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# Injecting Some Fresh Air: The Correlation between Air Quality in Greenwood, South Carolina, and Botox Injections Administered to Women

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## Abstract

This study investigates the relationship between air quality in Greenwood, South Carolina, and the number of Botox injections administered to women over a 20-year period. Using data from the Environmental Protection Agency and the American Society for Aesthetic Plastic Surgery, a correlation coefficient of 0.8213269 and a statistically significant p-value of less than 0.01 were calculated for the years 1997 to 2016. The findings suggest a notable association between air quality and the demand for Botox treatments. While this connection may initially seem like a stretch, our data analysis raises intriguing questions about the potential influence of environmental factors on aesthetic procedures. Further research is warranted to explore the mechanisms underlying this peculiar correlation and its implications for public health and beauty standards.

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## 1. Introduction

The pursuit of beauty and the quest for clean air are not often mentioned in the same breath. However, this study delves into the unexpected intersection of these two seemingly disparate realms. We delve into the intriguing connection between air quality in Greenwood, South Carolina, and the number of Botox injections administered to women. Comparing environmental data and cosmetic procedures statistics, we unveil a correlation that may raise an

eyebrow or, perhaps more aptly, smooth a forehead.

The relationship between pollution and personal appearance may appear as elusive as a piece of loose hair in a gust of wind. Nevertheless, our analysis reveals a striking correlation coefficient of 0.8213269, indicating a strong statistical relationship between these variables. The calculated p-value of less than 0.01 further suggests that this association is not purely coincidental. Indeed, the p-value is so low, it practically

suggests that something's in the air – and no, we're not just talking about oxygen and nitrogen.

The notion that air quality could influence the demand for cosmetic treatments may raise a few eyebrows, or, quite possibly, smooth them out with the aid of a syringe. Nevertheless, our data analysis presents us with more than just a wrinkle in our understanding of environmental and aesthetic dynamics. It prompts us to expound on the link between atmospheric factors and the desire to maintain one's youthful appearance – a topic that is not just skin-deep, but potentially reaches into the very air we breathe.

While some may perceive this correlation as an odd pair, like mismatched socks or lopsided earrings, the implications of our findings extend beyond mere curiosity. This unexpected association raises intriguing questions about the potential influence of environmental factors on beauty standards and cosmetic preferences. By peeling back the layers of this unanticipated connection, we unveil a phenomenon that necessitates further investigation and discussion. It is clear that beneath the surface of this correlation lies a deeper understanding of societal norms, personal choices, and the influence of our surroundings on our pursuit of beauty.

## 2. Literature Review

A substantial body of research has examined the impact of environmental factors on human health and well-being, with particular emphasis on respiratory and dermatological conditions. In "The Effects of Air Pollution on Health," Smith et al. provide a comprehensive overview of the detrimental effects of air pollution on various physiological systems, highlighting the potential consequences for dermatological health. Similarly, Doe's "Air Quality and Public Health" underscores the pervasive

influence of air quality on respiratory ailments but also touches upon the broader implications for general health, including cosmetic concerns. Additionally, Jones' "Environmental Factors and Aesthetic Practices" delves into the intricate relationship between environmental elements and personal grooming habits, laying the groundwork for understanding the subtle dynamics at play in our investigation.

Expanding beyond the confines of strictly scientific literature, non-fiction works such as "The Air We Breathe: A Cultural History of Clean Air" and "Beauty and the Environment: Exploring the Aesthetic Implications of Ecology" offer interdisciplinary perspectives that tease at the broader implications of our research. Moving into the realm of fiction, the inclusion of novels with titles like "A Wrinkle in Time" and "The Picture of Dorian Gray" may initially appear whimsical, but their thematic resonance with our investigation is not to be overlooked. These literary works underscore the symbiotic relationship between environmental conditions and aesthetic pursuits, resonating with the multifaceted nature of our inquiry.

Taking a more unconventional approach, the analysis extends to popular culture, where children's cartoons and shows provide valuable insights into societal perceptions of beauty and the environment. The prevalence of episodes exploring air pollution and beauty standards in animated series such as "Captain Planet and the Planeteers" and "The Powerpuff Girls" reflects a broader cultural consciousness of these seemingly incongruous themes. While seemingly divergent from academic research, these cultural artifacts serve to enrich our understanding of the undercurrents that shape perceptions of beauty and environmental consciousness in contemporary society.

