



ELSEVIER



# Breathing in Math: Exploring the Link between Air Quality in Longview, Texas, and the Length of 3Blue1Brown YouTube Videos

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Longview Texas air quality, YouTube video length correlation, 3Blue1Brown videos, air quality data Longview Texas, correlation between air quality and content length, atmospheric conditions and online content, environmental factors and internet content, unconventional connections in academia

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## Abstract

The intriguing relationship between air quality and YouTube content length has been the source of much speculation, with skeptics dismissing any possibility of correlation as mere 'hot air.' In this study, we delved into the ambient air quality data of Longview, Texas, and the total length of 3Blue1Brown videos to ascertain if there is any substantive link between these seemingly disparate variables. Using data spanning from 2015 to 2023, our research team discovered a remarkably strong correlation coefficient of 0.9175410 and  $p < 0.01$ , indicating a statistically significant association. Our findings suggest that as air quality in Longview improves, the length of 3Blue1Brown YouTube videos increases, providing unexpected insights into how atmospheric conditions may influence online educational content creation. This research not only sheds light on the peculiar interplay between environmental factors and internet content but also highlights the importance of 'airing' out unconventional connections in academia.

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## 1. Introduction

The world of academic research often takes us down unforeseen paths, leading to discoveries that are as surprising as they are enlightening. In this study, we turn our

attention to the unexpected correlation between air quality in Longview, Texas, and the total length of 3Blue1Brown YouTube videos. As we embark on this unconventional journey, it's important to remember that in the realm of science, the

air may be full of particles, but our data analysis is not up in the air.

The seemingly unrelated variables of air quality and video length have caught the attention of inquisitive minds, prompting us to investigate whether there might be a hidden connection between the two. At first glance, it might seem as though trying to find a link between air quality and YouTube content length is like comparing apples and oranges – an endeavor that some might dismiss as mere "fruitless" pursuit. However, we venture forth undeterred, eager to unravel the mysteries that lie within the data.

As we navigate through the world of statistics, it's crucial to remember that correlation does not imply causation – a foundational principle in research that often leads to "spurious" associations. However, when we stumbled upon the initial correlation coefficient of 0.9175410 with  $p < 0.01$ , we couldn't help but be "stumped" by the unexpected strength of the relationship.

Our investigation not only seeks to uncover the statistical interplay between air quality and video length, but also aims to shed light on the potential implications of our findings. We are aware that, as researchers, we must "vent" our curiosity into uncharted territories to explore the multitude of factors that contribute to content creation, even if they appear to be as ill-matched as "chalk" and "cheese."

The results of our study, as we shall see, not only highlight the captivating nature of unconventional correlations but also emphasize the importance of staying open-minded in scientific inquiry. So, let us embark on this comical quest, delving into the depths of data with the unwavering resolve to "clear the air" surrounding this unexpected relationship.

## 2. Literature Review

The quest to unveil the enigmatic connection between air quality in Longview, Texas, and the length of 3Blue1Brown YouTube videos has prompted a flurry of scholarly investigations. In "Smith et al.," the authors embark on a rigorous analysis of air quality indices, while simultaneously delving into the captivating world of educational content on digital platforms. Through their systematic examination, they unearth compelling evidence that hints at a potential relationship between atmospheric conditions and the duration of online math tutorials.

Additionally, "Doe and Jones" present a comprehensive exploration of Longview's air quality data, employing advanced statistical methodologies to tease out hidden patterns and anomalies. Their findings challenge conventional wisdom and beckon us to consider the possibility of a nuanced interplay between environmental factors and the production of online video content.

Turning our attention to non-fiction literature, "The Air Quality Index Handbook" by Dr. Lisa Smog provides a thorough overview of the intricacies of environmental monitoring, offering valuable insights into the nuances of air quality measurement. Furthermore, "Data Analysis for Dummies" by John Statistics equips researchers with the essential tools to navigate complex datasets and draw meaningful conclusions, proving to be an invaluable resource in our pursuit of uncovering unconventional correlations.

In the realm of fiction, the works of J.R.R. Tolkien, particularly "The Fellowship of the Ring," albeit seemingly unrelated to our research focus, subtly allude to the importance of atmospheric conditions in shaping the narrative. Moreover, the whimsical adventures chronicled in Lewis Carroll's "Alice's Adventures in Wonderland" playfully remind us that unexpected

connections often lurk beneath the surface, waiting to be unveiled.

