. A survey is included to analyze the correlation between stress levels and traffic congestion during commute times.

Contents

*Data and code is available at https://github.com/Mikmok14/Canadian-Stress-Levels-and-Work-Time-Use.git

1 Introduction

Work and school as primary sources of stress is not a novel discovery. "Work" however is a highly abstracted term that obscures the specific aspects of 'work' contributes to stress. By considering only workload as a derivative of the number of hours worked as the sole cause of stress, other aspects of work that are also contributors of stress such as commute times and number of workdays.

In this paper, we examine work hours, number of work days, commute time, and the frequency of traffic congestion to work and their correlation with stress levels. We construct a model in which higher stress levels are associated with longer and more work days as well as higher perceived traffic congestion; as average number of work days, hours, and daily traffic congestion experienced so does self-reported stress levels.

In section 2 we discuss the source of the data used in this paper, the strengths and weaknesses the source and methodology contains, and potential blind spots that the data misses. Section 3 discusses the methodology used to construct our stress models and presents the results from our construction and policy implications from these results are discussed in 4. In section 5 there is an optional survey used to gather more information about stress caused by commute and work hours.

2 Data

2.1 Key Features

The Canadian General Social Survey's (GSS) key purpose is to gather data to monitor changes of living conditions in Canada and to inform social policy/legislature.[1] The 2015 GSS focuses on time-use data to find how Canadians are spending both their personal and professional time. A few key time-use metrics gathered are: time spent sleeping, time spent on paid work, time spent looking for paid work, time spent commuting to work and school, time spent on household chores, time spent on childcare, time spent socializing, time spent on active and passive leisure, etc. The survey data has 17,390 respondents and counts 848 variables. Not all variables are related to time-use as the survey is also interested in other metrics as well such as the respondent's sex, income, marital status, number of children, and other variables that are relevant to social policy. Data was prepared, cleaned and processed using R[2]

2.2 Source and Methodology

All the data from this paper including the inputs used to create models are extracted from the 2015 Canadian General Social Survey on Time Use. The survey was administered to a population sample all 15 years of age and older throughout the country excluding the provinces of Yukon, the Northwest Territories, and Nunavut. The remaining ten provinces (Ontario, Quebec, British Columbia, Alberta, Manitoba, New Brunswick, Newfoundland and Labroador, Nova Scotia, Prince Edward Island [PEI], and Saskatchewan) were divided into strata based on geography and Census Metropolitan Areas (CMAs). A total of 27 strata were created from the 10 provinces and their CMAs.

The frame of the survey was created using phone numbers (both cellular and land-line) derived from telecommunication companies and previous census data and cross-referencing them to the Address Register. If a household had multiple phone numbers, they were sorted and based on the source and type of phone number and the 'best' one was used to call the household. 13% of the phone numbers were not linked to households but were included in the survey. A random sample from each stratum was chosen to be contacted for the survey. Due to this methodology, households with no phone numbers were not surveyed. Once a household

[1] Maps and GIS Centre (2017)
[2] R Core Team (2021)

was reached, one random member of the household age 15 or older was chosen to be interviewed via the telephone or to complete an electronic questionnaire. There were 17,390 respondents which reflects a response rate of 38.2%.

The survey data also includes a weighing factor for each individual surveyed. Bootstrap weights were also created for design-based variance estimation: estimates made using the survey data are adjusted by the bootstrap weight so that they are representative of the target population with specific characteristics in mind. Each province had a minimum sample size so that estimates would have acceptable variability at the stratum level. Once the sample sizes were met any spillover samples were allocated to strata to balance national-level and stratum-level estimations.

2.3 Strengths and Weaknesses

A strength of the 2015 GSS sample is the use of a new frame. Under this frame, households that only have cellphone numbers and no home phones were included unlike previous GSS. As smartphone adoption becomes more prominent, many households find land-lines redundant and opt to cancel their home phone services and use only cellphones for telecommunications. Exclusion of this growing population would neglect a larger and larger sample of the population as time goes on.

Another strength of this survey is the inclusion of contextual survey questions that are unrelated to time-use despite it being the focus of this survey cycle. Contextual data such as income, number of children, stress levels, age, gender, and others are important since they could have causal-relationships with how Canadians spend their time.

A weakness of this dataset is the unreliability of respondent answers due to the quantitative specificity of time-use. Many of the survey questions are about time spent on very specific activities such as "time spent on commute in minutes," responses are more likely to be estimates. This makes extrapolation an issue as the numbers in the GSS may not be an accurate reflection of reality. Although a "time-diary" was asked to be kept by the respondents, only a few of the few hundred variables were tracked by this diary. This includes time spent sleeping, studying, socializing, watching TV/videos, reading, attending events, and attending religious or civic activities.

Another weakness of this dataset is the reliance of a single reference day to extrapolate an average of how respondents spend time on average. 29.9% of respondents answered that the reference day used to inform the survey is different from the average day. This introduces a large amount of uncertainty and inaccuracy when using this data to conduct statistical analyses or to inform social policy as for roughly 30% of respondents, the day they provided data for was an outlier to their average day.

The grouping of different activities also poses a problem in the questionnaire because it becomes difficult to isolate variables. For example, variable DUR55 tracks time spent (in minutes) visiting museums, art galleries, heritage sites, and zoos.[3] The data documentation provides no reasoning for grouping these activities together nor is it immediately obvious except to save space and time by combining them into one category. This, however, restricts how we can use this variable because researchers are not able to separate the variables. This makes it impossible to tell whether a respondent spent 90 minutes at a zoo or an art gallery. This effectively makes the data unusable unless researchers are interested in time spent in that entire group of activity.

2.4 Ethical concerns

The major ethical issue of this dataset is the blindspot created from excluding residents from Yukon, the Northwest Territories, and Nunavut. Particularly, the exclusion of these provinces and only surveying those with access to phones ignores the already-marginalized Aboriginal communities in these provinces. In a study on Aboriginal restorative justice, it is found that historically evaluation of Aboriginal community projects

[3]Canada (n.d.)

by the Canadian government is rare because "there is probably reluctance on the part of the state to impose evaluation on programs... with unclear or at least ambiguous level of community support... there is undoubtedly a perception in some quarters that... such evaluation may place outsiders in the unenviable position of appearing to impose 'non-Aboriginal standards' on Aboriginal communities... In short, then, we have very little evaluative data upon which to draw to assess our success with community restorative initiative in Aboriginal communities."[4] With data on Aboriginal communities already rare, the continued exclusion of evaluative surveys in those areas continues to underrepresent their interests, especially if those data is used for policy-making. Although concerns of imposing non-Aboriginal standards is reasonable, the non-mandatory nature of the GSS means communities are free to choose whether they share their information or not.

