

# Happiness Predictions

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By Matthew Jue

# Overview

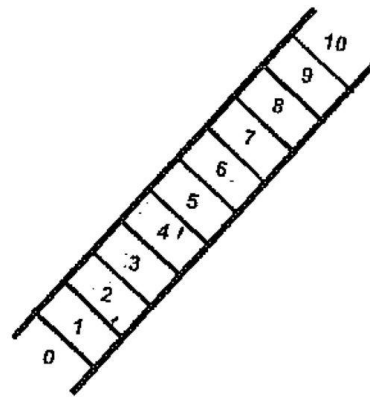
- A study at Oxford University's Saïd Business School found that happy workers are 13% more productive.
- We want to be able to predict an individual's happiness and know what factors are most important for happiness.
- Everyone's wants to be happy right?



# Data Description

- The dataset describes the World Happiness Report. A report that ranks countries on their citizens happiness on a scale from 1 to 10 (or their Ladder score).
- The Happiness Score is a national average of the responses to the main life evaluation questions asked in the Gallup World Poll (GWP), which uses the Cantril Ladder.
- The report provides data from 2015-2020. We'll be looking at 2020 data.

The Ladder of Happiness



Where are you on the ladder today?

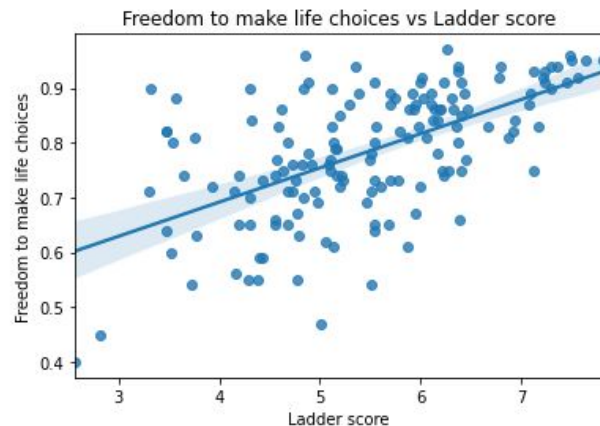
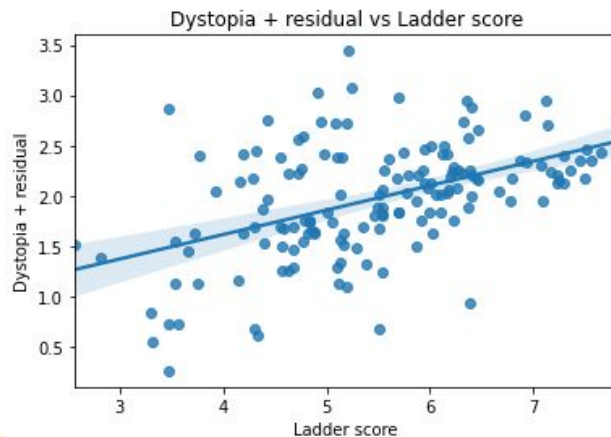
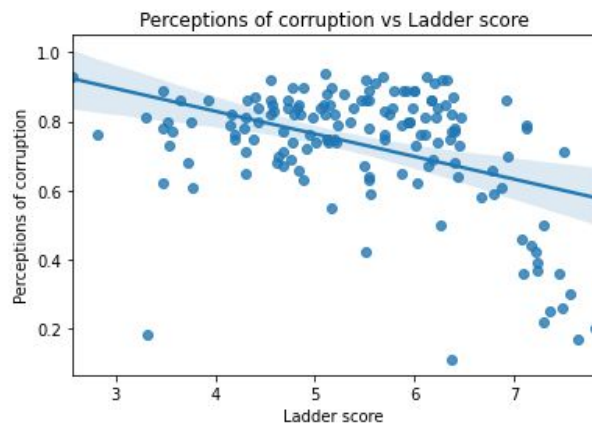
# Data Description cont'd

Variables we used to predict Ladder Score:

- Social support
- Generosity
- Corruption perception
- Healthy life expectancy
- Dystopia + residual
- Regional indicator