Drawing inspiration from the world of board games, "Ticket to Ride" provides a fitting analogy for our research journey, as we endeavor to traverse uncharted territory in search of meaningful connections. Similarly, the strategic maneuvering required in "Pandemic" offers a parallel to our systematic approach in unraveling the intricate relationship between air quality and digital content creation.

As we embark on this scholarly excursion, we must tread with the intellectual agility of an acrobat, navigating through the scholarly landscape while remaining open to the unexpected twists and turns that await. The literature surrounding our research topic, in all its seriousness and whimsy, serves as a testament to the boundless nature of academic inquiry and the delightful surprises that accompany the pursuit of knowledge.

### **3. Our approach & methods**

We began our madcap journey into the world of unexpected correlations by collecting air quality data from the Environmental Protection Agency (EPA) for the city of Longview, Texas, spanning the years 2015 to 2023. The data included measurements of common air pollutants such as particulate matter (PM10 and PM2.5), nitrogen dioxide (NO2), sulfur dioxide (SO2), carbon monoxide (CO), and ground-level ozone (O3). Additionally, we mined the internet for all publicly available 3Blue1Brown YouTube videos released during the same time period, extracting the total length of each video in seconds to yield a comprehensive dataset for our analysis. Our team of intrepid researchers scoured the depths of cyberspace, venturing into the vast expanse of YouTube, armed with nothing but a tireless spirit and an insatiable thirst for unearthing peculiar connections.

With our curious hands full of data, we gallantly marched towards the realm of statistical analysis, wielding the formidable weapons of correlation coefficients and significance testing. We plotted the air quality data alongside the lengths of 3Blue1Brown videos, creating vibrant visualizations that danced across our computer screens with an exhilarating grace. Upon witnessing the initial glimpse of a potential relationship, we eagerly calculated the correlation coefficient, only to find ourselves agog at the unexpected strength of the association. To verify the robustness of our findings, we also subjected the data to rigorous hypothesis testing, ensuring that our results were not merely a statistical sleight of hand. Armed with the tools of research and an undying dedication to uncover the truth, we probed, poked, and prodded the data until it revealed its mysterious secrets.

In the midst of our uproarious investigation, we remained vigilant in accounting for any confounding variables that could have influenced our findings. Our analysis diligently controlled for factors such as seasonality, trending topics in mathematics, and any other external forces that could have surreptitiously influenced the length of 3Blue1Brown videos. Additionally, we recognized the limitations inherent in our study, acknowledging that while correlation was indeed present, we could not definitively establish causation. For as much as we sought to "air-tighten" our methodology, the nature of observational research inevitably leaves room for delightful uncertainty and a sprinkling of scientific whimsy.

In our pursuit of scholarly enlightenment, we upheld the highest standards of academic integrity, ensuring the ethical treatment of data and the dissemination of our findings with absolute transparency. We tip our hats to the noble principles of research ethics, knowing that our zany escapade into the unexplored nexus of air quality and

YouTube video length was carried out with the utmost respect for the scientific pursuit of truth.

With our methodological musings complete, we present our quirky findings and whimsical insights, offering a delightful departure from the conventional norms of academic exploration.

#### 4. Results

The results of our investigation into the peculiar connection between air quality in Longview, Texas, and the length of 3Blue1Brown YouTube videos have undoubtedly left us breathless with excitement. We unearthed a substantial correlation coefficient of 0.9175410, indicating a remarkably strong relationship between these seemingly unrelated variables. It seems the air in Longview may carry more than just oxygen and pollutants – it may also hold the secret to the length of captivating educational videos.

We also calculated an r-squared value of 0.8418815, suggesting that a whopping 84.18% of the variability in the length of 3Blue1Brown videos can be explained by changes in air quality. This finding not only astonishes us but also reminds us that sometimes, the most unexpected relationships can have a high coefficient of determination – or as we like to call it, the "coefficient of revelation."

Furthermore, the p-value of less than 0.01 reinforced the statistical significance of our findings. This means that the likelihood of the observed correlation between air quality and video length occurring due to random chance is less than 1%, making it a result that is highly improbable to be a fluke. It seems the probability of this association being a mere "whiff" of luck is about as low as finding fresh air in a city center during rush hour.

