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Research Report

Report on Transit Demand and Choice Adaptation Survey 2021

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REPORT ON

TRANSIT DEMAND AND CHOICE ADAPTATION SURVEY 2021

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Introduction

The novel Coronavirus disease 2019 (COVID-19) has generated an unprecedented level of fear of infection amongst trip makers, with public transit undoubtedly suffering the most. Several studies reported that transit ridership dropped by 90% due to the pandemic (1–11). While part of this decline in ridership can be attributed to the reduction in commuting trips associated with work-from-home policies, part of it is also related to the perceived risk and fear of getting infected while using transit (12,13). However, how these factors affect people's travel decisions remains unclear as the vaccine rollout continues and people become more accustomed to the virus. Therefore, an investigation into the pandemic-related variables that influence individuals' travel decisions is required to form public policy, which will pave the way for efficient, cost-effective transit operations in the future.

Goals of SPETT'21

Investigating the influence of attitudinal factors on post-pandemic transit usage

Examine the potential of vaccination on reinstating the transit demand in future

The Travel Demand Modeling Group at the University of Toronto administered a survey (SPETT'21) in Summer 2021 following last year's survey, SPETT'20 (14). The surveys were designed under the project *Stated Preference Experiment on Travel mode and especially Transit choice behavior (SPETT)*, which aims to investigate the COVID-19 impacts on the transit usage behavior of the residents of the Greater Toronto Area (GTA). The data were collected from July 10, 2021, to August 19, 2021, through an online research panel. 923 completed data out of 1264 responses were used for the empirical investigations. Moreover, 181 respondents were in the panel of both surveys, enabling the project to have in-depth insight into the longitudinal change in travel behavior over a year in the pandemic.

Survey design

Additional features in SPETT'21

1. Vaccination related questionnaire
2. Extent of engagement in pandemic induced behavior such as telecommuting, online groceries/shopping
3. Attitudes and perceptions
   - ✓ level of satisfaction regarding the public transit system during the pandemic
   - ✓ time of returning to transit considering vaccination status
   - ✓ potential concerns and subsequent travel behavior post the pandemic
   - ✓ Intentions towards taking public transit in future.
4. Stated preference experiment
   - ✓ Transit mode and route choice considering vaccination campaign
   - ✓ Post-pandemic transit choice for those who avoided transit during the pandemic

Overview of the survey sample

Female	56%	*Income (in thousands)*	
Age (mean)	45.5	*Under $49.9*	30%
Currently student	19%	*$50 to $99.9*	38%
Currently employed		*$100 to $150*	18%
at workplace	54%	*Above $150*	9%
at home	12%	*Home location*	
hybrid	5%	*City of Toronto*	43 %
Private vehicle access	86%	*Peel*	21%
having driving license	87%	*York*	18%
having transit pass	39%	*Durham*	8%
Fully/partially vaccinated	82%	*Halton*	10%

