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Data Presentation & Visualization
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30,000 feet in the air. Despite the cramped space, you fancy yourself a yawn to relieve some of the aching stagnant pains associated with sitting in an uncomfortable chair stuffed into the aisle like a sardine. The small stretch provides a small bit of relief. Your 3rd episode of the Bachelor loaded up on your iPad slowly loses your attention and you sneak a glance out of the window (lucky you, a window seat!). You see nothing but clouds below. An absolutely gorgeous sight, and save the aforementioned discomfort in the cabin, the easy flight and beautiful views like this seem well worth it.

Suddenly, as you watch, a small spark seems to flutter out of the engine on the wing. While it initially catches your attention, you quickly dismiss it. *That seemed weird, but hey, I don't know planes that well, maybe that just happens.* You quickly resign your mind to the thought. Just as you begin to turn back to find out exactly what drama had made Sarah decide to leave the competition, you notice another small spark fly out of the engine again. Now you've become slightly more concerned, and decide to watch for a bit longer and see if these kindlings persist. However, after a few moments, nothing further comes of it. With your troubled mind assuaged, you once again decide to wave off these odd, fiery manifestations and readjust yourself from the man leaning slightly over the armrest next to you. *If only they'd make these seats a little bit wider, I wouldn't have to breathe in the scent of BO and scotch*.

Suddenly, a roar louder than you've ever experienced blasts to your right. You scream and turn towards the window. The once sparking wing engine is now alight, having plainly exploded. The cabin lights flash and the pilot comes on urging all to fasten their seatbelts and you're now rapidly falling, falling, falling straight towards the ground with nothing but freefall and fear and terror gripping you as you hurdle further, further towards the premature end to the flight and right as you're just about to reach your destination you seize up and…..

You wake up, startled. You quickly glance around you and try to gather your surroundings. The man who reeked of sweat and alcoholism now stood, gathering his carry-on from beneath the seat in front of him. You whip your head around and stare out the window, but the wing is perfectly intact. Then, over the intercom you hear, "Welcome to Chicago, we hope you enjoyed your flight"!. A wave of relief washes over you. You're so overjoyed to be safe from that terrible nightmare that you hug your seat neighbor, despite his scent. You gather your things and quickly depart the airplane, having successfully completed another safe flight back home. Your family greets you as you walk to the arrivals lane, and you once again appreciate the beautiful gift that flying gives you: a chance to see the loved ones, friends, and family that a car trip simply couldn't allow.

The reality is, the media at large seems eager to jump off the page and end the story before you've awoken. To lead you to believe that in the case you ever board a plane, you're more likely to experience the nightmare and not the dream that is reality. That's what we're here today to do, lay the truth bare, and show that flying, and airlines together, are one of, if not *the* safest method of transportation, with a lot of other positives to boot!

Let's do a short review of the advantages flying has over other methods of transport shall we?

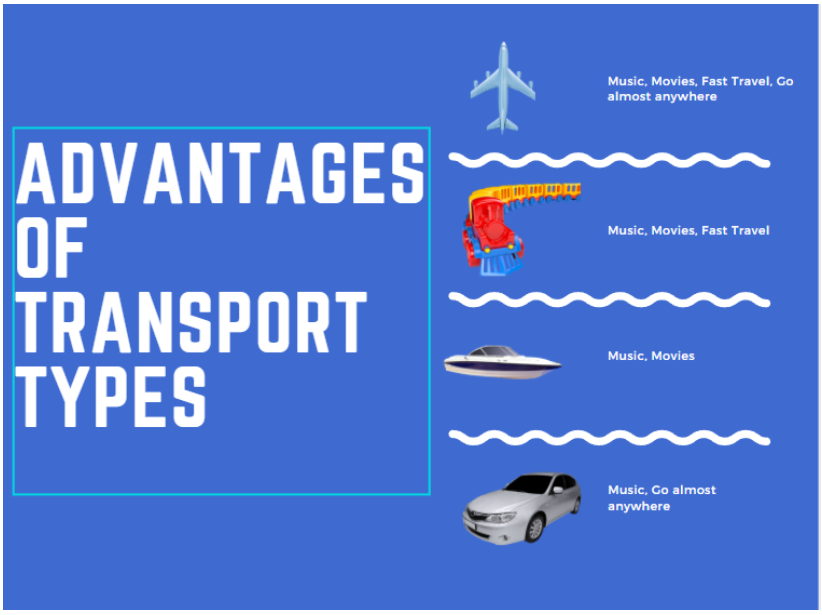

Figure 1: Relative Advantages of Transport Types

As we can see, air transport offers the same amenities as all other types of travel, with the added bonus that it's the fastest method of travel, while still being able to go almost anywhere. There's basically no attribute in this discussion outside of cars having a bit more mobility in terms of destination to outweigh the advantages shown here for air transport.

