

# DEPRESSION AND SOCIAL MEDIA

## DEPRESSION & MEDICATION

According to the World Health Organization, depression is the leading cause of disability worldwide, and is a major contributor to the overall global burden of disease. Due to access barriers to treatment depression is often under-reported.

For our analysis we are using antidepressants as an estimator for severe mental health issues as mild depressions are usually first trying to be treated with therapy approach.

## MEDICATION & SOCIAL MEDIA

Research has shown that the use of social media can have an impact on mental health.

We are trying to shed some light on this topic by comparing the consumption of anti-depressants in selected European countries and the use of social media in these countries.

We are trying to answer the following question:

***Can we develop a model that can predict the consumption of antidepressants with social media use?***

The findings can help to increase governments' as well as peoples' awareness towards the risks of social media.

The findings in this study can of course also be of use for manufacturers of antidepressants.

## DATA SOURCES

The data on the consumption of antidepressant was taken from a dataset on the consumption of different medication in the pharmaceutical market worldwide.

That dataset contains information on antidepressants for 30 countries worldwide by year from 2000 until 2018, although the data for the the latter is incomplete.\*

The consumption is given by *Defined daily dosage per 1 000 inhabitants per day*.

For the Social Media Data for the Year 2019 a website with relevant data has been scraped.\*\*

This website contains relevant information about 22 European countries.

The social media use is given by *Percentage of Active social media penetration*.

## DATA CLEANING & MANIPULATION

We were only interested in countries present in both datasets, therefore some country specific data from the antidepressants dataset has been left out. We included 21 countries in the analysis.

Additionally, general information about the development of antidepressant consumption over time has been used to display general facts about the increase in mental health medication over time.

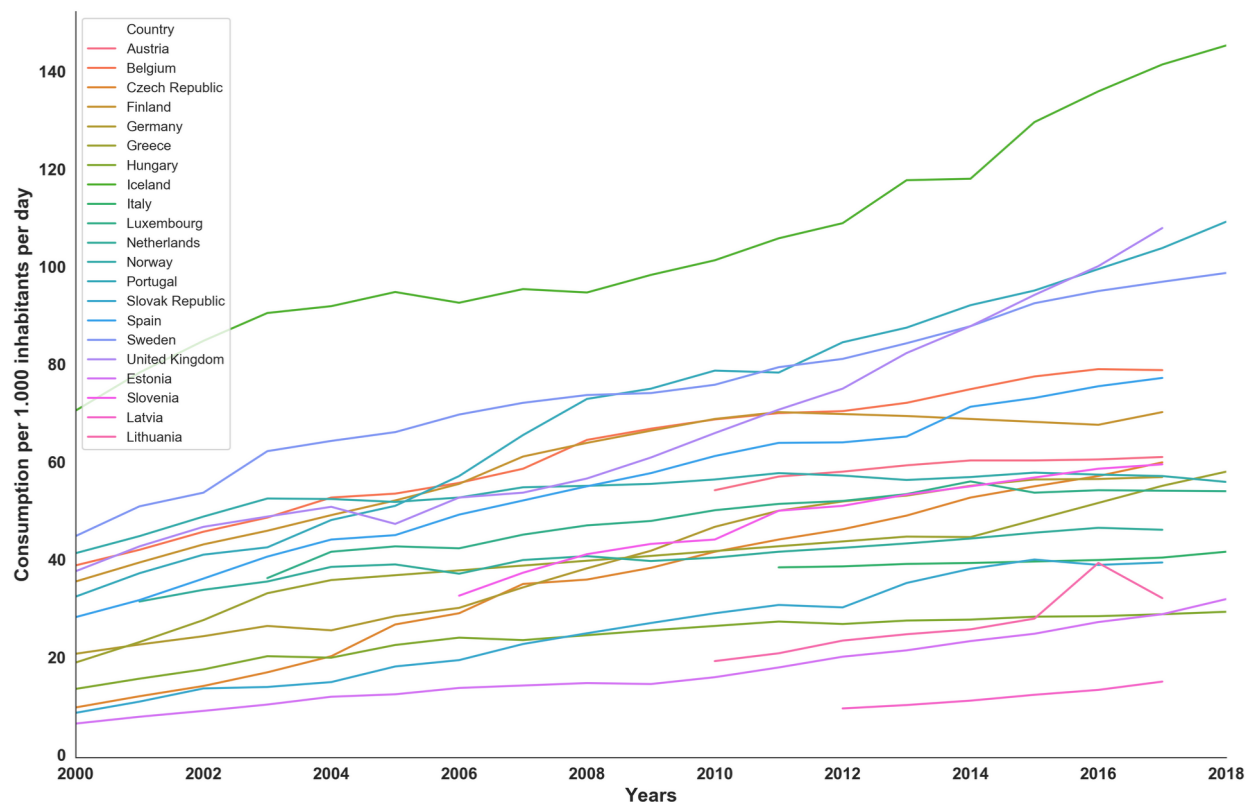
However, for the actual analysis, we only used data from the antidepressant consumption dataset for the year 2017.