Changes in modal preferences

Modal shares are analyzed considering the respondents' private vehicle availability. Similar to the last year's SPETT'20 report, it was observed that pre-pandemic transit users with vehicle access were mainly seen to avoid transit. The drop in transit usages for the group was as high as 56% from pre-pandemic usage. On the contrary, the dip ranged from 16 to 24% for the alternate group without vehicle access, emphasizing the significance of the transit services for this community. Among those who shifted from taking transit to another mode, or combination of modes, and have vehicle access, more than 75% reported using their cars for their daily travel. Active transports (walking/cycling) seemed to be the second choice for this group. Moreover, this mode was also the first choice amongst those with no vehicle access and those avoiding transit during the pandemic. Nearly 69% of them either walked or cycled to their
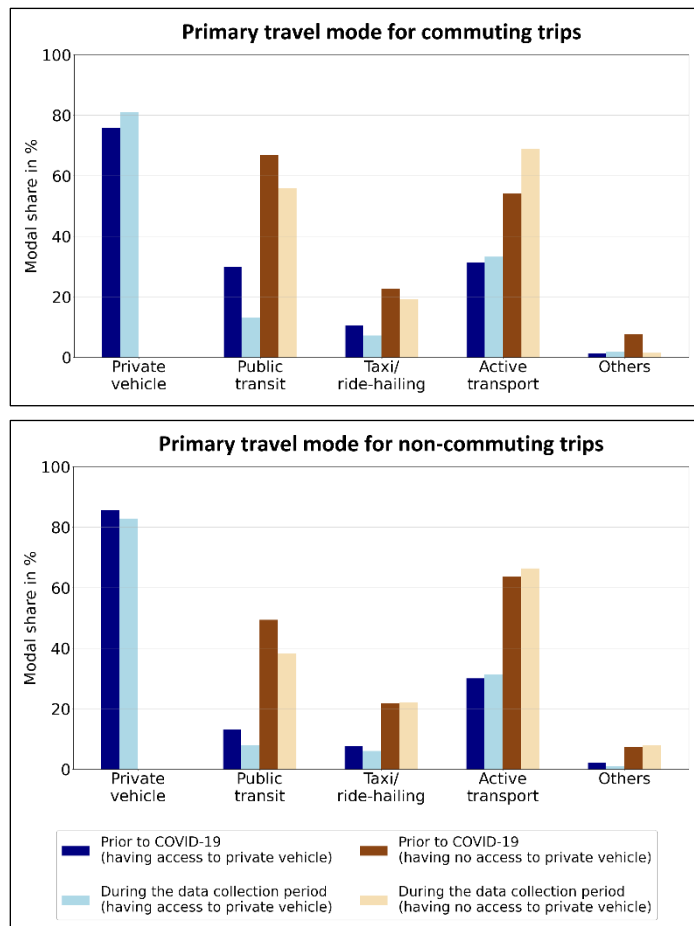
Preferred transit substitutions

	📍	🚗	🚶	🚕
Commuting		79 %	37 %	14 %
Non-commuting		77 %	54 %	9 %
Commuting		-	78 %	21 %
Non-commuting		-	69 %	24

destination during this period. However, on-demand services like taxi/ride-hailing were also seen to be the second popular substitution mode. The above figures give a better insight into the changes in the modal preferences over a year in the pandemic.

Pandemic-induced activities

Due to provincial lockdown and social distancing measures, urban residents had adapted to working remotely or doing online shopping during the pandemic. These practices reduce one's necessity to make physical trips and limit exposure to the virus. Thus, the survey intended to capture the extent of adaptation to these norms. It was observed that almost 33.1% of those who were either students or in the labor force remotely studied/worked from home for more than three days a week. Conversely, 28.4% of the respondents were seen to do online shopping twice or more in a week.

Figure 1. COVID impacts on primary travel modes

Telecommuting

49.7 %
*of those who **were student or employed** worked virtually from home for at least **two days in a week***

27.8 %
did not telecommute

Online shopping

60.1 %
*of the respondents ordered their groceries and shopping online at least **once a week**.*

17.6 %
did not shop online

Changes in transit usage

Figure 2 shows respondents' transit usage frequency before and during the pandemic. Travelers have continued to avoid transit during the pandemic. During this time, 55.4% of them did not take any transit trips, half of which used to take transit at varying frequencies before the pandemic. Also, frequent transit users (i.e., those who took transit daily) comprised 9.3% of all travelers. This value was 23.2% before the paramedic.
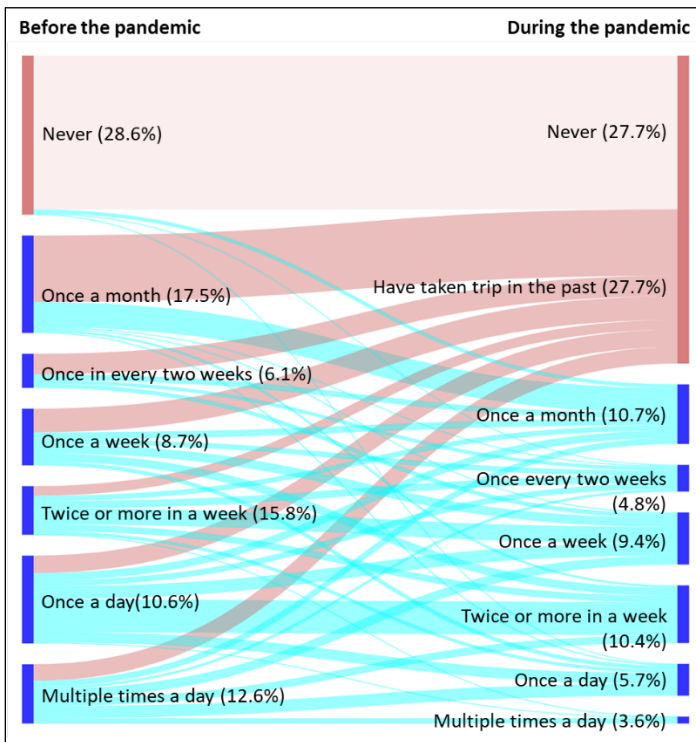

