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Statistics Report

I began this project with a simple question: are higher speed limits dangerous? I remember a story I was told by my father when he was in Montana: he was driving on a stretch of highway when he noticed the speed line, instead of a number, said "At your own discretion." I wondered whether or not that was safe. Speed limits are there for a reason. But how safe do they keep us?

I knew that in order to narrow it down, I would have to find speeding fatalities per state in a year and census data in a year. I found US census data from 2010, and speeding fatalities from 2009. I knew that the years did not quite match up, but I was unable to find speeding fatalities alone in 2010-the charts I found only gave total car-related deaths, and the 2009 chart gave speeding-related fatalities.

I started by making a chart of each state and its population, average highway speed limit, and amount of speeding fatalities in 2009-2010. From this I could calculate other values I would need to be able to answer my question. I hypothesized that a higher speed limit would have a positive linear correlation with speeding deaths per capita. However, I had no idea how strong that correlation would be.

Knowing that different states have different populations, I decided to weigh each state equally by calculating their traffic deaths per capita. For each state I divided their speeding fatalities by population to get your chance of dying in a car crash in each state. All of the numbers were incredibly low, but that was to be expected. Imagine living in a state with even a 1% chance of dying in a speeding accident! Not even Oklahoma, the one outlier, was that bad!

I now had each state's speed limit and deaths per capita. I could test the correlation between the two to determine if states with a higher speed limit had more speeding deaths per capita.

Calculating correlation by using Excel, I determined that the correlation between speed limit and speeding related deaths per capita was .2431, and I graphed it accordingly. The coefficient of determination, or the correlation squared, was .059101. In layman's terms, an increased speed limit explains 6% of the increase of deaths per capita. Realistically, that's not much, considering that the other 94% increase in deaths per capita could be explained by something else. However, it was greater than 0, so I could conclude that higher speed limits do increase the likelihood of dying in a speeding accident, albeit by a miniscule amount.

I also decided to test whether or not it was higher populations that meant more speeding related deaths. Judging by the map of speed limits, there was no correlation between state population and speed limits, so the answer was up in the air. Similar to testing speed limit and deaths per capita, I tested the correlation between state population and deaths per capita. I at first hypothesized that higher state populations would lead to more deaths per capita, since driving in urban areas with a lot of people is more dangerous than driving in rural, sparsely populated states. However, to my surprise, the correlation between population and speeding deaths per capita was -.0991. It was negative! If anything, I could conclude that statistically, you are *safer* driving in more populous states, although with a coefficient of determination being around .01, population is a negligible factor.

On the whole, I concluded that neither speed limit nor population change the likelihood of you dying in a speeding related accident. While those factors do play some role, they are incredibly tiny. Strangely enough, Oklahoma was the most dangerous state to drive in, with about a 13x higher chance of dying. It was an outlier in both graphs, so it is an anomaly.

For future tests, I would compare the age demographics of each state to account for elderly drivers, or compare each state's terrain based on how rough it is, since mountain driving is harder than prairie driving. I would also account for how well serviced the roads are. There are many other factors that may explain how safe driving in different states is. I may solve this after further education in statistics.

Summary Table A:

	Speed Limit	Speeding Deaths	State Population	Speeding Deaths per capita (Speeding Deaths/State Population)
Mean	70.196	662.902	6053834	.00015977
Standard Deviation	4.238	670.289	6823984.3	.00026284

Summary Table B:

	Speed Limits & Speeding Deaths Per Capita	State Population & Speeding Deaths Per Capita
Correlation (r)	.24310757	-.099116
Coefficient of Determination (R^2)	.05910129	.009823981

Sources

Census. United States Census Bureau, n.d. Web. 4 Dec. 2013. <http://www.census.gov/compendia/statab/cats/transportation/motor_vehicle_accidents_and_fatalities.html>.

"File:US Speed Limits13.svg." *Wikipedia*. Wikipedia.org, 19 Sept. 2013. Web. 4 Dec. 2013. <http://commons.wikimedia.org/wiki/File:US_speed_limits13.svg>.

"List of U.S. States and Territories by Population." *Wikipedia*. 2013. *Wikipedia*. Web. 4 Dec. 2013. <http://en.wikipedia.org/wiki/

List_of_U.S._states_and_territories_by_population>.

Complete Table (Outlier in **bold red**)

State	Speed Limit	Fatalities	Population	Fatalities/Population
United States + DC		33,808	308,745,538	0.000109501
Alabama	70	848	4779736	0.000177416
Alaska	65	64	710231	0.000090112
Arizona	75	807	6392017	0.000126252
Arkansas	70	585	2915918	0.000200623
California	70	3081	37253956	0.000082703
Colorado	75	465	5029196	0.00009246
Connecticut	65	223	3574097	0.000062393
Delaware	65	116	897934	0.000129185
DC	65	29	601723	0.000048195
Florida	70	2558	18801310	0.000136054
Georgia	70	1284	9687653	0.00013254
Hawaii	60	109	1360301	0.000080129
Idaho	75	226	1567582	0.000144171
Illinois	70	911	12830632	0.000071002
Indiana	70	693	6483802	0.000106882
Iowa	70	372	3046355	0.000122113
Kansas	75	386	2853118	0.000135291
Kentucky	70	791	4339367	0.000182285
Louisiana	75	821	4533372	0.000181101
Maine	75	159	1328361	0.000119696
Maryland	65	547	5773552	0.000094742
Massachusetts	65	334	6547629	0.000051011
Michigan	70	871	9883640	0.000088125
Minnesota	70	421	5303925	0.000079375
Mississippi	70	700	2967297	0.000235906
Missouri	70	878	5988927	0.000146604
Montana	75	221	989415	0.000223364
Nebraska	75	223	1826341	0.000122102
Nevada	75	243	2700551	0.000089982
New Hampshire	70	110	1316470	0.000083557
New Jersey	65	583	8791894	0.000066311
New Mexico	75	361	2059179	0.000175313
New York	65	1156	19378102	0.000059655
North Carolina	70	1314	9535483	0.000136925
North Dakota	75	140	672591	0.00020815
Ohio	70	1021	11536504	0.000088502

Oklahoma	**75**	**738**	**3751351**	**0.00196729**
Oregon	65	377	3831074	0.000098406
Pennsylvania	65	1256	12702379	0.000098879
Rhode Island	65	83	1052567	0.000078855
South Carolina	70	894	4625364	0.000193282
South Dakota	75	131	814180	0.000160898
Tennessee	70	989	6346105	0.000155844
Texas	75	3071	25145561	0.000122129
Utah	80	244	2763885	0.000088282
Vermont	65	74	625741	0.00011826
Virginia	70	757	8001024	0.000094613
Washington	70	492	6724540	0.000073165
West Virginia	70	356	1852994	0.000192122
Wisconsin	65	561	5686986	0.000098646
Wyoming	75	134	563626	0.000237746