2.5 Data terminology

Respondents of the 2015 GSS were asked to rate their stress levels using the following categories: Not stressed at all, not very stressful, a bit stressful, quite a bit stressful, and extremely stressful. Although these categories are not quantified, they are in ascending hierarchical order according to increasing stress levels. Time-use metrics are measured in hours and minutes depending on the activity which are specified in table and figure captions when required.

2.6 Stress data

Table 1: Provincial Stress Level Percentages

Stress level	Ontario	Quebec	British Columbia	Alberta	Manitoba	New Brunswick	Newfoundland and Labroador	Nova Soctia	PEI	Saskatchewan
Not stressed at all	37.8	34.3	35.3	38.8	41.9	35.1	35.3	37.7	36.5	37.4
Not very stressful	2.0	2.2	3.4	2.6	1.4	0.9	1.9	1.4	1.5	1.9
A bit stressful	0.4	0.3	0.4	0.1	0.5	0.1	0.2	0.2	0.2	0.6
Quite a bit stressful	1.9	1.6	1.1	1.7	0.9	1.5	1.7	2.3	1.7	0.9
Extremely stressful	17.5	22.4	20.3	16.6	17.9	24.3	23.2	20.6	20.4	18.1
Refusal to answer	27.8	24.1	27.0	27.9	26.5	28.4	30.1	27.6	31.9	29.6
Answer not stated	12.6	15.1	12.5	12.0	10.7	9.5	7.6	10.1	7.7	11.3
Don't know	0.0	0.0	0.2	0.3	0.1	0.1	NA	0.1	NA	0.1

Table 1 shows the percentage of answers at each stress level organized by province. Across all the provinces, the response that got the most answers is "not stressed at all which consists of 37.8% of all responses in Ontario, 34.43% from Qeuebc, and 35.3% in British Columbia. The province with the most"not stressed at all" responses is Manitoba with a response rate of 41.9%. This may make it seem as though more than half of Canadians experience some level of stress ranging from a small amount to an extreme amount. However, "refusal to answer" and "answer not stated" composes a large chunk of the responses as well. 27.8% of Ontarians refused to reveal their stress levels and 12.6% of Ontarians did not state an answer for a combined total of 40.4% non-answers. Excluding missing and non-answers, 21.8% of Ontarians experience stress, 26.5% of Quebecois, 25.2% of British-Columbians, 21% of Albertans, 19.3% of Manitobans, 26.8% of New Brunswick residents, 27% of Newfoundlanders, 24.5% of Nova-Scotians, 23.8% of Prince-Edward-Islanders, and 21.5% of Saskatchewan residents. On average, this means around 21.58% of Canadians 15 and older experience some level of stress.

[4]Dickson-Gilmore and Prairie (2020) pages 183 - 183

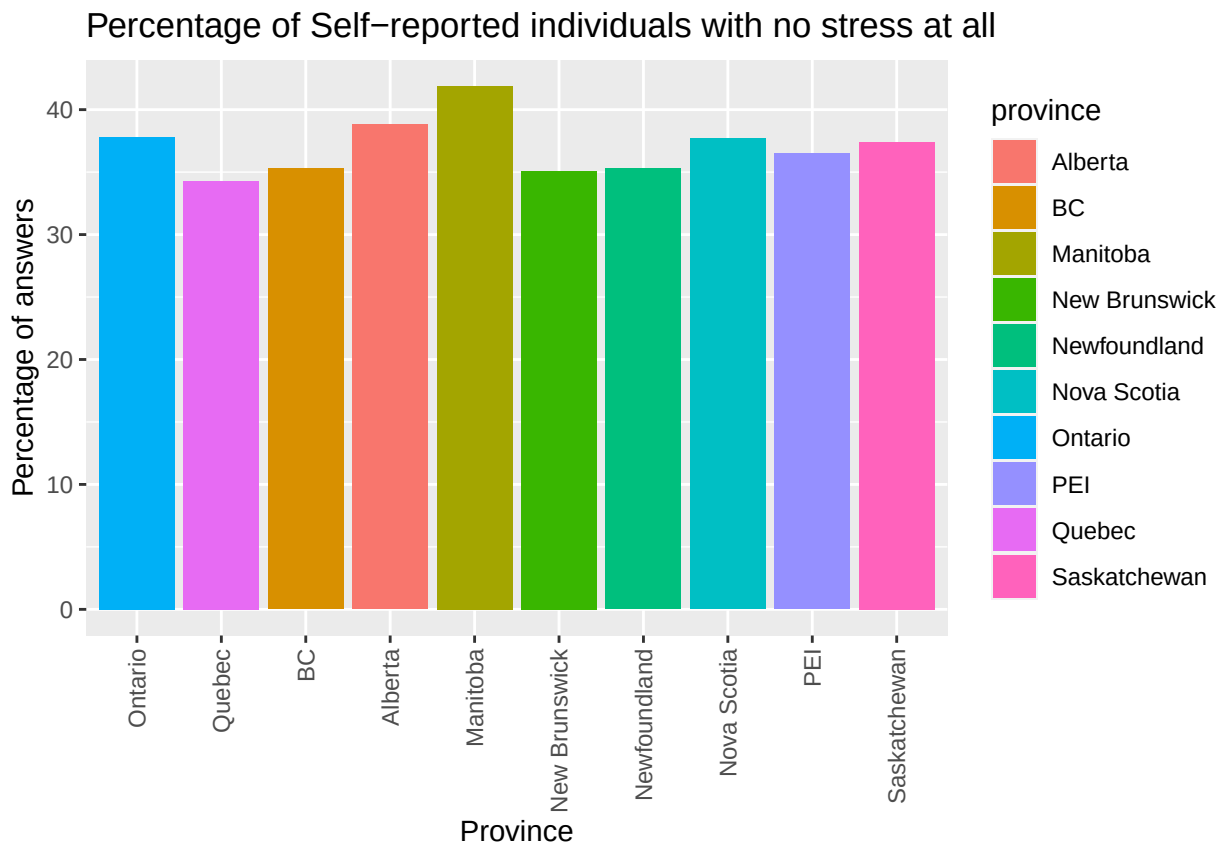

Figure 1: No stress respondents by province

Figure 1 depicts percentage of respondents from each province with no stress at all. Contrary to assumptions, Ontario which has some of the country's largest metropolitan cities such as Toronto and Ottawa has the third most respondents that experiences no stress. Unsurprisingly, Quebec and British Columbia which also house some of the country's largest cities have some of the least respondents with no stress although the differential between them and other provinces are not large. Interestingly, Alberta and Manitoba, the two provinces in the middle of Canada, have the most respondents with no stress.