Figure 2. COVID impacts on transit usage frequency.

Figure 3 presents the comparison in SPETT'20 and SPETT'21 cycles by age, gender, household income, and employment status. Overall, transit usage frequency decreased unanimously across all socioeconomic variables of interest. However, the 2021 cycle revealed a recovery of transit demand, which was indicated by a smaller transit frequency drop across all variables. The most significant declines in transit demand were observed from age above 54, wealthy families, and workers who can work from home. Conversely, those below 34 and who have income below $50,000 were seen to return to taking transit trips.
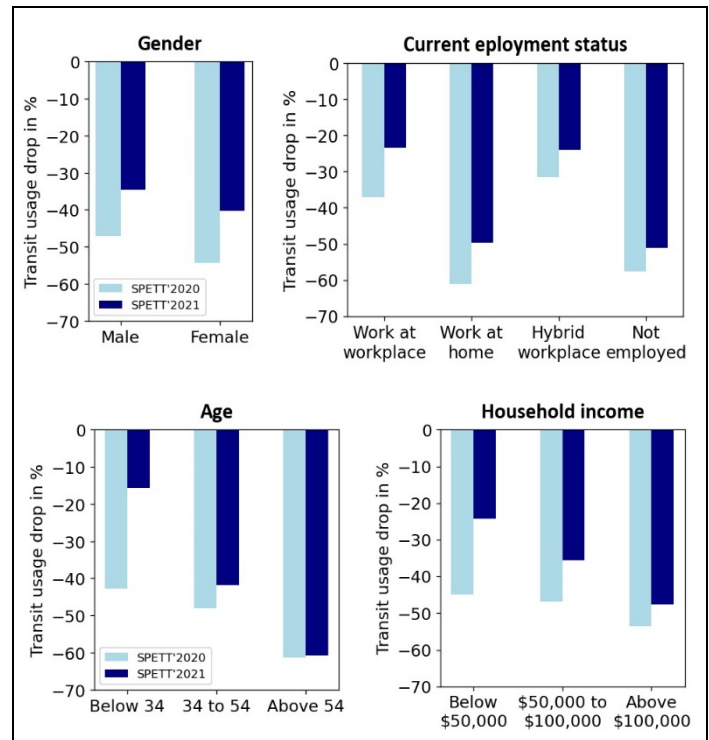

Figure 3. Transit usage drop by socioeconomic status

Further analysis revealed that fully vaccinated participants were still swayed away from taking trasnit trips. Almost 41% of this group reduced their trasnit trips compared to their pre-pandemic trasnit usage. This might be due to their sustained safety vigilance regarding the trasnit system posed by the pandemic. On the contrary, the drop was comparatively lower amongst the partially or non vaccinated individuals.

Vaccination impact on transit usage

41%
of the fully vaccinated reduced transit usage

31%
of the partially vaccinated minimized transit usage

35%
of non-vaccinated avoided taking transit

Perceived transit usage satisfaction

The 2021 SPPET survey also collected respondents' perceived satisfaction from using public transit during the pandemic, and the results are presented in Figure 4.