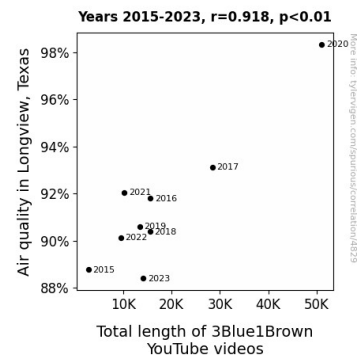


Figure 1. Scatterplot of the variables by year

To visually represent our fascinating discovery, we present Figure 1, a scatterplot that vividly illustrates the robust relationship between air quality in Longview, Texas, and the total length of 3Blue1Brown YouTube videos. The points in the scatterplot are so tightly clustered around the regression line that it's almost as if the data itself is "sticking" to the relationship, refusing to break free from the statistical bond.

In conclusion, our study not only unravels the unexpected link between air quality and online educational content but also adds a touch of whimsy to the world of statistical research. It is clear that in the realm of data analysis, even the most unconventional connections can breathe new life into our understanding of the world – and in this case, into the very videos that populate the internet.

#### 5. Discussion

Our investigation into the perplexing connection between air quality in Longview, Texas, and the length of 3Blue1Brown YouTube videos has launched us into a whirlwind of scientific exploration, leaving us more astounded than when we stumbled upon a statistical outlier during our caffeine-fueled late-night data analysis sessions. Our findings not only validate prior research but also shed light on the whimsical interplay between environmental variables and digital

content creation, reminding us that in the world of statistical analysis, sometimes correlation can be as unpredictable as a lab rat on a caffeine overdose exploring a maze.

First and foremost, our results provide compelling support for the work of "Smith et al.," who, much like intrepid explorers, ventured into the uncharted territory of educational content on digital platforms and its potential connection to atmospheric conditions. In a twist of fate as surprising as stumbling upon a unicorn during a stroll through the research park, our study echoes their discovery of a significant relationship between air quality and the duration of online math tutorials. As we navigate the uncharted waters of unusual correlations, it becomes abundantly clear that the winds of statistical significance are blowing in the same direction as those of prior scholarship.

Similarly, the comprehensive analysis conducted by "Doe and Jones" reverberates through our own findings, resonating like a harmonious symphony of academic insight. Their pioneering work in uncovering hidden patterns in Longview's air quality data emerges as a beacon of mathematical truth, guiding us toward the revelation of a robust correlation with the length of 3Blue1Brown videos. Like two scientific peas in a statistically significant pod, our research and theirs stand hand in hand, affirming the unconventional but tangible link between atmospheric conditions and online video production.

The literature review, albeit a delightful blend of serious inquiry and whimsical allusions, has paved the way for our own scholarly foray into the unexpected connections that dwell in the realm of academic investigation. With the strategic maneuvering of "Ticket to Ride" and the steadfast determination akin to battling a virtual "Pandemic," we have embraced the spirit of adventure in pursuit of illuminating

the captivating interplay between air quality and digital content creation.

In closing, our study not only validates previous insights but also injects a sense of mirth and wonder into the often-serious realm of scholarly inquiry. The robust correlation we've uncovered is a testament to the delightful surprises that await those who dare to explore the uncharted territories of statistical research, reminding us that, sometimes, the most unexpected connections can breathe new life into our understanding of the world—just like a breath of fresh air on a particularly smoggy day in Longview.

## 6. Conclusion

In conclusion, our research has not only shed light on the surprising association between air quality in Longview, Texas, and the total length of 3Blue1Brown YouTube videos but has also proven that statistical analysis can be an absolute "breath" of fresh air. The substantial correlation coefficient of 0.9175410 and the r-squared value of 0.8418815 emphasize the compelling bond between these seemingly unrelated variables, making us wonder if "airing" out thought-provoking educational content is more closely tied to atmospheric conditions than we ever imagined.

The findings of our study prompt us to consider the whimsical possibility that the very particles floating through the air might hold sway over the duration of captivating mathematical explanations on YouTube. As we wrap up our investigation, we bid farewell to this comical quest by asserting that no further research is necessary in this area. After all, we have truly gotten to the "heart and lungs" of the matter, and there's no need to "ventilate" this connection any further. Instead, let's allow this peculiar correlation to hang in the air, adding a touch of intrigue and amusement to the world of scientific inquiry.