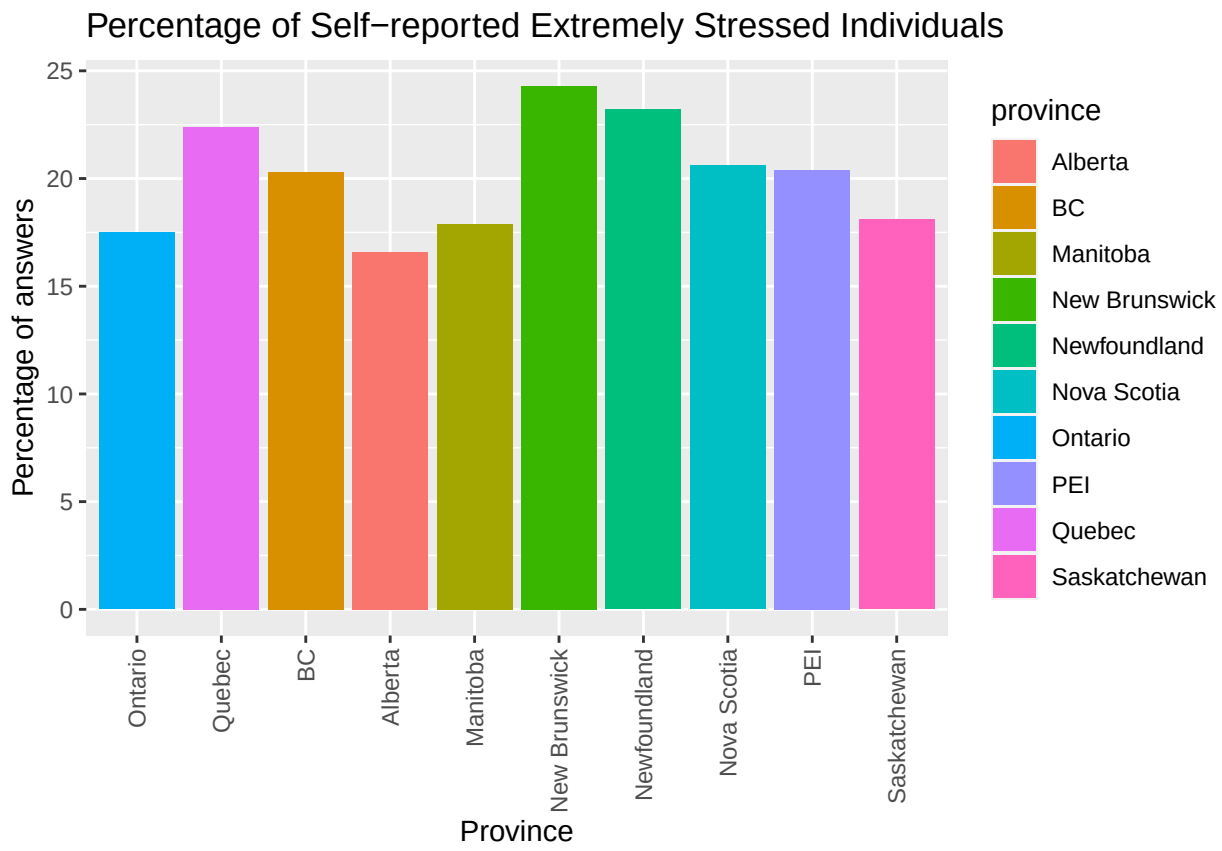

Figure 2: Extremely stressed repondents by province

Figure 2 depicts percentage of respondents from each province with extreme stress. Of all the provinces, Alberta contains the least extremely stressed respondents while New Brunswick has the most stressed individuals. Interestingly, the provinces along the Atlantic ocean on the east coast seems to have the most extremely stressed respondents including: New Brunswick, Nova Scotia, Newfoundland and Labrador, Quebec and Prince Edward Island. The differences in the percentage of answers of extremely stressed individuals is much more staggered than differences in percentage of unstressed respondents shown in Figure 1.

Table 2: Source of Stress

Main Stress Source	Number of answers	Percentage of answers
Answer not stated	1	0.0
Don't know	75	0.9
Family	1281	14.6
Financial concerns	1185	13.5
Health	724	8.2
Not enough time	795	9.1
Other	820	9.3
Refusal to answer	12	0.1
School work	438	5.0
Work	3449	39.3