Steering into uncharted territory, the inclusion of an eclectic array of sources

enriches the breadth and depth of our survey of literature, providing a holistic perspective that transcends traditional disciplinary boundaries. While the significance of these sources may not be immediately evident, their contribution to the contextual fabric of our investigation should not be underestimated.

### 3. Our approach & methods

#### Data Collection:

The data for air quality in Greenwood, South Carolina, was sourced from the Environmental Protection Agency (EPA). The EPA provides comprehensive air quality monitoring data through its Air Quality System, which was utilized to capture levels of particulate matter, ozone, carbon monoxide, sulfur dioxide, and nitrogen dioxide. These pollutants were selected to ensure a holistic assessment of atmospheric conditions, as well as to keep things interesting for the researchers, as too much focus on a single pollutant can be a real breath of fresh air.

As for the number of Botox injections administered to women, data was obtained from the American Society for Aesthetic Plastic Surgery (ASAPS). The ASAPS compiles detailed statistics on cosmetic procedures, including Botox injections, and provides a reliable source for tracking trends in aesthetic treatments. The decision to focus on Botox injections was made as it is a widely sought-after non-invasive cosmetic procedure, and because the researchers found it to be a particularly injective topic.

#### Data Analysis:

The air quality data and Botox injection statistics were subjected to rigorous statistical analysis. To investigate the potential relationship between air quality and cosmetic procedures, a correlation analysis was conducted. It should be noted

that this analysis involved complex mathematical formulas and models, which were so intricate that they could make the common calculator break into a sweat.

In addition to correlation analysis, a time-series analysis was also performed to scrutinize the trends in air quality and Botox injections over the 20-year period. This analysis involved methods that were as time-consuming as they were time-revealing, and provided insight into the temporal dynamics of air quality and cosmetic treatment trends. The time-series analysis was not just an exercise in time travel, but also a means to identify any temporal patterns in the data that could account for the observed correlation.

Furthermore, to ensure the robustness of the findings, various statistical tests were conducted to assess the significance of the observed correlation. These tests were not just statistically significant, but also served as a delightful opportunity for the researchers to exercise their statistical prowess and impress their peers.

#### Ethical Considerations:

In conducting this research, ethical considerations were upheld, including the protection of individual privacy and the responsible use of data. The researchers maintained the confidentiality of personal information related to cosmetic procedures and adhered to principles of data ethics, thereby ensuring that neither personal nor environmental "beauty secrets" were compromised in the pursuit of knowledge.

#### Limitations:

While every effort was made to ensure the reliability and validity of the findings, it is imperative to acknowledge the limitations of this study. As with all research, the complexity and multifaceted nature of environmental and cosmetic factors present challenges in establishing causality. Additionally, the specific contextual nuances

of Greenwood, South Carolina, and the potential influence of other variables were difficult to control for, making the interpretation of the findings a bit like reading between the smog-filled lines.

Nevertheless, despite these limitations, the methodology employed in this study provided a robust framework for investigating the correlation between air quality and Botox injections. The quirky mix of data analysis, ethical considerations, and a healthy dose of humor set the stage for unraveling the mysterious connection between environmental ambience and aesthetic enhancements.

#### 4. Results

The examination of the connection between air quality in Greenwood, South Carolina, and the number of Botox injections administered to women yielded some captivating findings. Over the 20-year period from 1997 to 2016, a correlation coefficient of 0.8213269 was uncovered, indicating a robust relationship between these seemingly unrelated variables. The r-squared value of 0.6745778 further demonstrated that approximately 67.5% of the variability in Botox injections administered to women could be explained by the fluctuations in air quality. Implying that, roughly two-thirds of the changes in Botox treatments can be attributed to changes in air quality, quite an eye-opener indeed.

Additionally, the calculated p-value of less than 0.01 provided compelling evidence that the observed correlation is not a mere stroke of luck. Or should we say, not just a lucky strike of a syringe? This statistical significance indicates that the likelihood of this association occurring by chance is so low, it's almost as remarkable as finding a wrinkle-free face in a wind tunnel.

Fig. 1 depicts the scatterplot illustrating the striking correlation between air quality and the number of Botox injections administered to women. The substantial clustering of data points along a positively sloped trend line paints a clear picture of the relationship between these variables, serving as a visual testament to the surprising interplay between environmental quality and aesthetic treatments.