• <https://stats.oecd.org/index.aspx?queryid=30123#>

• \*\* <https://www.statista.com/statistics/295660/active-social-media-penetration-in-european-countries/>

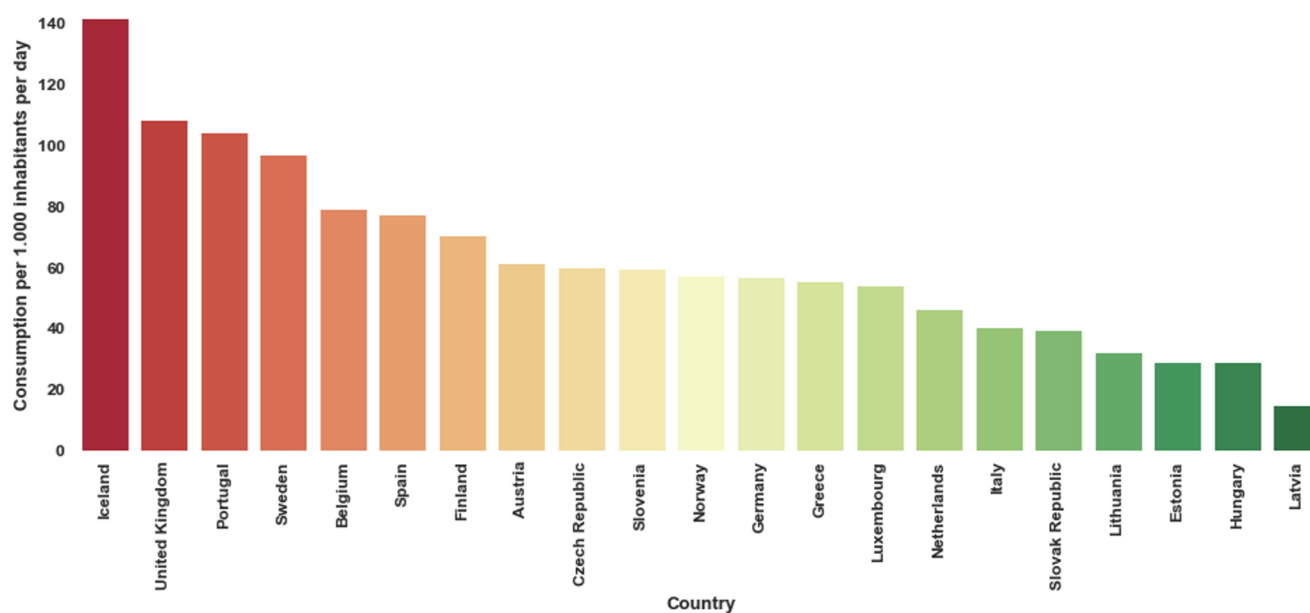
## ANTIDEPRESSANTS CONSUMPTION OVER TIME

The combined consumption of antidepressants in 21 European countries has increased by approximately **322 %** since 2000. The graph below shows the development of antidepressant consumption by country.



