

# Assessing Early Public Response to COVID-19-Related Restrictions in New York City Using Spatial Analysis of Urban Mobility Data

Emily May-Ying Chen

Department of Geography, McGill University, Montréal (Québec) Canada

2021

Supervisor: Dr. Grant McKenzie, Reader: Dr. Clio Andris

The rapid spread of COVID-19 in the United States initiated shelter-in-place policies that significantly impacted human mobility and daily routines. Prior literature has examined the differences in lockdown policy efficacy and compliance with government orders between cities, as well as the effect of mobility changes on case counts. However, less attention has been placed on the connection between mobility and socio-demographics after the onset of COVID-19 within the same city. This undergraduate thesis focused on how human mobility patterns in New York City during the first three months of the pandemic differed based on socio-demographic factors like age, household income, and method of transportation to work. A secondary analysis determined if the four measurements of mobility used, namely distance traveled from home, home dwell time, non-home dwell time, and percentage time home, yielded significantly different findings. Using aggregated and anonymized cellphone mobility data from SafeGraph, I created a mobility ratio representing the change in mobility between the first two weeks of February and April 2020. I calculated a Global Moran's Index for each mobility ratio to test for the presence of spatial autocorrelation, and then I applied two spatial lag models to account for the existence of autocorrelation. That there existed significant differences in mobility patterns based on socio-demographics reinforced the need for physical distancing policies that acknowledge the demographic diversity present not only between but also within cities.