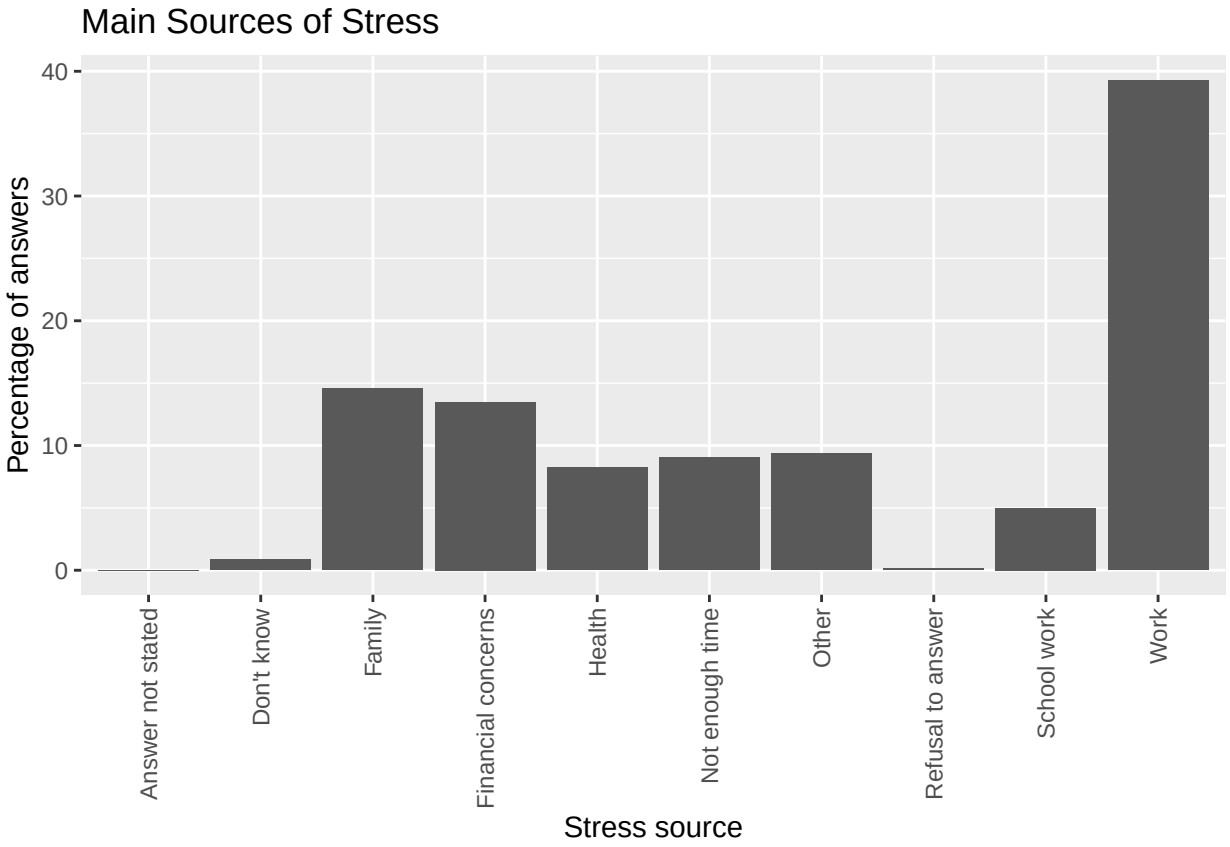

Figure 3: Primary sources of stress

Figure 3 and table 2 shows the different answers respondents gave when asked what their main source of stress is, the number of answers each reason received, and the percentage of answers the category received. Respondents were only allowed to choose 1 answer as their primary source. Only respondents that indicated that they experiencing some level of stress (not very much, a bit, quite a bit, to extreme) were permitted to answer this question. For Canadians that do experience stress, work is the most common primary source with a response rate of 39.3%. There are more than double the individuals that cite work as a primary cause of stress compared to individuals that cite family or financial concerns which are the 2nd and 3rd most common primary causes of stress for Canadians. Since respondents differentiate between work and financial concerns as different sources of stress, the causes of stress due to work is likely unrelated to pay and income but something else associated with employment. To better understand potential sources of stress with activities related to work, we extracted associated time-use information from the GSS.

Table 3: Stress levels of people who never experience traffic on commute

Self-rated stress level	Number of answers	percent	Frequency of traffic
Not stress at all	515	12.4	Never
Not very stressful	1071	25.7	Never
A bit stressful	1916	46.0	Never
Quite a bit stressful	601	14.4	Never
Extremely stressful	63	1.5	Never
Don't know	3	0.1	Never

Table 3 contains the stress levels, number of responses, and percentage of responses of respondents who never experience traffic on their commute to work and school. More than 50% of respondents who never experience traffic on their commute are in the lower half of the stress hierarchy, with 12.4% experiencing no stress at all and 46% who are a bit stressful. The majority of respondents in this traffic category only experience a bit of stress and only 1.5% of them self-report extreme stress.

Table 4: Stress levels of people who never experience traffic on commute

Self-rated stress level	Number of answers	percent	Frequency of traffic
Not stress at all	105	7.2	1 - 2 days
Not very stressful	377	25.9	1 - 2 days
A bit stressful	705	48.5	1 - 2 days
Quite a bit stressful	244	16.8	1 - 2 days
Extremely stressful	21	1.4	1 - 2 days

Table 4 contains the stress levels, number of responses, and percentage of responses of respondents who experience traffic 1 - 2 days per week on their way to work or school. In this traffic category, most respondents are still experiencing only a bit of stress with 48.5% indicating as such. The percentage of respondents who experience no stress at all, however, has dropped by nearly half from 12.4% to 7.2%. The percentage of respondents who experience extreme stress remains largely consistent between the two respondent populations, dropping from 1.5% to 1.4%. It's also important to note that many more respondents never experience traffic on their way to work or school compared to respondents who do sit through traffic 1 - 2 days a week. A total of 4,169 respondents self-reportedly never have traffic on their commute while 1,452 respondents have traffic up to twice a week.

Table 5: Stress levels of people who never experience traffic on commute

Self-rated stress level	Number of answers	percent	Frequency of traffic
Not stress at all	42	7.8	3 - 4 days
Not very stressful	104	19.3	3 - 4 days
A bit stressful	283	52.6	3 - 4 days
Quite a bit stressful	96	17.8	3 - 4 days
Extremely stressful	10	1.9	3 - 4 days
Don't know	2	0.4	3 - 4 days

Table 5 contains the stress levels, number of responses, and percentage of responses of individuals who experience traffic 3 - 4 days a week on their commute to work or school. 7.8% of respondents in this traffic category experience no stress compared to 12.4% of respondents who never experience traffic on their commute. The number of extremely stressed individuals is still relatively low, increasing from 1.4% to 1.9% as traffic frequency moves up from 1 - 2 days to 3 - 4 days. More than half of the respondents in this traffic category experience a bit of stress at 52.6%.

Table 6 shows the stress level, number of answers, and percentage of respondents who experience traffic everyday on their commute. Although the percentage of individuals who report feeling extremely stressed increase from 1.9% to 3.5% from the previous traffic-frequency tier of 3 - 4 days. This near double in increase in stress level is staggering as the rate of change of extreme stress from previous increases in traffic-frequency categories were quite tame. Of all the traffic-frequency categories, the percentage of respondents who experience no stress at all are at the lowest here at 7.1%. Respondents who feel quite a bit stressed, the second highest stress level in the GSS rating system, is at a peak of 24.9%, which is more than double the percentage of respondents who never experience traffic.

