My title*

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This study investigates the connection between income inequality and national hapiness, questioning the impact of the Gini index. By examining cross-sectional data we find that income inequality has a limited direct effect on happiness. It is evident that factors like the quality of institutions and levels of development as measured by the Democracy Index and the Inequality adjusted Human Development Index (IHDI) have a more significant impact on shaping happiness. Our results indicate that focusing solely on income inequality doesn't provide a complete understanding. Instead a wider range of indicators are. This research contributes to the conversation on disparity and satisfaction by emphasizing the importance of using multifaceted approaches in happiness research and policy development.

1 Introduction

You can and should cross-reference sections and sub-sections. We use R Core Team (2023) and Wickham et al. (2019).

The remainder of this paper is structured as follows. Section 2….

2 Data

Some of our data is of penguins (**?@fig-bills**), from Horst, Hill, and Gorman (2020).

```
[1] 0.687 0.588 0.747 0.721 0.860 0.859
```

*Code and data are available at: LINK.

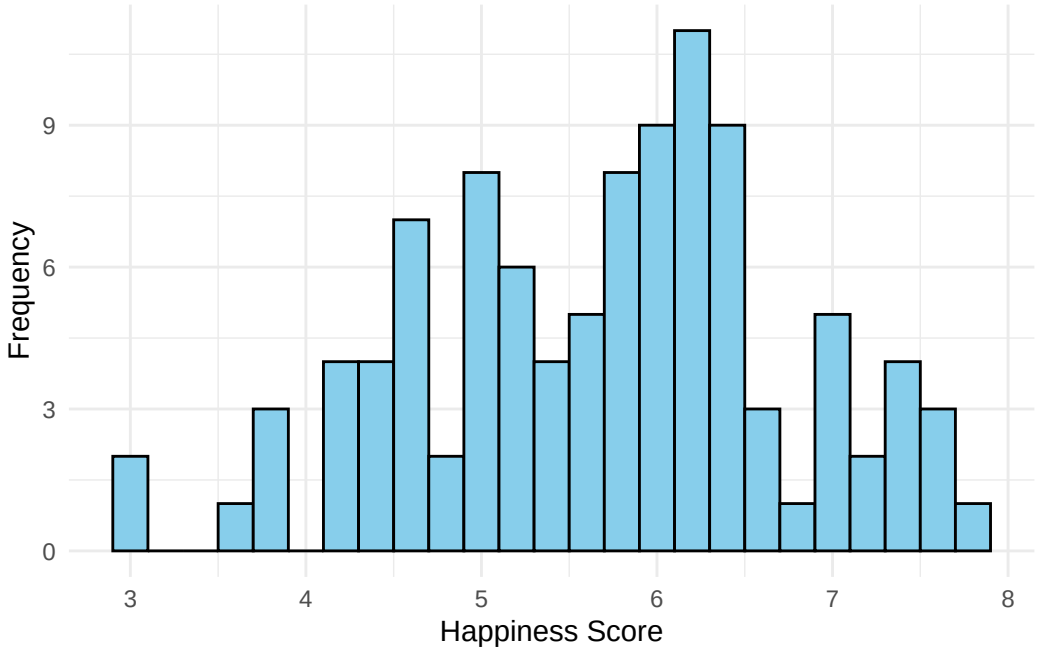

Figure 1: Distribution of Happiness Scores

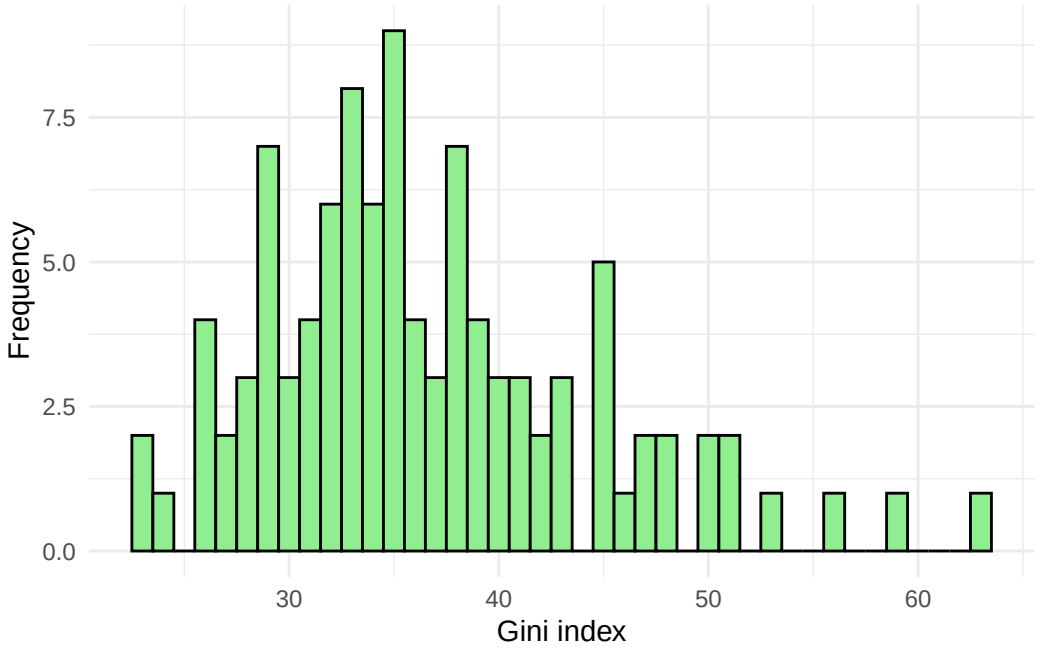

Figure 2: Distribution of Gini Index

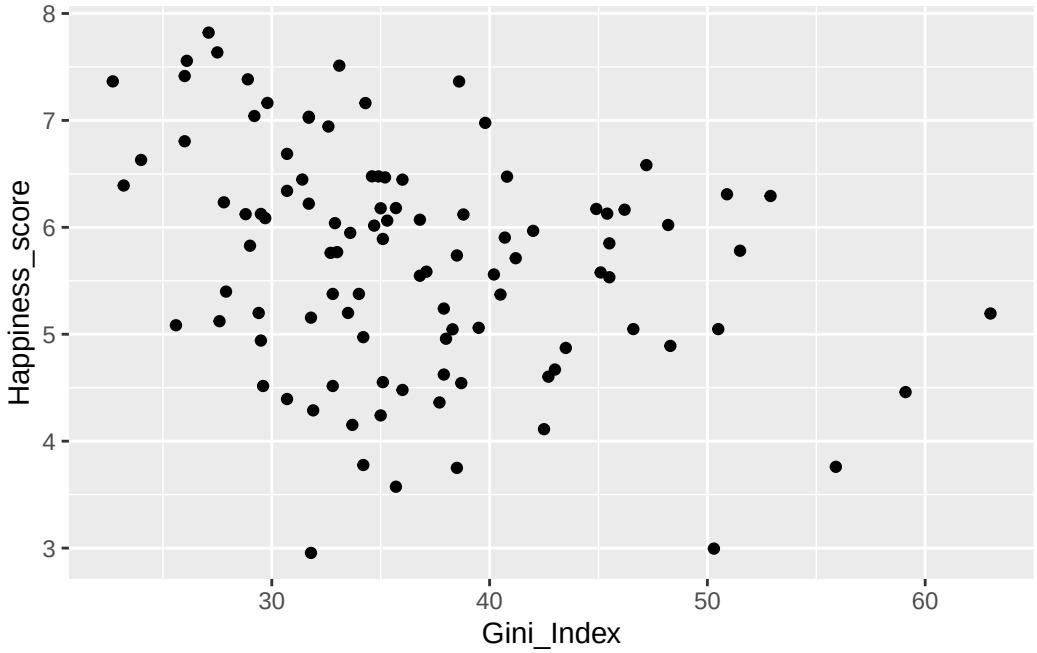

Figure 3: Relationship between Gini Index and Happiness

```
Warning: Removed 2 rows containing missing values or values outside the scale range
(`geom_point()`).
```