But just in case you needed one more, we've put a look at an in-depth discussion of impact on one other important aspect of the debate, the cost breakdown. One common comparison people consistently make is that airfare simply costs more. Again, we question the validity of these statements, and look to verify via the treasure trove of bureau of labor statistics datasets, more specifically, the ones regarding transport costs, which can be found here: https://www.bls.gov/ppi/#data . Graphing this data visually, we find the following diagram for transport costs over time:

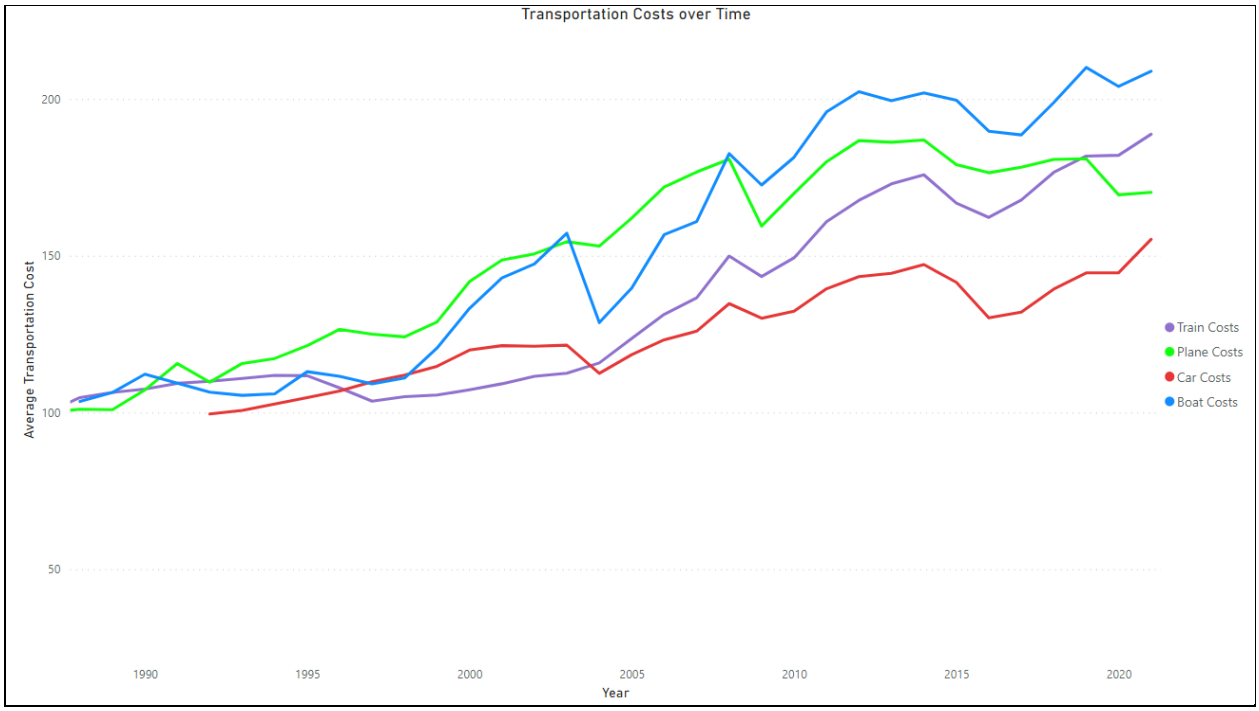

Figure 2: Transportation Costs over Time by Transport Type

As we can see from said visual, while flight costs have tended to be on the higher end of the spectrum, they've never been more affordable now! In fact, they're in a place where while car costs are rising, they've fallen off in pricing, reaching a closer equilibrium state to the steering wheels of the car world. The disparity between the two is dissipating, a trend that will continue to go down as time goes on!