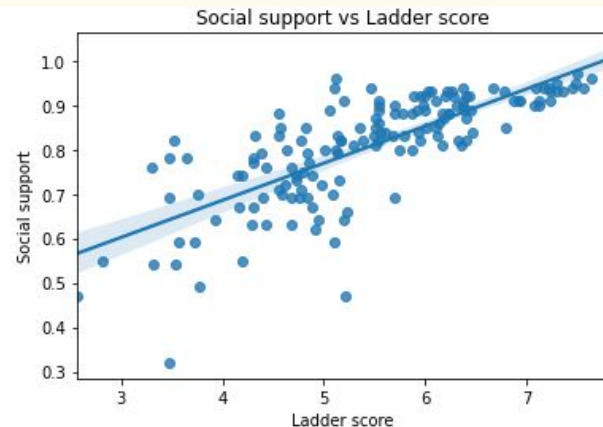
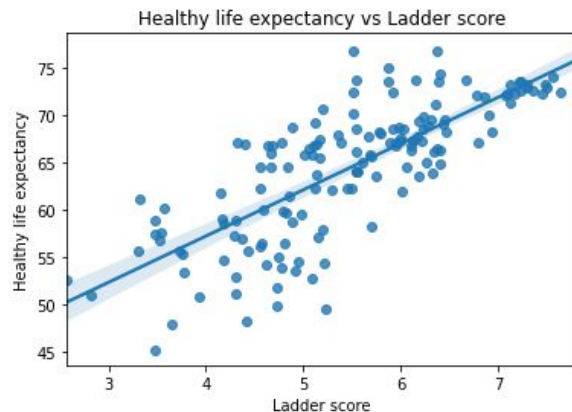
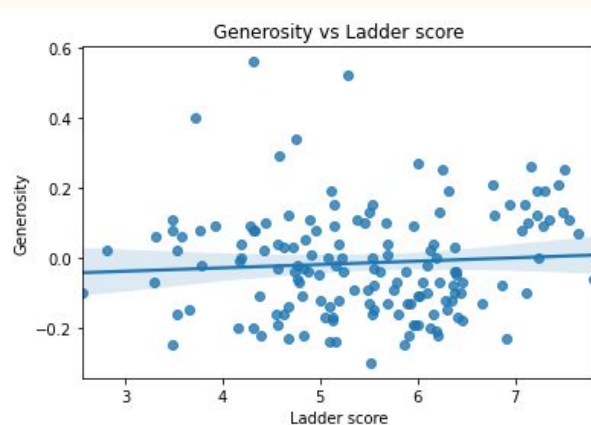
# Exploring our predicting variables

- Here's some of our numeric variables in relation to the ladder score.
- Perceptions of corruption is our only negatively correlated variable here.



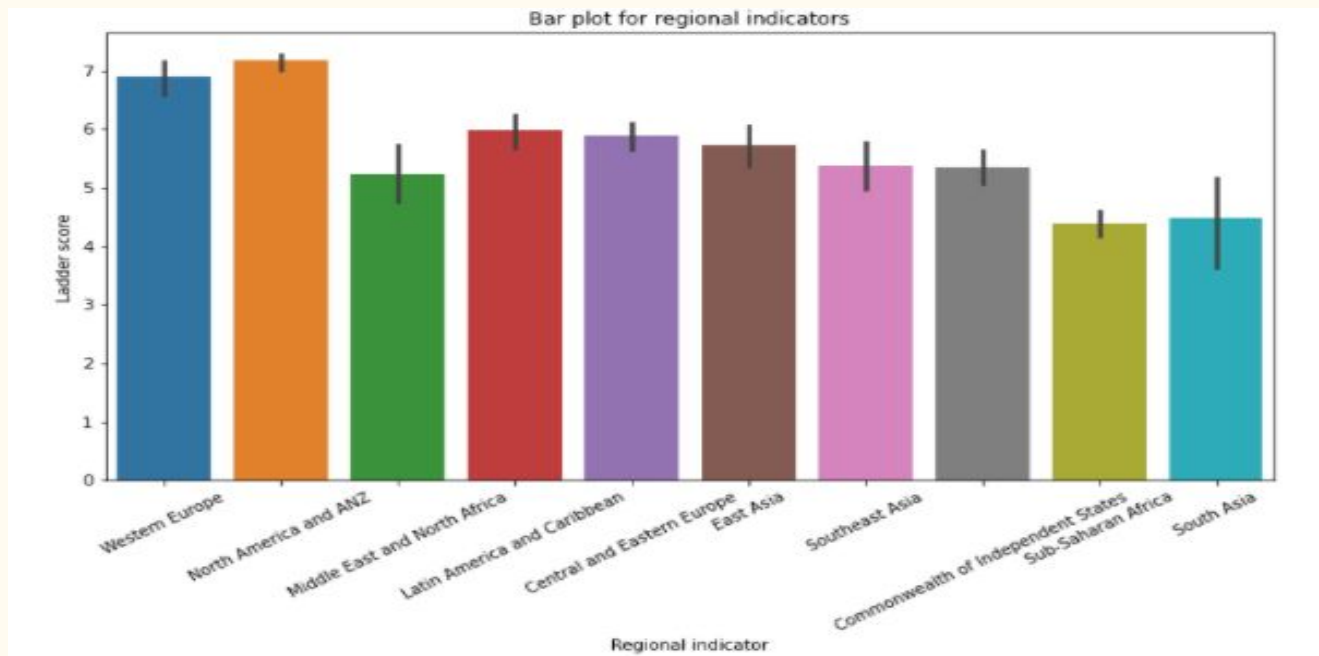
# Exploring our predicting variables (cont'd)

- Here's some more of our numeric variables in relation to the ladder score.
- Social support seems to have a strong positive correlation.
- Generosity has a weak correlation.