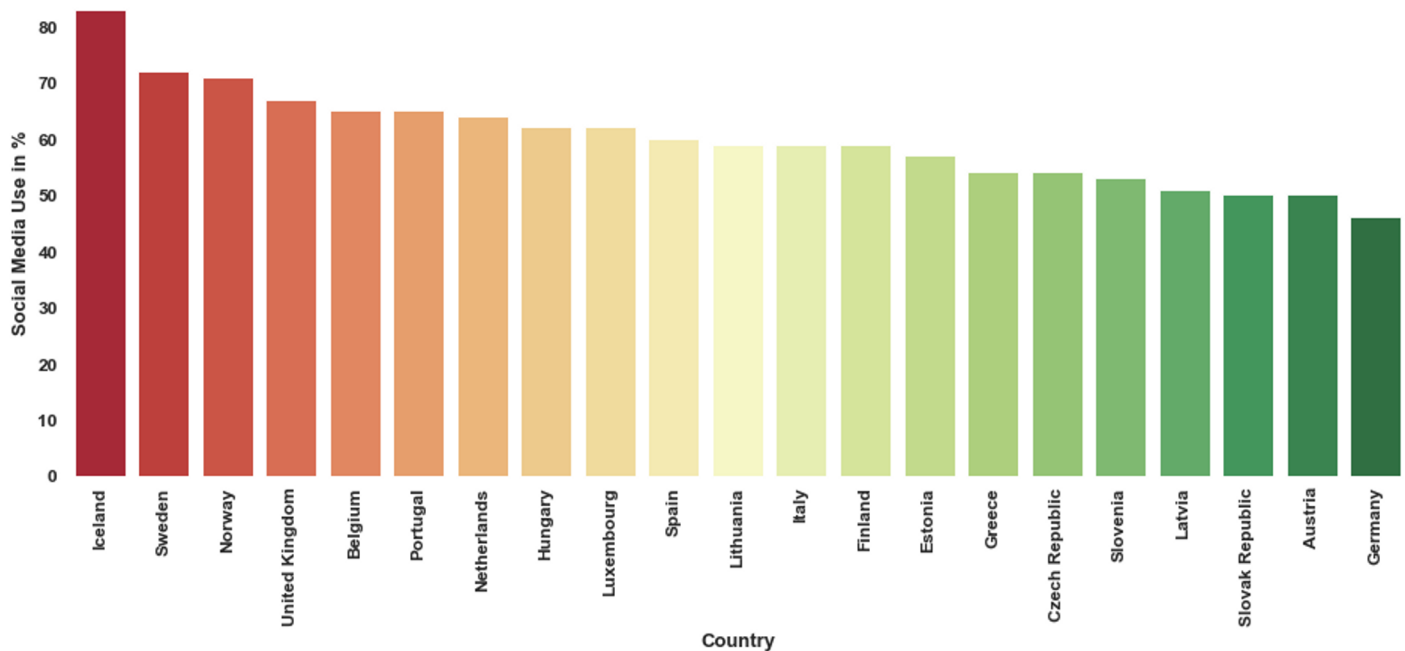
## ANTIDEPRESSANTS CONSUMPTION BY COUNTRY 2017

Since we are interested in the recent events we will zoom in on the year 2017. The below graph shows how antidepressants consumption differed across the countries sorted from most to least consumption.



