

Effects of consumption of fish and sugar on happiness measures

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01

Executive Summary

Motivation

- Interest in seafood and sugar intake
- Interest in how diet affects mental state
- My own mental health journey led me through some diet exploration

Data Sources

- [1] Based on free material from
GAPMINDER.ORG, CC-BY LICENSE
<https://www.gapminder.org/data/>
- [2] IHME-GBD
Global Burden of Disease Collaborative Network.
Global Burden of Disease Study 2021 (GBD 2021) Results.
Seattle, United States: Institute for Health Metrics and
Evaluation (IHME), 2022.
Available from <https://vizhub.healthdata.org/gbd-results/>.

02

Data Question

How were measures of happiness associated with changes in sugar and seafood consumption?

01



Fish Consumption
Measured in kg per
person per year

02



Sugar consumption
Measured in g per person
per day

03



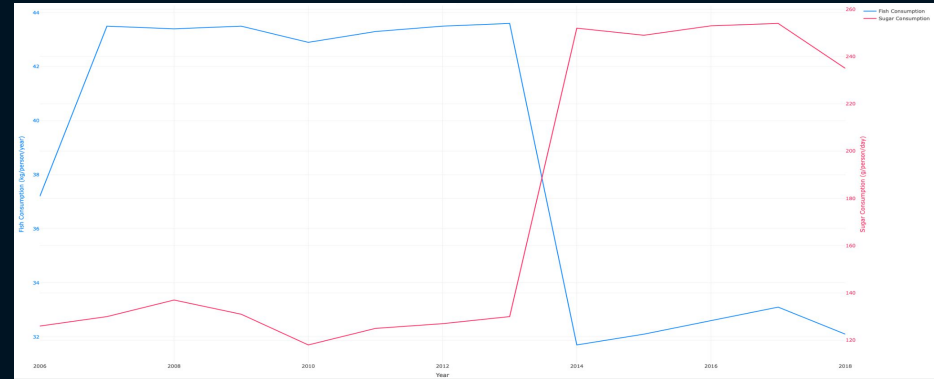
Happiness Measures
Happiness Scores
(Cantril Ladder
(1-10)*10)
Sadness Scores n new
depressive or anxiety
disorder / mid year
population

03

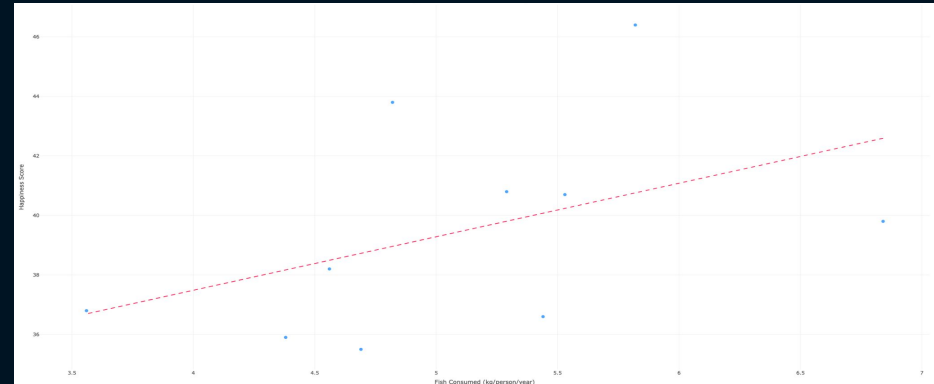
Data Exploration

Hypotheses

- Fish consumption has a positive association with happiness score
- Sugar consumption has a negative association with happiness score
- Fish consumption has a negative association with sadness score
- Sugar association has a positive association with sadness score.