Table 6: Stress levels of people who never experience traffic on commute

Self-rated stress level	Number of answers	percent	Frequency of traffic
Not stress at all	109	7.1	Everyday
Not very stressful	272	17.7	Everyday
A bit stressful	712	46.4	Everyday
Quite a bit stressful	382	24.9	Everyday
Extremely stressful	53	3.5	Everyday
Don't know	5	0.3	Everyday

3 Results

In this section (section 3) we take all the traffic levels and combine them into a singular table for easier comparison between traffic frequency, stress level, percentage of answers. We also extracted time spent in traffic, weekly work hours, and weekly work days and calculated the average amount of time spent in each of these variables according to the stress levels reported by the respondent. The averages were derived by adding all the responses together and then finding dividing the sum by the total number of numbers added together.

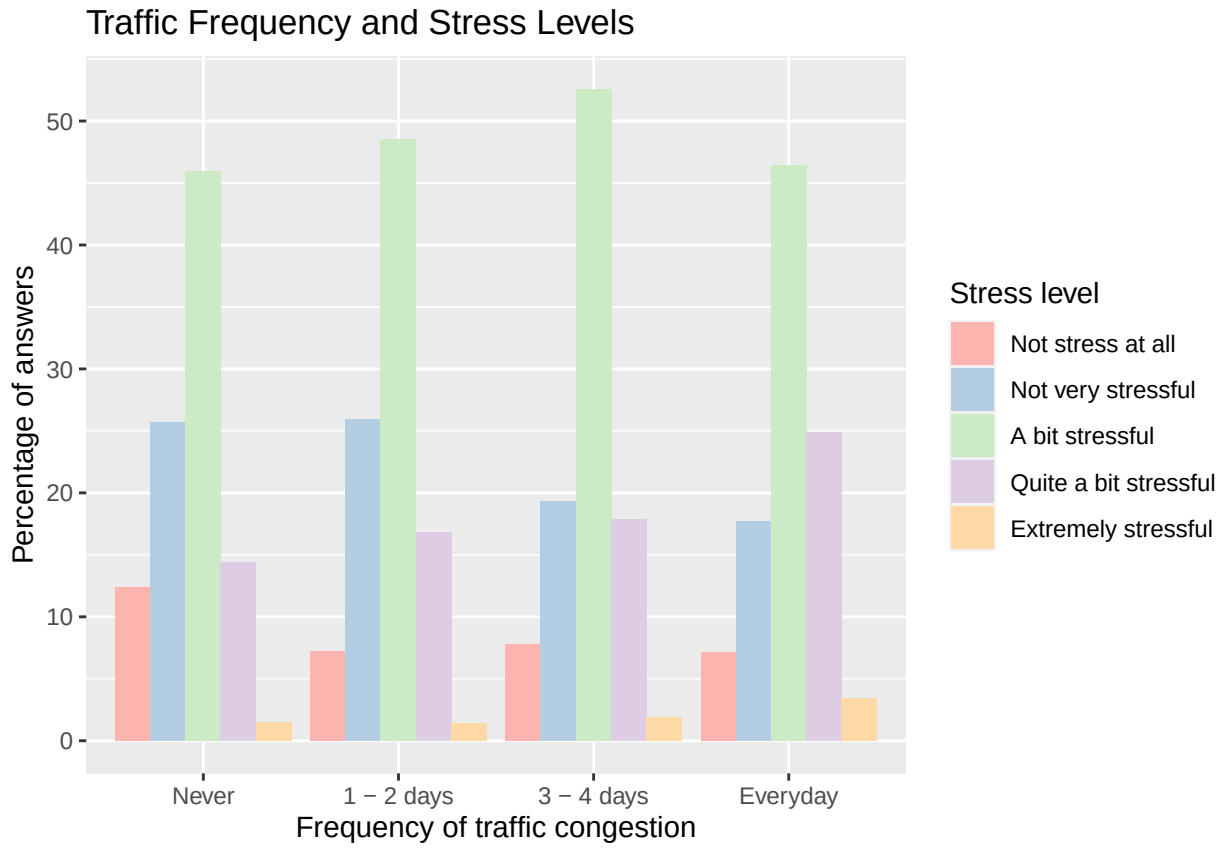

Figure 4: Traffic frequency and stress levels

In figure 4 the traffic frequency, stress level, and percentage of answer distribution from tables 3, 4, 5, and 6.

The trend of the figure shows that as traffic-frequency increases, a higher percentage of respondents claim that the experience quite a bit of stress and an extreme amount of stress. The rate of increase also goes up between respondents who experience traffic everyday versus respondents who experience it only 3 - 4 days a week. This could be explained by the increase in the days included in the category. As we move from respondents who experience traffic from 1 - 2 days a week versus 3 - 4 days a week this is an increase of potentially 2 more days of traffic. As we move from 3 - 4 days to everyday, however, the potential increase in days with traffic congestion is 3 days as some respondents may work or go to school everyday of the week. This would also mean they experience no "rest days" from traffic which accelerates the self-perceived level of stress. Also note that although there are changes in percentage levels of answers throughout the different traffic frequences, the order of magnitude between the lowest and highest stress level remains unchanged. Extremely stressed individuals are the smallest percentage in all categories and individuals who are a bit stressed make up the majority. There is a switch, however, between the percentage of respondents who are not very stressed and those who are quite stressed as traffic frequency moves from 3 - 4 days to everyday. As a result of figure 4, the GSS suggests that there is a positive relationship between the number of days a Canadian spends in traffic, and the amount of stress they feel.