Almost 45% of the transit users during the pandemic held positive views towards the listed transit attributes. However, the most substantial disagreement comes from the overcrowding onboard transit vehicles, the waiting environment at the stops/stations, and hygiene safety. More than 28.4% of the respondents expressed their concerns about overcrowding on transit. However, the undertaken safety measures against COVID infection and their enforcement by the transit authorities were appreciated by almost 51% of the transit users. It indicates the safety measures are ensured to provide safer transit trips amidst the pandemic.
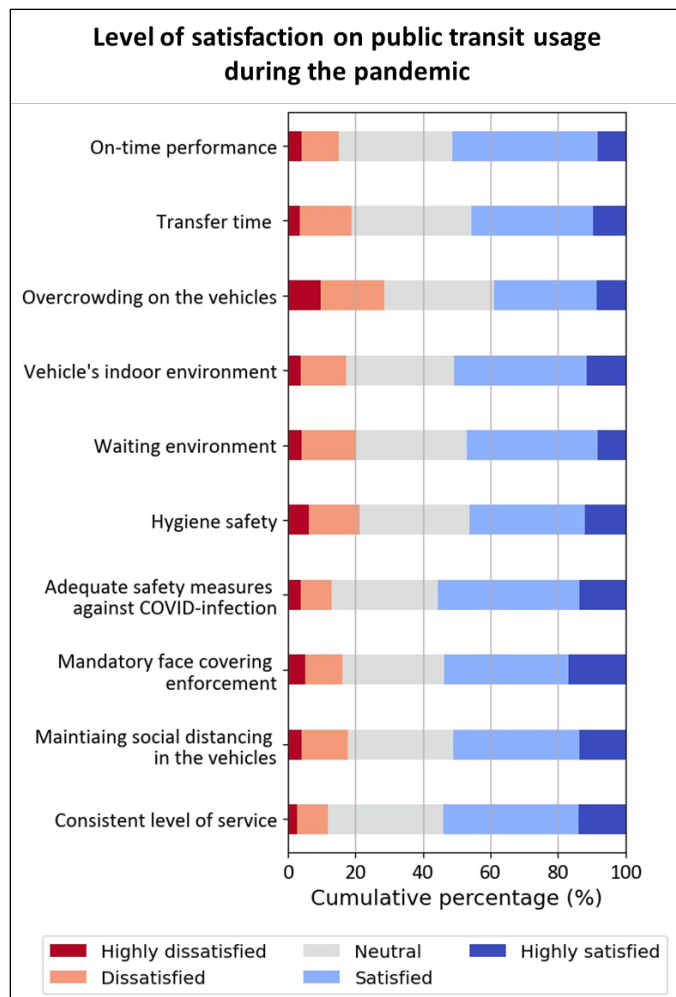
Post-pandemic transit usage

Individuals' attitudes towards post-pandemic transit usage and policies are illustrated in Figure 5. Around 46.2% of the respondents disagreed with the notion of altogether avoiding transit in the future. However, 41% intended to use transit as frequently as their pre-pandemic transit usage, whereas a similar proportion disagreed that they would use transit as their primary travel mode post the pandemic. This indicated that transit demand might endure some recovery post the pandemic, but it will also face serious competition from other modes.