# Exploring our predicting variables (cont'd)

- Last we have our categorical variable in relation to the ladder score.



# Models and Model Evaluation

- Models uses: Elastic Net Linear model and XGB Regression model.
- The Elastic Net model had the better performance (XGB was overfit)
- The Elastic Net model does 97% better than guessing the overall average ladder score.
- On on average, the Elastic Net model was off by .12 on predicting the Ladder score, or off by 2.2%.



# Important Factors Contributing to Happiness

	feat	coef
5	Perceptions of corruption	0.531533
1	Social support	0.429519
0	Regional indicator	0.425820
2	Healthy life expectancy	0.148700
3	Freedom to make life choices	0.067270
6	Dystopia + residual	0.060744
4	Generosity	-0.138502

- It seems weird that Perception of corruption has a positive relationship with happiness right?
- This is due to the Simpson's paradox.

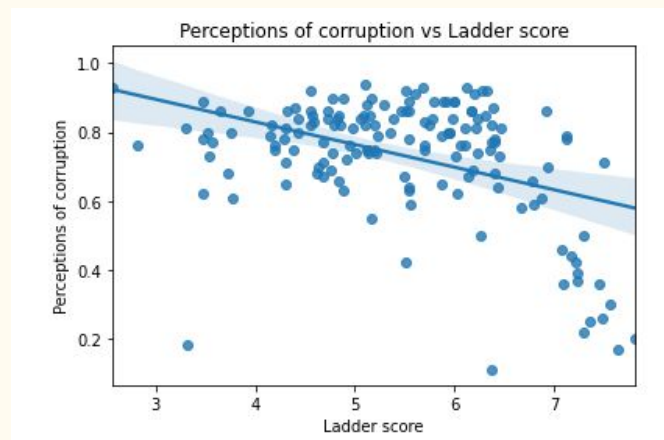
Our linear equation is:

$$Y = 0.53(\text{POC}) + 0.43(\text{SS}) + 0.42(\text{RI}) + 0.15(\text{HLE}) + 0.07(\text{FMLC}) + 0.06(\text{Dyst}) - 0.14(\text{Gen})$$

# Simpson's Paradox for Perception of corruption

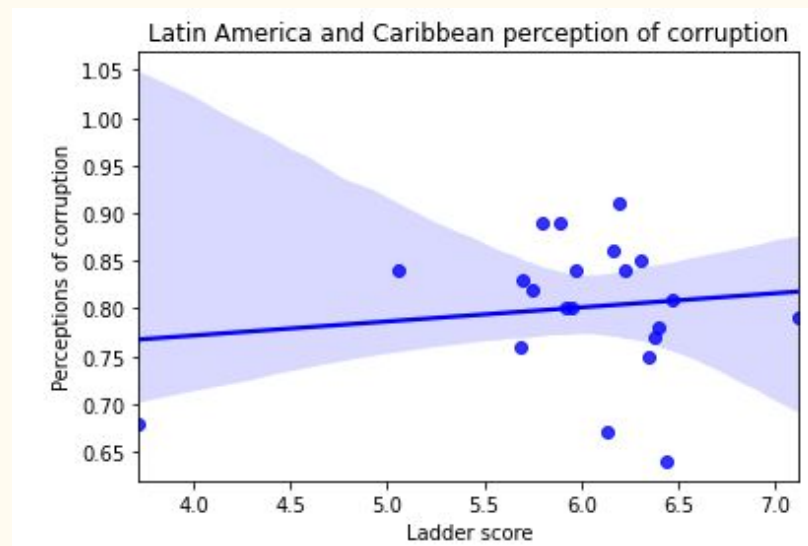
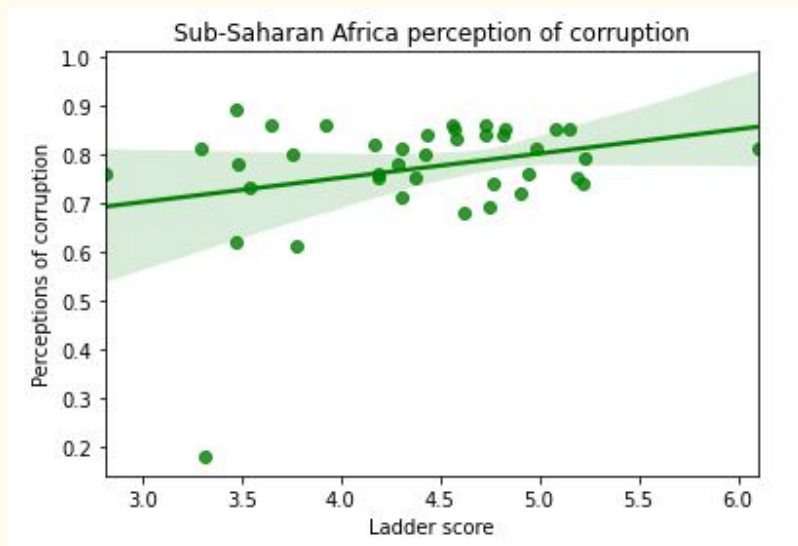
- Remember the perceptions of corruption vs ladder score scatterplot, perceptions of corruption was our only variable that had a negative correlation with with our ladder score.
- But when we look at perceptions of corruption by region (our categorical variable) we don't always get a negative correlation, 4 out of the 10 regions had a positive correlation.