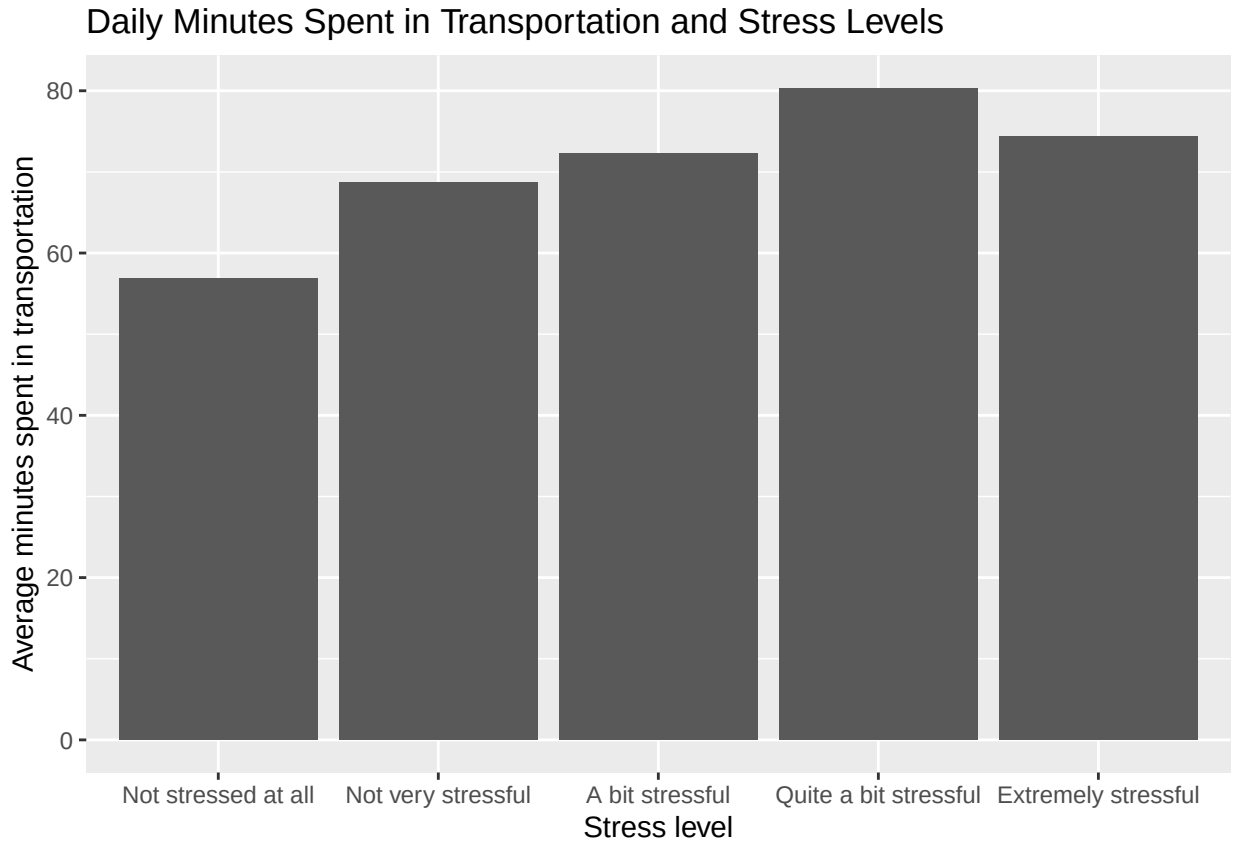

Figure 5: Minutes spent in transportation

Figure 5 shows the results from calculating the average time spent in minutes in transportation between activities by respondents in each stress level category whether as a passenger or as a driver. Results indicate that individuals that are not stressed at all spend the least amount of time in transportation. The overall results show a positive trend between time spent in transportation and stress level except for extremely stressed individuals who, on average, spend less time than respondents who are quite stressed. Extremely stressed individuals however still spend more time on average in transportation than respondents who are

only a bit stressful, not very stressful, and not stressed at all. Figure 5 also shows that respondents who experience any level of stress on average spend more than an hour travelling while respondents who do not feel stressed spend less than an hour on transportation.