Regardless of what the future holds for pricing amounts between the two, one can never put a price on one's life. Consistently and repeatedly as of late, we've heard media measuring sticks spewing ideas about how dangerous flying is and that, in particular, those two lowest cost items in flying and cars are a great comparison, namely that automobiles are much safer than that of air travel. With this slanderous nature showing up in the public's eye, we wanted to test that statement and back it up with statistics to show these comparisons.

Let's start off by addressing the airline industry itself. With the fresh machinations on the supposed decreased safety of air transport, certainly the trends of airline fatalities must be on the rise, hence the reasoning for increased scrutiny? Let's check on that:

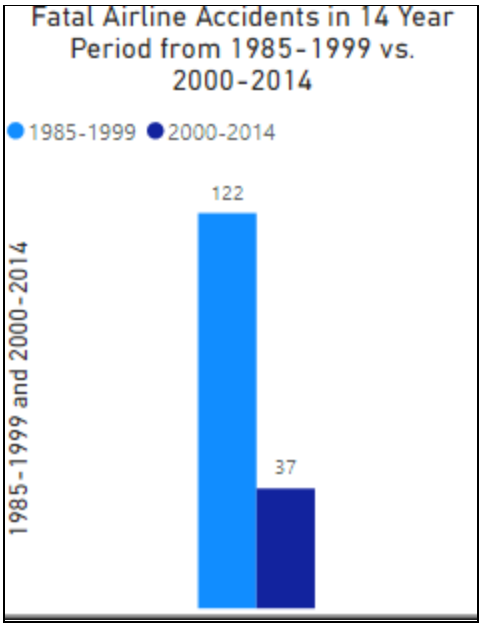

Figure 3: Fatal Airline Accidents over 14 Year Periods

Hmm, well that's odd. As you can see from the graphic above, it would appear that, in fact, fatal airline accidents have actually decreased tremendously over time. Now some of you may be thinking, well sure, airline accidents have gone down, but perhaps overall fatalities have increased due to larger planes? We can examine overall fatalities in a similar fashion, as shown here:

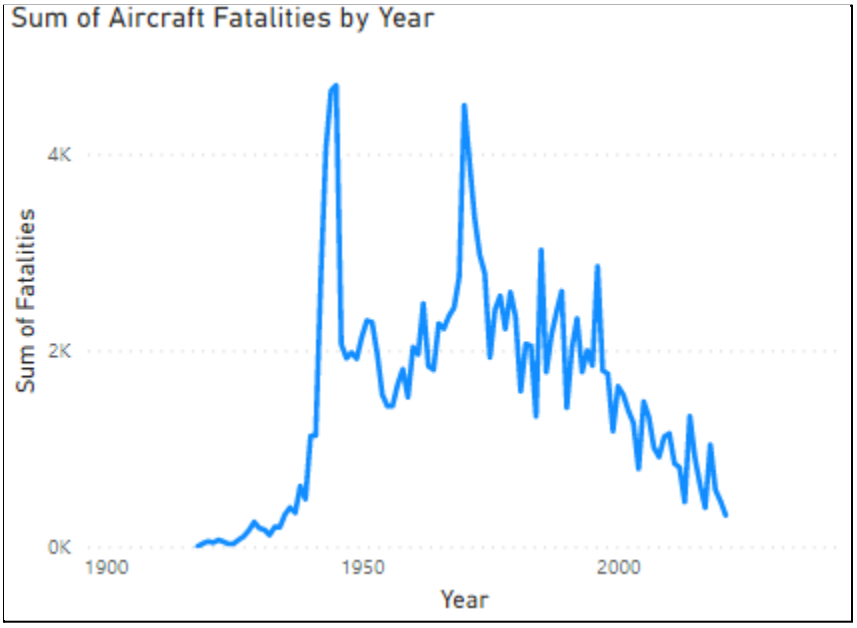

Figure 4: Aircraft Fatalities over Time

Just as we saw with accidents themselves, fatalities overall have steadily been on the decline over the past 50 years or so, nearing some of the lowest numbers since flight was first commercialized. Truly, this recent jump in media attention seems like an oddly targeted

campaign. However, let's take this examination one step further into their claims. Their argument is that compared to flight fatalities, cars are a much safer bet when travelling. We can pull the same fatality information from the National Highway Traffic Safety Administration and compare it to our airline fatality statistics:

