Measuring Disruptions’ Impacts on the Reliability of Public Transit Accessibility with High-resolution Real-time Transit Data

Luyu Liu 1, Adam Porr 1, Harvey J. Miller 1, \*[[1]](#footnote-1)

1 Department of Geography and Center for Urban and Regional Analysis, The Ohio State University, Columbus, OH, USA

# Introduction

Accessibility is the primary indicator of a public transit system’s useability. It determines passengers’ ability to reach opportunities given a fixed amount of time [CITATION NEEDED]. However, public transit systems’ unreliability issue is a primary disadvantage compared to other transportation systems. Transit systems are highly dynamic and time-dependent, and their actual arrival time and accessibility can be significantly different from the scheduled time. On-time performance loss worsens the useability and user experience of transit systems, and it is one of the most important reasons why people do not favor public transit among other mobility options.

A major cause of unreliability is public transit systems’ vulnerability to outer disruptions, including short-term and long-term disruptions. Short-term disruptions introduce temporary disturbances usually in only a part of the system. Prominent examples are traffic jams, extreme weather, and major social events. Short-term disruptions affect accessibility primarily by influencing the on-time performance, in the form of delayed or early arrivals. Long-term disruptions have persistent impacts on the reliability of the whole system, such as the COVID-19 pandemic, schedule adjustment, and system redesign. Besides the on-time performance, long-term disruptions can also change the schedule, which create more nuanced patterns of unreliability.

The unreliability of public transit accessibility is

1. \* Corresponding author, email: miller.81@osu.edu

   ORCID: Luyu Liu (0000-0002-6684-5570), Adam Porr (0000-0002-4776-5575), Harvey J. Miller (0000-0001-5480-3421) [↑](#footnote-ref-1)