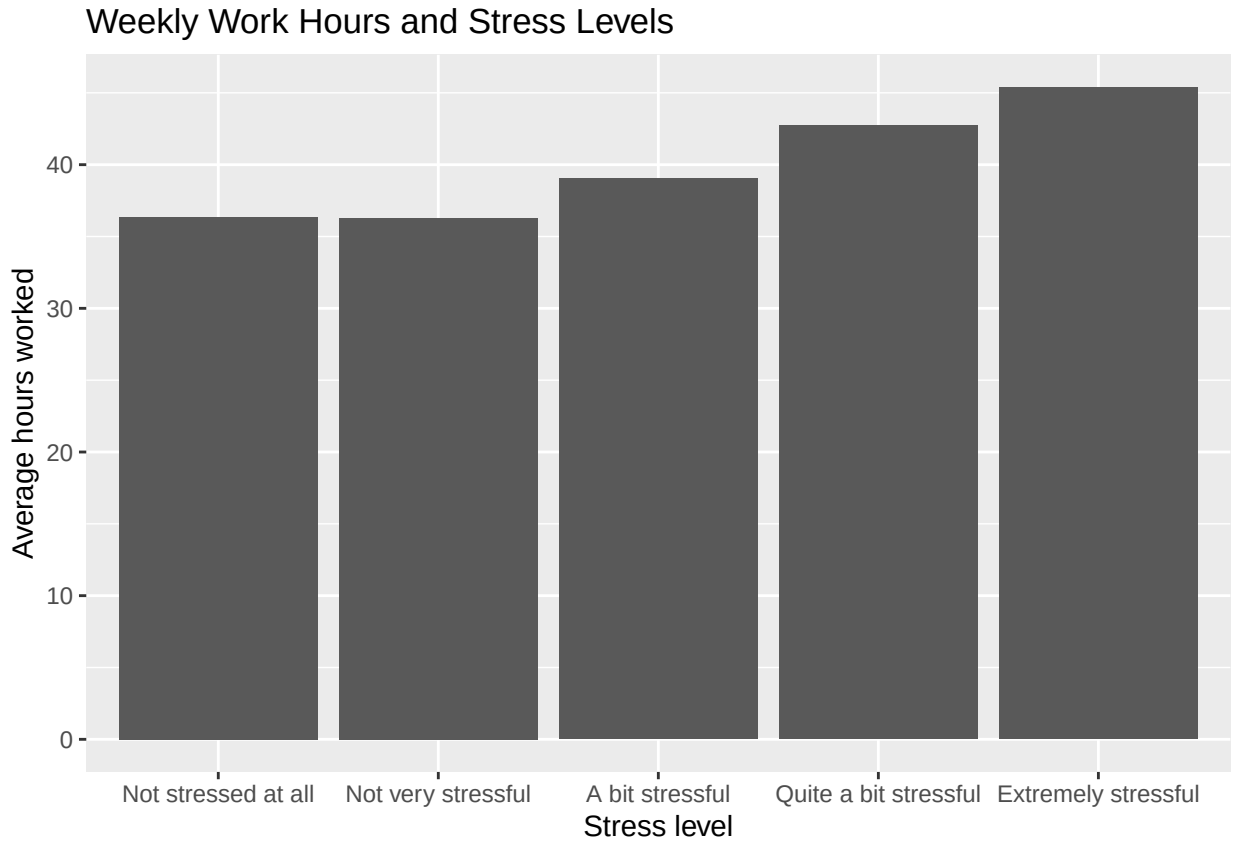

Figure 6: Weekly work hours and stress

Figure 6 shows results from calculating the average hours worked per week by respondents in each stress level category. Respondents who are not stressed at all and those who are not very stressed have about the same average hours worked. This implies there may be another variable contributing to the increase in stress level from no stress to not very much stress. Individuals in this stress category and the next stress category, those who are a bit stressed, on average work less than 40 hours a week. Respondents that are quite a bit stressed and extremely stressed work more than 40 hours a week, which exceeds full-time employment in Canada. Extremely stressed individuals, on average, work a bit more than 45 hours a week, which is roughly 10 hours more than respondents who are not stressed at all and respondents who are not very stressed.

Figure 7: Average days worked and stress

Figure 7 depicts the result from calculating the average number of days worked per week from respondents in each stress-level category. Respondents who are not stressed at all and those who are not very stressed work on average less than 5 days a week. In addition, individuals who are not very stressful actually work on average fewer working days than those who are not stressed at all. Respondents who are extremely stressed or quite a bit stressed work on average more than the traditional working week of 5 days. The decrease in average work days from unstressed and not very stressed individuals in figure 7 supports the implication found in 6 that there are other variables other than time-spent-working that explains work-related stress.

4 Discussion

4.1 Perceived traffic congestion and stress levels

The figures found in section 3 shows a positive relationship between perceived traffic congestion and self-rated stress levels. We distinguish between perceived traffic congestion and actual traffic congestion because of the results from 5; despite being extremely stressed, respondents from this stress category on average spend less time travelling between destinations than those who are quite a bit stressed. This suggests that the respondent's perception of whether there is traffic delays impacts stress levels more than an actual increase in time spent commuting. Of course these too are correlated as the more time someone spends in traffic, the more likely they will believe that there is traffic congestion. Arguing for causal relationships between traffic and stress, however, is difficult because, despite decades of research, "it is unclear which conditions

travel in and of itself is actually onerous."[5] Some individuals actually report positive utility derived from travel times to and from work. A 1998 study has shown that commute variability as a major source of stress for commuters.[6] The more unpredictable traffic congestion to work is, the more stressed research subjects become. Our data at first glance does not reflect this conclusion as we would expect respondents who experience traffic congestion everyday to be less stressed than respondents who experience traffic only a few times a week since respondents who experience traffic everyday has no traffic variability. This can be explained by a study done in 2007 which found that car commuting (which is the primary reflected transportation mode in Figure 4) is associated with higher stress than other transportation modes due to commuting delays and the actions of other drivers.[7] Although commuting distance does play a factor in higher stress levels, it is only a significant cause when coupled with high impedance, that is, when there is congestion.[8] This discovery is significant because travel distance in itself is not a significant cause of extra stress for individuals, but rather the true cause of stress is when there are obstacles in the way slowing down travel. The study also found that "an individual's perception of traffic congestion as a serious problem for them helped explain how commute time negatively affects life satisfaction and increases time pressure."[9] The result of this study is significant because traffic congestion as a source of stress was previously a blindspot as a source of stress. Similar to the 2015 GSS where traffic as a source of stress is not an available answer, many assumed that it was pressure from work that caused stress. In an anonymized therapy session in 2014, a client expressed: "by the the time I get home from work, I'm just, you know, after that drive, I'm just so dead, it's like, you know, shaking and don't want to drive anymore. I don't want to do anything else... sometimes I like if there's been lots of traffic or like if I've been tired and like been forcing myself to stay awake so I can get home."[10] A significant nuance in this client's answer is her specification of heavy traffic as the source of stress, and not the distance of the drive or time spent driving. Acknowledging perceived traffic congestion on commutes as a source of stress is an important step in starting the process of looking for solutions on a government level.

Possible policy and solutions to reduce stress caused by traffic congestion is costly and difficult to implement. it is clear from our results and existing literature that policy aimed at reducing travel time itself would be an inadequate solution to reducing traffic-related stress. Rather than reducing distance travelled or time spent travelling, the problem requires policy that reduces the number of congestion encounters individuals experience. Although the objective is clear, implementation is hindered by feasibility. Building more roads and expanding lanes may bring some marginal benefit, but employment hot-spots would see little to not benefit from this as space limitations in already over-crowded cities would cause bottlenecks. This would just push congestion further down the commute and although there may be less frequent congestion, the duration of congestion will increase which counteracts the benefits from less congestion encounters. It may be advisable to incentivize firms, employers, and residents to move away from high-density locations. As the population spreads geographically, there will be less traffic congestion, especially in highly-populated cities. This solution also seems unfeasible as infrastructure for businesses and residents will take time to build and it is variable whether firms and residents are willing to move to less-populated areas. A more feasible solution is to encourage the use of public transportation as a primary mode of transportation to reduce the number of personal vehicles on the road and therefore reduce congestion probability and frequency. A study conducted in Malaysia in 2017 found that average personal car usage can be reduced by 89% if public transportation infrastructure is expanded to increase the frequency of trains, buses, and serviced routes.[11] Although expansion of public transportation also takes time, it does not require already-established firms and residents to move from their locations.

[5] Higgins, Sweet, and Kanaroglou (2018) page 1268
[6] Kluger (1998)
[7] Gatersleben and Uzzell (2007)
[8] Higgins, Sweet, and Kanaroglou (2018) page 1268
[9] Higgins, Sweet, and Kanaroglou (2018) page 1253
[10] Bello (2014)
[11] M. Shekarchian (2017)

4.2 Work hours and work days

The results from Figure 6 and Figure 7 are interesting because they suggest a threshold where increased work hours and work days adds to stress only when it is crossed. For the number of days worked, this threshold is around 4.5 work days and for weekly work hours it is around 36. We came to this conclusion because although the number of work days and average work hours remained constant, respondents showed increased stress levels from not stressed at all to not very stressful in both figures. This suggests that the source of stress for respondents in these stress categories is not from work. This changes, however, once weekly work hours exceeds 35 hours; respondents move from being not very stressed to the next stress level, a bit stressed.