Respondents were also asked their view on continuing the transit safety measures in the future. More than 62 % of the participants preferred to keep the policies in place, suggesting their compliance with these measures.
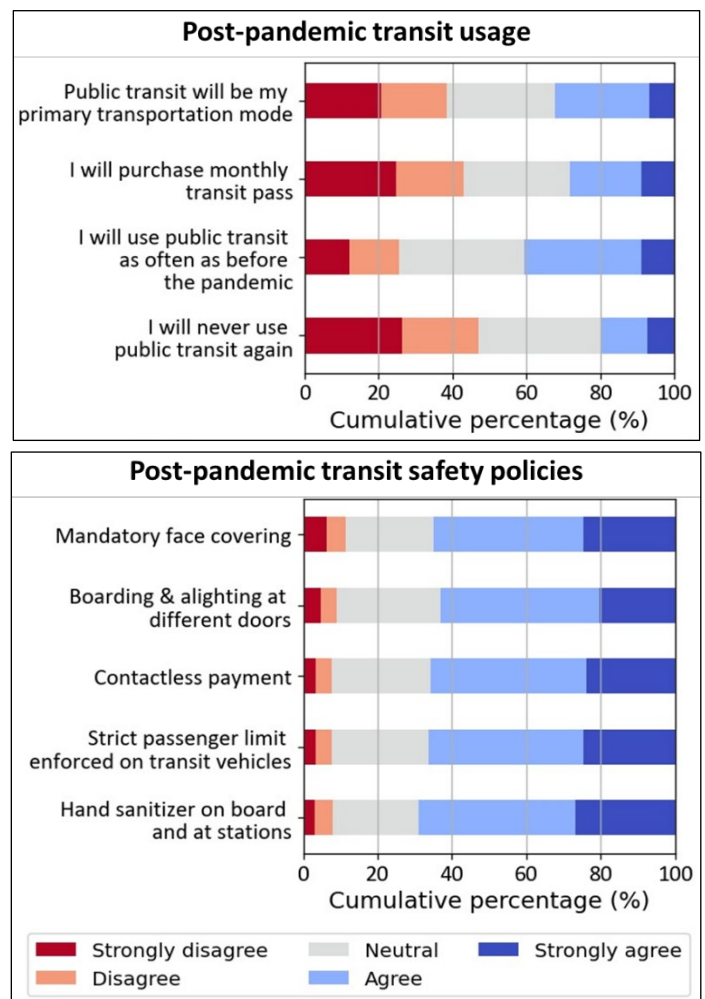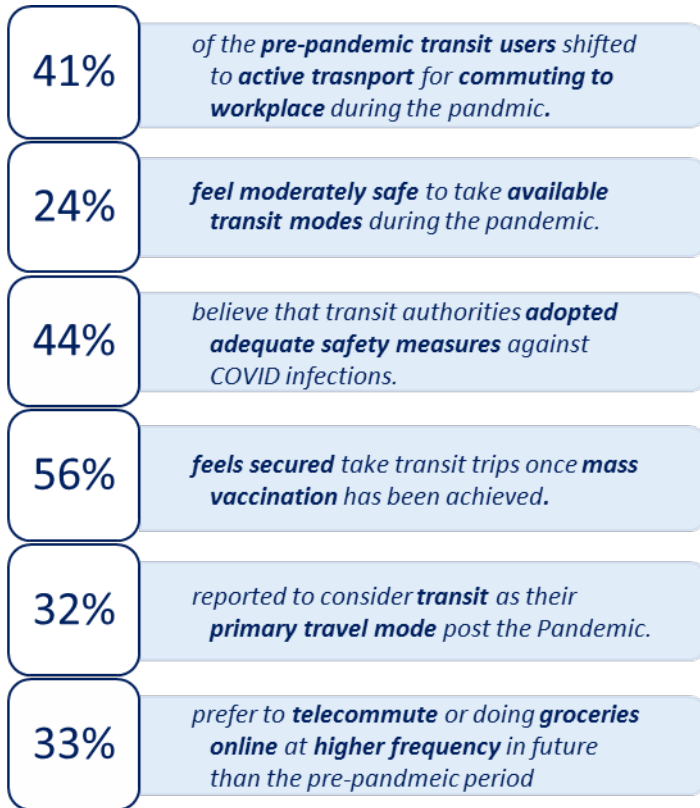

Figure 4. Degree of satisfaction towards public transit system during the pandemic

Figure 5. Attitude towards post-pandemic trasnit usage and safety policies.

Keys Statistics for the Policy Makers

41% of the **pre-pandemic transit users** shifted to **active trasnport** for **commuting to workplace** during the pandmic.

24% feel **moderately safe** to take **available transit modes** during the pandemic.

44% believe that transit authorities **adopted adequate safety measures** against COVID infections.

56% **feels secured** take transit trips once **mass vaccination** has been achieved.

32% reported to consider **transit** as their **primary travel mode** post the Pandemic.

33% prefer to **telecommute** or doing **groceries online** at **higher frequency** in future than the pre-pandmeic period

Conclusion

The principal focus of this study was to examine the one-year impact of the pandemic on the GTA residents transit usage behavior. In particular, the survey intends to capture the effect of various pandemic related factors, including but not limited to extent of telecommuting, online shopping, and vaccination. Moreover, various attitudinal factors were investigated to identify the prominent ones that may impact the post-pandemic transit usage.

The preliminary analysis indicated that the lost transit ridership is recovering, as the severity of the pandemic diminishes with mass vaccination being underway. Moreover, respondents were seen to be optimistic about returning to transit in future, suggesting the continuous demand recovery post the pandemic, but it will also face serious competition from other modes. Further in-depth investigation is required to provide constructive insights for future transit policy making to ensure a better transit operation in the region.

Acknowledgments

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