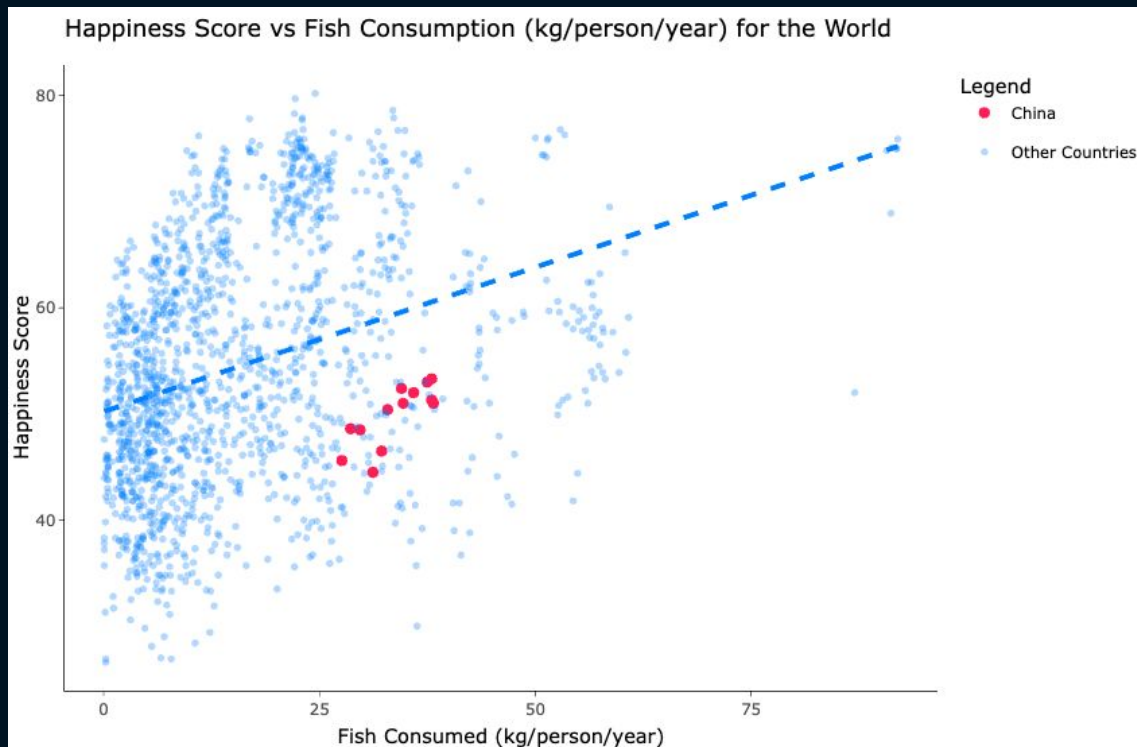
Change over time in both sugar and fish consumption for Lithuania