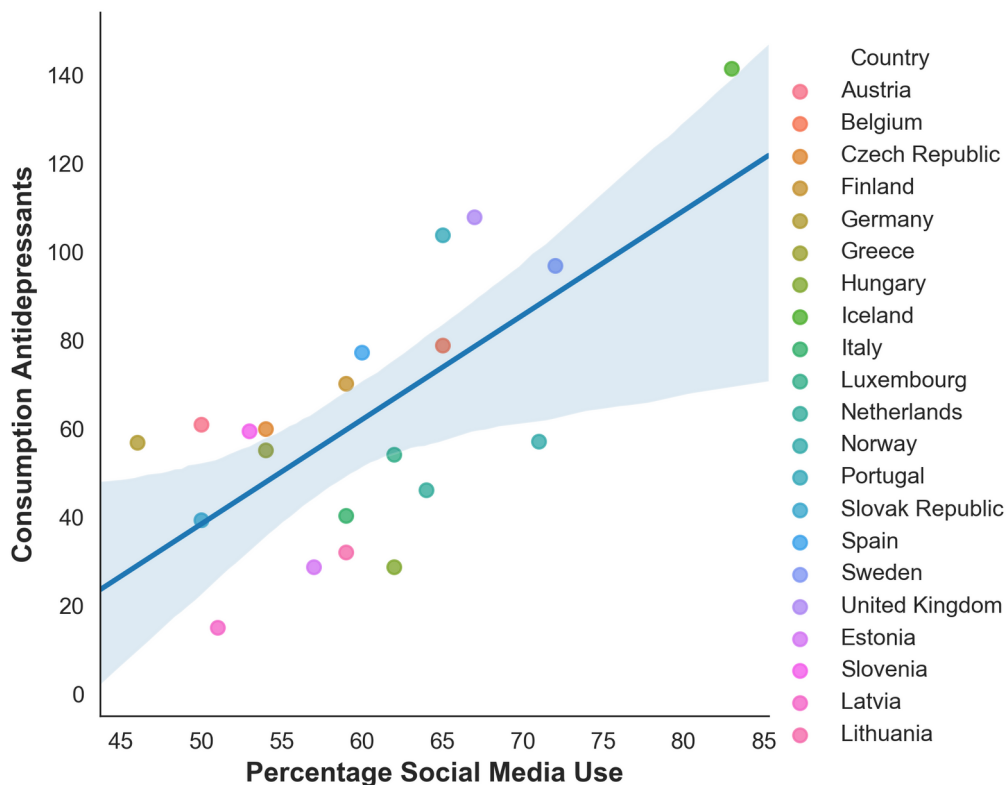
## SOCIAL MEDIA USE BY COUNTRY 2019

The below graph shows the Social Media Use for the 21 countries sorted from most to least usage.



## CORRELATION BETWEEN ANTIDEPRESSANTS AND SOCIAL MEDIA

After plotting social media use and antidepressant consumption we can detect a linear positive trend. The calculated **correlation coefficient** is **0.657**, which suggests that both variables seem to have a connection.



## BUILDING A LINEAR REGRESSION MODEL

We fitted a positive linear regression line that is aiming at predicting antidepressants consumption with social media use for our model. The best fit model resulted in the following formula.:

$$y = - 79.56 + 2.36 * x$$

With y being the dependent variable antidepressants consumption and x being our predictor variable social media use, we can interpret this such that **an increase of 2.36 % of social media use will lead to a 1 step increase in antidepressants consumption.**

## REJECTING THE NULL HYPOTHESIS

The null hypothesis assumes that the use of social media . use has no impact on the antidepressant consumption.

We conduct a test to determine the p-value which can tell us if our correlation coefficient is statistically significantly different from 0. The value of p is the probability that the results occurred by chance. We obtained a **p-value** of **0.00079**, or in other words 0.079 %.

Therefore we can reject the null hypothesis at the 99% Confidence level and conclude that **our two variables are not independent of each other.**

## MODEL FIT

How well can our model predict our model changes in the consumption of antidepressants?

We are calculating the R-squared value that evaluates the scatter of data points around the fitted regression line. It is a measure of fit that indicates the percentage of variance in the dependent variable explained by the independent variable.

We obtain a **R-squared value of 0.456** on a 0 to 1 scale.

This is due to high variation of our data points around the line.

But what does this mean for our model?

It means that social media alone cannot explain antidepressant consumption. In order to improve our model, we would have to take other predictors into account as well.

In the **Future Adjustment** section we give suggestions for such predictors that can be included in future research.

## KEY FINDINGS

- SOCIAL MEDIA USE IN SELECTED EUROPEAN COUNTRIES HAS AN EFFECT ON ANTIDEPRESSANT CONSUMPTION
- IN OUR MODEL A 2.36 STEP INCREASE IN SOCIAL MEDIA USE ACCOUNTS FOR 1 STEP INCREASE IN ANTIDEPRESSANT CONSUMPTION
- HIGH VARIATION IN OUR MODEL - CANNOT BE SOLELY EXPLAINED BY SOCIAL MEDIA USE

## FUTURE ADJUSTMENTS

In order to develop a well predicting model, we have to include several more predictor variables. For example hours of sunlight or the countries' GDP values could be of interest. Sunlight and darkness trigger the release of hormones in your brain. Exposure to sunlight is thought to increase the brain's release of a hormone called serotonin.

Furthermore, if we really want to use the model as a worldwide predictor for sales, we would need to adjust the sample method. We either need to use cluster sampling for all countries or sample in a way that the chosen countries are representative for the world.