Our results from calculating average work days and work hours is reflective of a rising sentiment in cutting work hours. Figure 6 reveals that respondents working less than 40 hours a week exhibit the least amount of stress. Prime facie it seems obvious that people who work more are more stressed, and this may be justified because they need to work longer to get more work done. However, studies suggest that there is productivity drop-off after 35 hours.[12] This suggests that although respondents are working more, the marginal benefit of their work past 35 hours is diminishing. A study of a sample of 425 employees conducted in 2010 found that "increased stress leads to reduced productivity and increases satisfaction leads to increased productivity" especially when "work begins to overlap with workers' personal life. Quality work is more related to conscientiousness and personal satisfaction than work load."[13] The implication for employers and firms our results and existing is tricky because it suggests that less stressed workers produce higher quality work, but this is achieved by reducing work hours to around 35 hours a week. By reducing weekly work hours stress-inducing sources unrelated to work can be alleviated as well. As shown in Figure 3, although work is a primary source of stress for 39.3%, this does not mean they do not have other sources of stress as well. By giving people more time to handle personal affairs, they may become less stressed and therefore become more productive at the workplace. Although there are benefits, it will be difficult for the government and policymakers to mandate shorter workdays. Sudden enforcement of shorter workdays potentially reduces income for many low-income workers and families that depend on long work hours to make ends meet. In order to avoid unintentionally marginalizing wage workers, the implementation of shorter work days to reduce stress needs to be coupled with subsidies or alternative income methods for wage workers.

4.3 Conclusion

Stress is a major source of both physical and mental well-being. Through the 2015 Canadian GSS, a big-picture view of work being a major source of stress for Canadians is revealed. This is then further narrowed to analyze the impacts of time-spent commuting to work, frequency of traffic congestion, weekly work hours, and weekly work days on self-rated stress levels. Through our results we found that although both have a positive relationship with stress, there are nuances that complicate policy-making. Time spent commuting to work alone does not add to stress, but rather the frequency and variability of traffic congestion coupled with longer commute times does. Policy to address this source of stress must not only cut commute times, but also traffic congestion frequency. In regards to work hours and days, we found that respondent stress-levels are indifferent to 5 day work weeks that sums to roughly 35 hours of work per week. Contemporary research suggests that this is the optimal work schedule to maximize efficiency and quality of work, however the potential harms that enforcing this policy requires policymakers to take precaution and provide safeguards for stakeholders such as wage workers to avoid doing more harm than good.

[12] Bryan Lufkin (2021)
[13] Halkos G (2010)

5 Appendix

A link to our survey exploring work-related-activities and its impact on stress levels can be found in the footnotes below.[14]

[14] https://forms.gle/sA3NoeoMdqQAnZ46A

March 20, 2022

Three Brain Cells Poll
691 Bloor St. W
Toronto, ON
M6G 1L3

Dear Ontario Citizen,

The purpose of this survey is to gain insight into how commute time and work hours relate to stress. Your input is crucial to assessing systems to improve commuting methods in the province.

To access the online survey, please use the URL or QR code located below to share your opinions on the subject. This process will take approximately 5 minutes. Three Brain Cells Poll is an independent contractor collecting data for the purposes of analysis. The results of the survey will only be shared with necessary parties in a secure and anonymous method.

Sincerely,

Three Brain Cells Poll

Finding the causes of work-related stress in Ontario

Work is one of the most common primary sources of stress for many individuals in Canada. The term "work" however is an abstracted term that obscures the real causes of stress that originates from employment. The purpose of this survey is to get a better understanding of the causes of stress that work-related-activity causes.

By filling this form you acknowledge and consent to the use of your answers to help better understand the nature of work-related stress in Ontario. Identifiable information will not be asked nor will your data be shared for non-academic purposes by the original creators of this survey.

1. What is your age?

Mark only one oval.

- ◯ 15 - 24
- ◯ 25 - 34
- ◯ 35 - 44
- ◯ 45 - 54
- ◯ 55 - 64
- ◯ 65 - 74
- ◯ 85+
- ◯ Prefer not to answer

2. What is your gender?

Mark only one oval.

- ◯ Female
- ◯ Male
- ◯ Non-binary/ Non-Conforming
- ◯ Transgender
- ◯ Prefer not to say
- ◯ Other: _____

3. Are you currently employed?

Mark only one oval.

- ◯ Yes
- ◯ No

4. Are you currently a student?

Mark only one oval.

- ◯ Yes
- ◯ No

5. Generally, how stressed are you at the start of the average work / school day?

Mark only one oval.

	0	1	2	3	4	5	
not stressed at all	◯	◯	◯	◯	◯	◯	Extremely stressed

6. Generally, how stressed are you at the end of the average work / school day?

Mark only one oval.

	1	2	3	4	5	
Not stressed at all	◯	◯	◯	◯	◯	Extremely stressed

7. Do you commute to work / school?

Mark only one oval.

- ◯ Yes
- ◯ No
- ◯ Not applicable (I don't go to work/school)

8. What is your method of transportation to work/school?

Mark only one oval.

- ◯ Public transportation
- ◯ Personal vehicle (as a driver OR as a passenger)
- ◯ Other: _____

9. How many minutes does it take for you to commute to work / school? (Please provide a range)

_____

10. Does your commute time remain the same everyday?

Mark only one oval.

- ◯ Yes
- ◯ No

11. How many days a week do you experience traffic jams on your commute to work / school?

Mark only one oval.

- ◯ 0
- ◯ 1 - 2
- ◯ 3 - 4
- ◯ 5 - 6
- ◯ 7

12. Do you experience multiple traffic jams in the same day?

Mark only one oval.

- ◯ Yes
- ◯ No

13. How many hours a week do you spend at work / school?

Mark only one oval.

- ◯ 1 - 10
- ◯ 11 - 20
- ◯ 21 - 30
- ◯ 31 - 40
- ◯ more than 40
- ◯ Other: _____

Figure 8: Survey page 4.

14. How many days a week do you go to work / school?

Mark only one oval.

- 1 - 2
- 3 - 4
- 5
- 6 - 7

Figure 9: Survey page 5.

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