Happiness Score vs. Fish Consumption for Madagascar

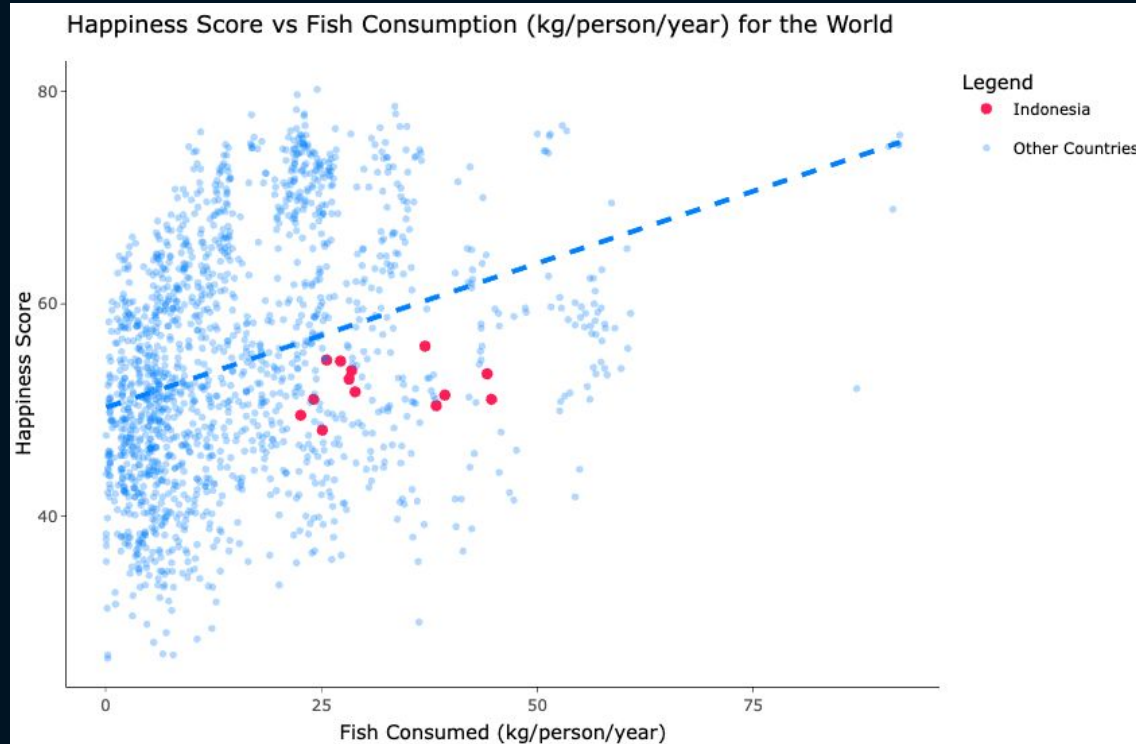
Findings

- Poor fit with linear model
- Some countries follow the general trend that aligns with the hypothesized results



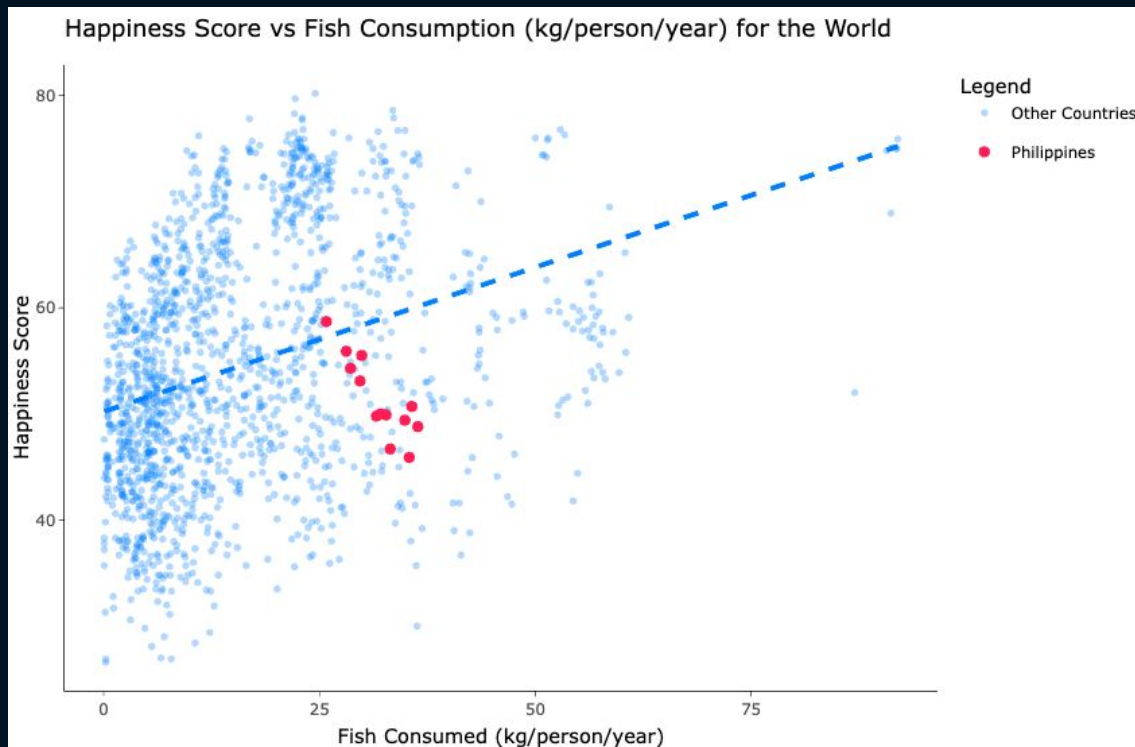
Findings

- Poor fit with linear model
- Some countries follow the general trend that aligns with the hypothesized results



Findings

- Evidence of Simpson's Paradox
- Violations in assumptions for linear regression