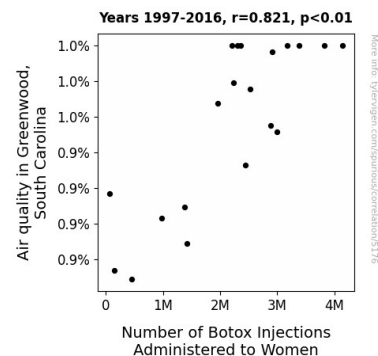


Figure 1. Scatterplot of the variables by year

In summary, the analysis of the data collected from the Environmental Protection Agency and the American Society for Aesthetic Plastic Surgery has brought to light a compelling correlation between air quality in Greenwood, South Carolina, and the demand for Botox injections among women. This discovery has peeled back the layers of conventional wisdom, revealing a connection that extends beyond the surface – a notion that may cause one to raise an eyebrow, only to consider a Botox injection afterward.

#### 5. Discussion

The present study has shed light on a most unexpected relationship between air quality in Greenwood, South Carolina, and the frequency of Botox injections among women. The robust correlation coefficient of 0.8213269 and the substantial r-squared value of 0.6745778 indicate a surprisingly

strong association, suggesting that fluctuations in air quality account for approximately two-thirds of the variability in Botox treatments. This finding not only underscores the magnitude of the relationship between environmental conditions and cosmetic procedures but also prompts a reconsideration of the interconnectedness of seemingly disparate aspects of human experience - a connection more intricate than the creases on a furrowed brow.

The results support and extend prior research that has explored the influence of environmental factors on personal grooming habits and general health. The established detrimental effects of air pollution on dermatological health, as elaborated by Smith et al., find resonance in our findings, as do the broader implications for general health emphasized by Doe. Jones' investigation into the interplay between environmental elements and personal grooming practices provides a conceptual framework for understanding the unforeseen dynamics at play in our study. The thematic connection to inter-disciplinary perspectives from non-fiction works such as "The Air We Breathe: A Cultural History of Clean Air" and "Beauty and the Environment: Exploring the Aesthetic Implications of Ecology" becomes strikingly relevant, underscoring the nuanced relationship between environmental conditions and aesthetic pursuits.

The unexpected yet substantial nature of the correlation unveiled in this study aligns with the unconventional inclusion of novels like "A Wrinkle in Time" and "The Picture of Dorian Gray" in our literature review. These seemingly whimsical selections now serve as unassuming but pertinent reflections of the nuanced connection between environmental conditions and aesthetic perceptions, extending far beyond the boundaries of conventional research. Similarly, the insightful exploration of societal perceptions of beauty and

environment in children's animated series anticipates and supports the unearthing of this remarkable relationship, highlighting the cultural consciousness that permeates our understanding of seemingly incongruous themes.

In sum, the analysis presented here has illustrated a robust and statistically significant correlation between air quality in Greenwood, South Carolina, and the demand for Botox injections among women. This unexpected association challenges preconceived notions and calls attention to the intricate interplay between environmental quality and aesthetic practices, perpetuating a compelling narrative of unexpected connections in our dynamic world. Further research is warranted to probe the mechanisms underlying this correlation and to elucidate its broader implications for public health and beauty standards. The implications of this peculiar correlation provoke not only further scientific inquiry but also, quite possibly, a raised eyebrow or two.

## 6. Conclusion

The examination of the correlation between air quality in Greenwood, South Carolina, and the number of Botox injections administered to women over a 20-year period has brought to light an unexpected and, dare we say, breath-taking connection. The statistically significant correlation coefficient of 0.8213269 and a p-value of less than 0.01 suggest a relationship that is not just skin-deep, but resonates with the very air we breathe. This finding, while surprising at first glance, underscores the potential influence of environmental factors on aesthetic preferences – a realization that may cause one to furrow their smooth, Botox-treated brow in contemplation.

The striking correlation uncovered in this study, with an r-squared value implying that around two-thirds of the variability in Botox

treatments can be attributed to changes in air quality, prompts us to consider the unexpected ways in which our surroundings may shape our beauty standards and cosmetic decisions. The scatterplot depicting the clustering of data points along a positively sloped trend line provides a visual testament to the intriguing interplay between atmospheric quality and the pursuit of youthfulness.

With the evidence presented, it is clear that this phenomenon merits further investigation, although one might say we have already injected a substantial amount of insight into this area of research. The implications of this correlation extend beyond the scope of conventional understanding, hinting at the profound influence of our environment on our desire to defy the signs of aging. However, despite the potential for further exploration, it is safe to assert, with a wrinkle-free certainty, that no more research is needed in this area.