

# Population growth and its effect on MCAS scores

## Table of Contents

Introduction.....	1
Methodology.....	1
Reading the MCAS data.....	1
Population Data.....	1
Joining the data.....	2
Removing Boston.....	2
Calculating Percentage Growth.....	2
Correlate population growth to average MCAS.....	2
Results.....	3
Discussion.....	3
Conclusion.....	3

## Introduction

Population growth can strain school systems by requiring rapid hiring and expansion of school facilities. One can imagine that school systems have tipping points where their growth affects MCAS results. This report analyzes that relationship.

## Methodology

I used the MCAS data provided along with population data from the US Census.

### Reading the MCAS data

I've provided a CSV file that contains per-school MCAS data. It only contains data for schools that are directly associated with a municipality (a city or town, called a MUNI in the data).

```
MCAS = readtable("MCAS.csv");
MCAS(1,:)
```

```
ans = 1x9 table
```

	MUNI	SchoolName	Subject
1	'Abington'	'Abington - Abington High'	'BIO'

...

## Population Data

The project compares Average MCAS scores across municipalities with population growth. The report excludes Boston, as the largest city in New England has confounding factors that could make it difficult to analyze the data from smaller communities.

The report uses Massachusetts Census Data (<https://malegislature.gov/Redistricting/MassachusettsCensusData/CityTown>) to examine population growth across all cities and towns.

Whereas the original data contains columns for growth percentage and estimated 2019 numbers, this report uses only census data from 2020 and 2010. The scrubbed data looks like this:

```
pop = readtable("Population.csv");
```

```
pop(1, :)
```

```
ans = 1x3 table
```

	MUNI	Pop2020	Pop2010
1	'Abington'	17062	15985

## Joining the data

I used the MUNI name to join the tables, so that each school had population data associated with its town.

```
MCASpop = join(MCAS, pop);  
MCASpop(1:2, :)
```

```
ans = 2x11 table
```

	MUNI	SchoolName	Subject	Exceeds	Meets
1	'Abington'	'Abington - Abington High'	'BIO'	3	47
2	'Acton'	'Acton-Boxborough - Acton-Boxborough Regional High'	'BIO'	54	127

## Removing Boston

We remove the Boston rows to make analysis easier.

```
noBoston = ~matches(MCASpop.MUNI, 'Boston');  
MCASpopNoBos = MCASpop(noBoston, :);
```

## Calculating Percentage Growth

We'll use growth percentage between 2010 and 2020 as our measurement of population growth:

$$\frac{(\text{Pop2020} - \text{Pop2010})}{\text{Pop2010}} \times 100$$

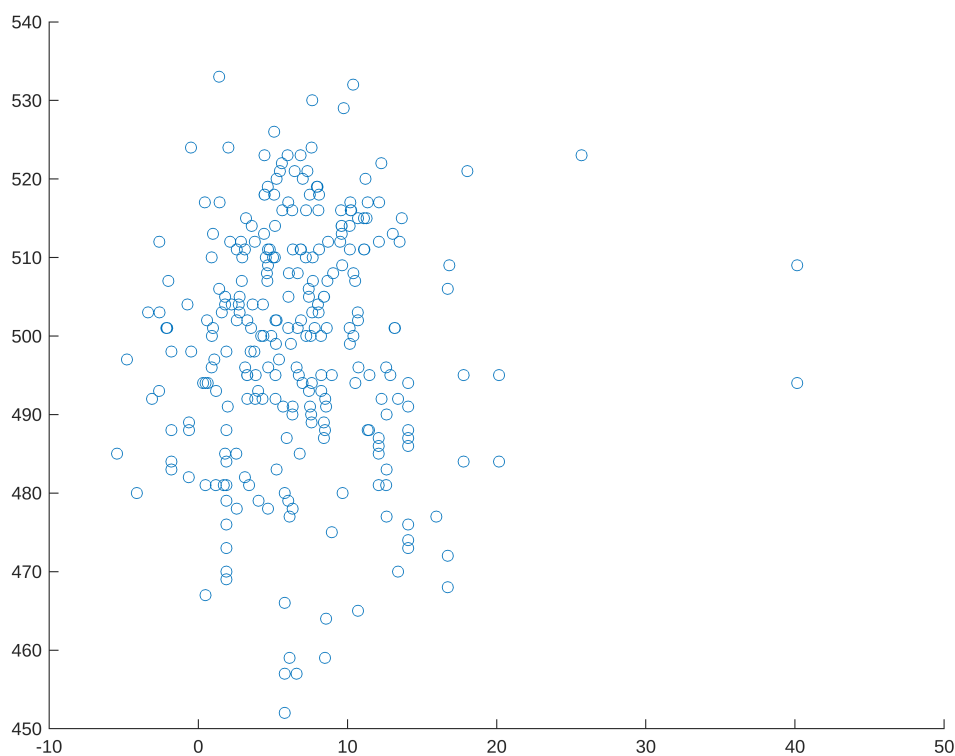
```
MCASpopNoBos.PerGrowth = (MCASpopNoBos.Pop2020 - MCASpopNoBos.Pop2010) ./  
(MCASpopNoBos.Pop2010) * 100;
```

## Correlate population growth to average MCAS

```
GrowthCorr = corrcoef(MCASpopNoBos.PerGrowth, MCASpopNoBos.AvgScore)
```

```
GrowthCorr = 2x2  
    1.0000    0.0304  
    0.0304    1.0000
```

```
scatter(MCASpopNoBos.PerGrowth, MCASpopNoBos.AvgScore)
```



## Results

Not including Boston, there was no discernable relationship between population growth between 2010 and 2020 and MCAS scores. A correlation of .03 suggests that looking at population growth will give you no clue about MCAS scores.

## Discussion

While the idea that population growth would strain school systems and hurt MCAS scores, there is no evidence that this happens in communities other than Boston. School systems have had no problem absorbing growth over the past ten years when it comes to MCAS scores. One might look at more recent population data (2023,) but given the complete lack of a relationship it would be surprising if that data generated a significantly different result.

## Conclusion

Arguments that adding housing to communities, by itself, will reduce MCAS scores cannot be supported by this data.