Sub-Saharan Africa	39
Western Europe	21
Latin America and Caribbean	21
Middle East and North Africa	17
Central and Eastern Europe	17
Commonwealth of Independent States	12
Southeast Asia	9
South Asia	7
East Asia	6
North America and ANZ	4



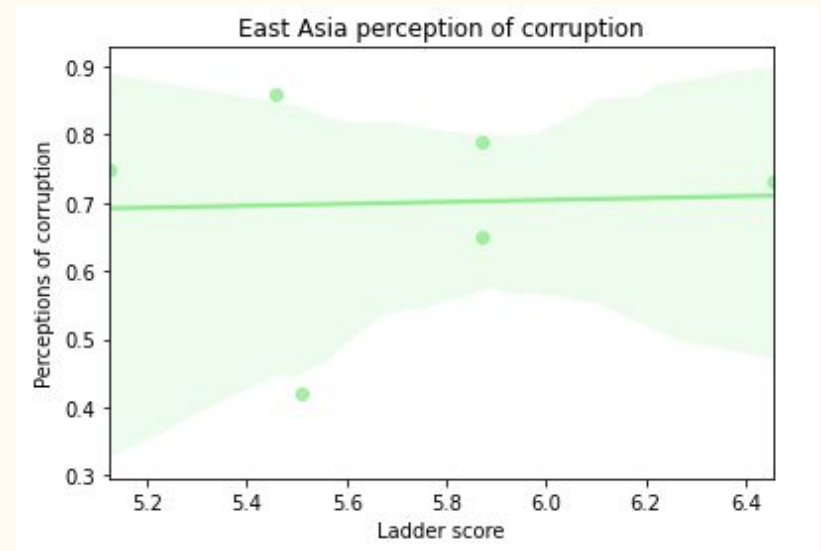
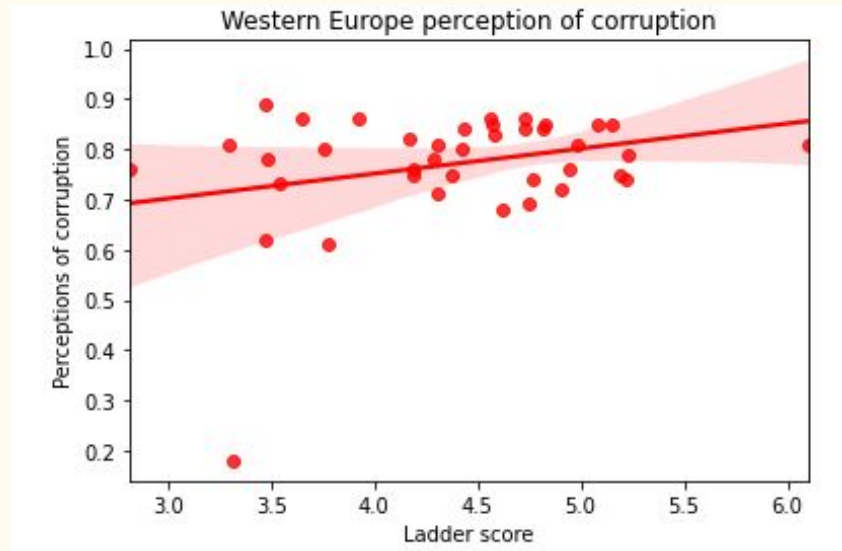
# Our regions that seem to like corruptions

- Here are 2 of the 4 regions that have a positive correlation between perception of corruption and their ladder scores.



# Our regions that seem to like corruptions (cont'd)

- The other 2 of the 4 regions that have a positive correlation between perception of corruption and their ladder scores.



# Limitations and Next Steps

- We had a limited amount of data since we only got national average scores.
- It would be better to get individual citizen's scores or to get the scores of employees to further test our model that appears to be predicting well.
- It would also be beneficial to survey employees at a large number of businesses to see if happiness really does lead to higher productivity.