Assessing accessibility measures that account for daily fluctuations in transit and jobs availability

**Access and Time**

Accessibility, defined as the potential to reach desired destinations, depends on the transportation infrastructure and the location of opportunities (true case, jobs).

Recent research has developed measures that are sensitive to temporal constraints. These include:

1. Bus, subway and streetcar schedule (Transit service)
2. Working hours (Jobs availability)

**Methods**

**Regression Analyses**

Based on this methodological study explores whether accessibility measures that account for daily fluctuations in transit and jobs availability would also like to thank Guillaume Barreau for\

**Context**

Accessibility to jobs by transit is increasingly incorporated into transportation and land-use planning objectives, as it is proven to be a relevant indicator for assessing land-use and transportation systems performance.

In recent years, a plethora of accessibility measures have been developed, namely with regard to temporal fluctuations. Choosing the appropriate measure is increasingly challenging for engineers, planners and policy-makers.

This methodological study explores whether time-sensitive measures of accessibility to jobs by transit throughout the day provide a more appropriate time-sensitive measurement.

Performance of the Models (R2-Adjusted Reported)

<table>
<thead>
<tr>
<th>Measure</th>
<th>Time Period</th>
<th>Static</th>
<th>Dynamic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bus, subway &amp; streetcar (transit)</td>
<td>6:00 - 7:00 am</td>
<td>0.974</td>
<td>0.976</td>
</tr>
<tr>
<td>Jobs availability (jobs)</td>
<td>6:00 - 7:00 am</td>
<td>0.974</td>
<td>0.976</td>
</tr>
</tbody>
</table>

Although static and dynamic measures are expected to provide better model fits, a smaller amount of data due to data stratification, contributes to decreasing the performance of the models.

**Results and Analysis**

**Similar performance of the regression models**

Findings show that all three measures behaved similarly in the three regression models. The set of models using more detailed measures of accessibility (static and dynamic) do not provide better model fits than models using constant measures.

**Relative accessibility is constant across time**

Relative accessibility at 8 am, which reflects the constant measure, is highly correlated with relative accessibility at other time periods both for static and dynamic measures.

**Static and dynamic measures are highly correlated**

Accessibility at 8 am, which reflects the constant measure, is highly correlated with accessibility at other time periods both for static and dynamic measures.

**Measures Usability**

The authors would like to thank Guillaume Barreau for generating the travel time matrices with OpenTripPlanner. We would also like to thank David Levinson and Richard Schwartz for their valuable insights. Thanks also to Alexandre Legrain for providing help with the accessibility measures.

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**Acknowledgements**

The results show that the constant measure at 8 am is representative of the relative accessibility (static or dynamic) over the course of the day in the GTA.

Performance of the Models Based on Usability Criteria

<table>
<thead>
<tr>
<th>Measure</th>
<th>Constant</th>
<th>Static</th>
<th>Dynamic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theoretical soundness</td>
<td>+++</td>
<td>+++</td>
<td>+++</td>
</tr>
<tr>
<td>Data requirements</td>
<td>+++</td>
<td>+++</td>
<td>+++</td>
</tr>
<tr>
<td>Computationally usable</td>
<td>+++</td>
<td>+++</td>
<td>+++</td>
</tr>
<tr>
<td>Interpretation</td>
<td>+++</td>
<td>+++</td>
<td>+++</td>
</tr>
</tbody>
</table>

All criteria considered, the constant measure is the most usable as it is easily communicable, empirically sound and does not require data stratification.

**Conclusion**

The authors would like to thank Guillaume Barreau for generating the travel time matrices with OpenTripPlanner. We would also like to thank David Levinson and Richard Schwartz for their valuable insights. Thanks also to Alexandre Legrain for providing help with the accessibility measures. Finally, we gratefully acknowledge the financial support received from the Natural Sciences and Engineering Research Council of Canada (NSERC) and the Fonds de recherche du Québec–Nature et technologies (FRQNT).