Simpson's Paradox occurs when a trend or relationship observed in aggregate data reverses when the same data is divided into subgroups due to confounding variables

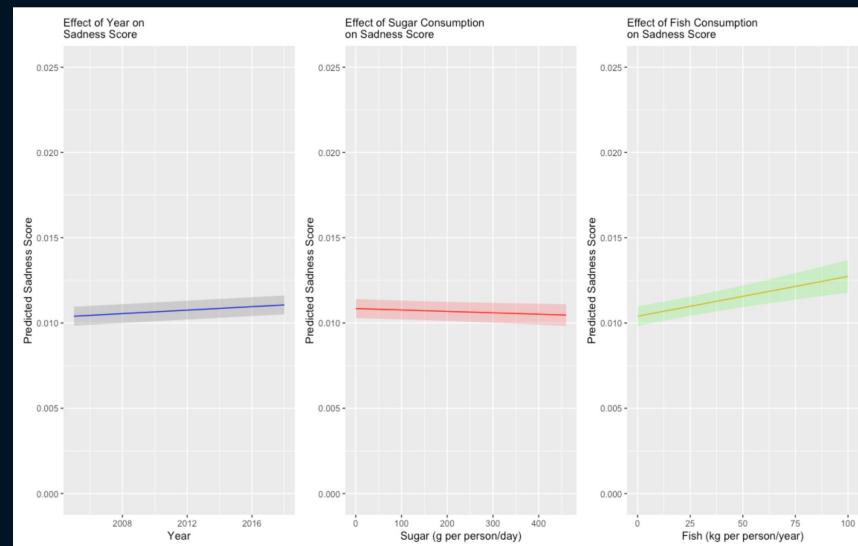
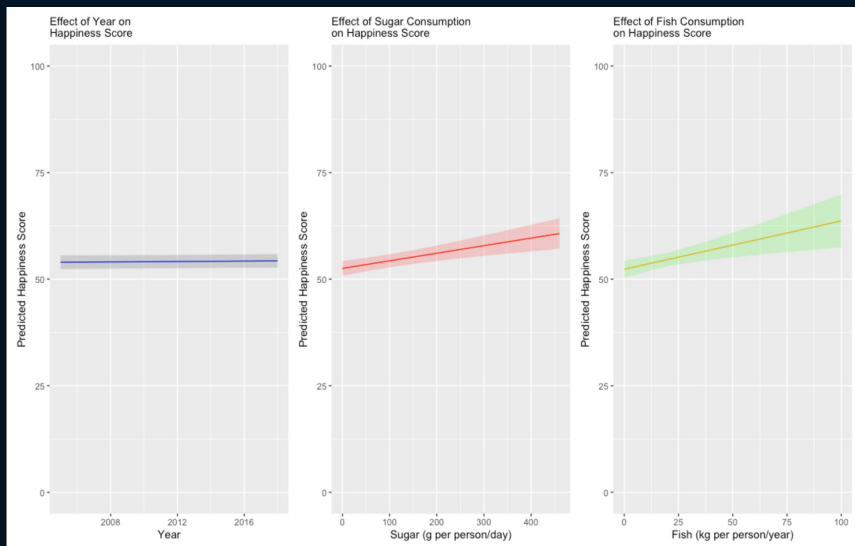
04

Analysis

LMER (Linear mixed effects regression)

```
mixed_model <- lmer(happiness_score ~ year + sugar_consumption + fish_consumption + (1 | country), data = data)
```

```
mixed_model2 <- lmer(sadness_score ~ year + sugar_consumption + fish_consumption + (1 | country), data = data)
```



Results

Happiness Score

- Fish consumption highly significant positive association
- Sugar consumption highly significant positive association
- Year not statistically significant
- Baseline happiness score explains ~86% of variation in happiness scores between countries

Sadness Score

- Fish consumption highly significant positive association
- Sugar consumption highly significant **negative** association
- Year extremely statistically significant positive association
- Baseline sadness score explains ~98% of variation in sadness scores between countries

*Z-scores and anova tests indicate that difference in scale of happiness & sadness scores do not impact results.

Questions?

05

Thank you

06

App Exploration