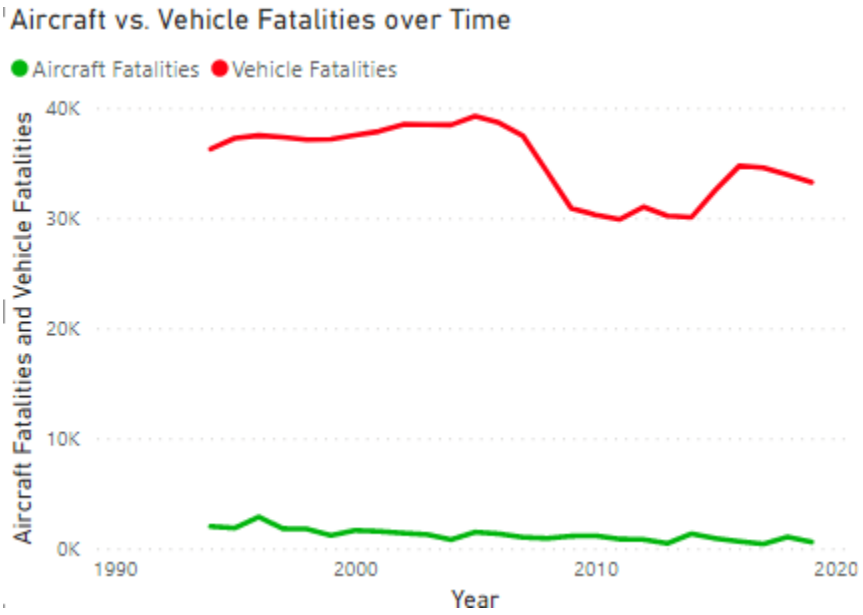

Figure 5: Aircraft vs Automobile Fatalities over Time

Again, the rhetoric here does not seem to match the statistics! Even during the highest spikes in aircraft fatalities, the annual amount comes nowhere close to the amount of automobile-related deaths. And on an aggregate level, the sum of these fatalities over time show that of these two transportation vectors, 85% of fatalities observed were found relating to vehicles.

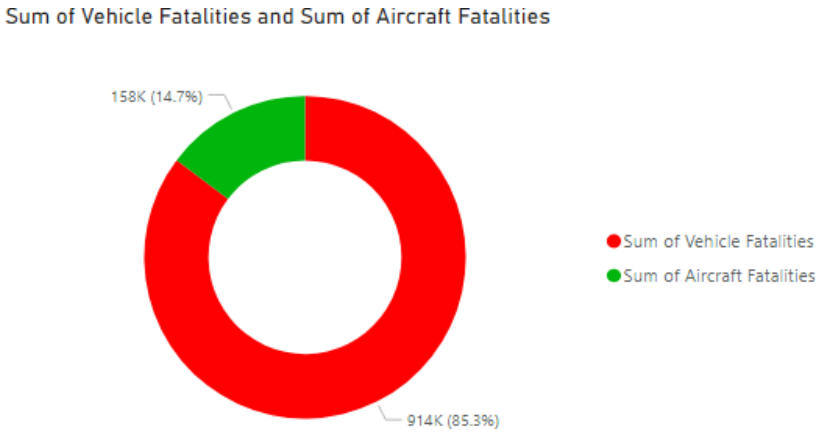

Figure 6: Aircraft vs Automobile Fatalities in Aggregate

Taking a step back, we can identify so many positives from airfare as a transportation method. It offers all the amenities that other methods of transportation can, and then some. The pricing which acted previously as a barrier to some has gone down tremendously in recent years making it more affordable than ever, and most importantly of all, the risk you take in boarding an airplane are

nowhere near as high as those when getting behind the wheel of a car, and that gap is only growing as time goes on.

With all this being said, and with the holidays coming up soon, we hope that when the time comes to see your loved ones, particularly after having such a long hiatus likely from the crazy past year and a half we've had, you'll remember the loving memories to be had after coming out of the airport in our opening story, and not the grim, harrowing story that mimics the media's misleading messages.

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Github Link: https://github.com/jrickord/DataPresentationVisualization