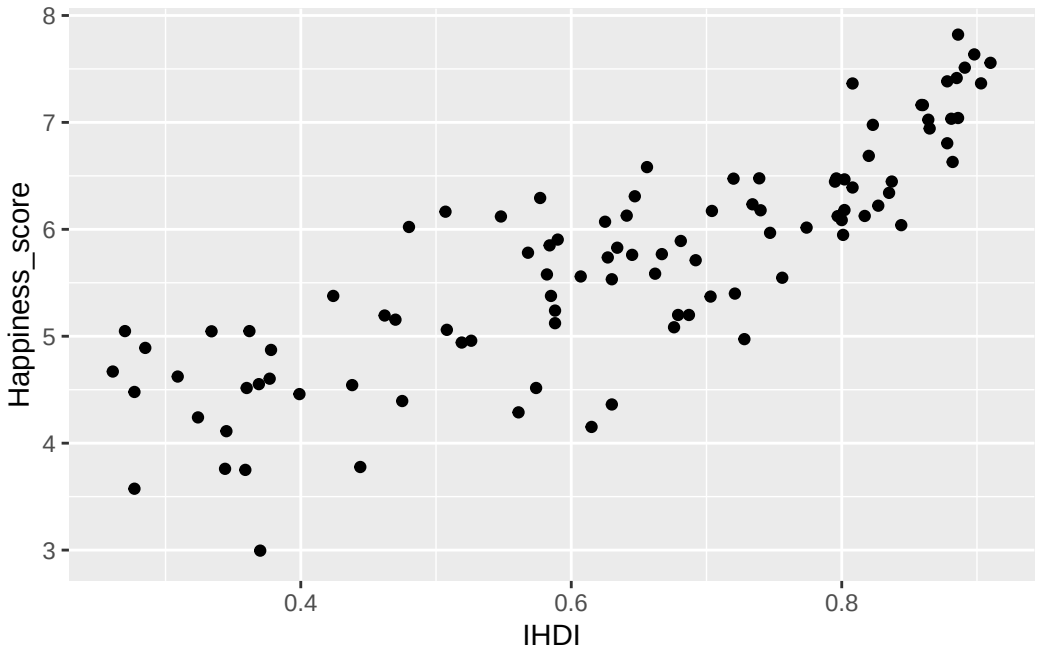

Figure 4: Relationship between IHDI and Happiness

Talk more about it.

And also planes (**?@fig-planes**). (You can change the height and width, but don't worry about doing that until you have finished every other aspect of the paper - Quarto will try to make it look nice and the defaults usually work well once you have enough text.)

Talk way more about it.

3 Model

The goal of our modelling strategy is twofold. Firstly,…

Here we briefly describe the Bayesian analysis model used to investigate… Background details and diagnostics are included in Appendix B.

3.1 Model set-up

Define y_i as the number of seconds that the plane remained aloft. Then β_i is the wing width and γ_i is the wing length, both measured in millimeters.

$$\text{HappinessScore}_i \sim \text{Normal}(\mu_i, \sigma) \tag{1}$$
$$\mu_i = \alpha + \beta \times \text{GiniIndex}_i \tag{2}$$
$$\alpha \sim \text{Normal}(0, 2.5) \tag{3}$$
$$\beta \sim \text{Normal}(0, 2.5) \tag{4}$$
$$\sigma \sim \text{Exponential}(1) \tag{5}$$

$$\text{Happiness\_score}_i = \beta_0 + \beta_1 \times \text{Democracy\_index}_i + \beta_2 \times \text{Gini\_index}_i + \beta_3 \times \text{IHDI}_i + \varepsilon_i \tag{6}$$
$$\varepsilon_i \sim \text{Normal}(0, \sigma^2) \tag{7}$$

We run the model in R (R Core Team 2023) using the `rstanarm` package of Goodrich et al. (2022). We use the default priors from `rstanarm`.

3.1.1 Model justification

We expect a positive relationship between the size of the wings and time spent aloft. In particular…

We can use maths by including latex between dollar signs, for instance θ.

4 Results

Our results are summarized in **?@tbl-modelresults**.

5 Discussion

5.1 First discussion point

If my paper were 10 pages, then should be be at least 2.5 pages. The discussion is a chance to show off what you know and what you learnt from all this.

Table 1: Linear Regression

	First model
(Intercept)	7.263
	(0.476)
	(15.265)
	(<0.001)
	[6.319, 8.207]
Gini_Index	−0.043
	(0.013)
	(−3.390)
	(0.001)
	[−0.068, −0.018]
Num.Obs.	102
R2	0.103
R2 Adj.	0.094
AIC	295.2
BIC	303.1
Log.Lik.	−144.613
F	11.489
RMSE	1.00

Table 2: Multiple Linear Regression

	Second model
(Intercept)	2.016
	(0.468)
	(4.310)
	(<0.001)
	[1.087, 2.944]
Democracy_index	0.096
	(0.040)
	(2.385)
	(0.019)
	[0.016, 0.176]
Gini_Index	0.013
	(0.009)
	(1.551)
	(0.124)
	[−0.004, 0.030]
IHDI	4.112
	(0.515)
	(7.987)
	(<0.001)
	[3.090, 5.134]
Num.Obs.	100
R2	0.735
R2 Adj.	0.727
AIC	166.6
BIC	179.6
Log.Lik.	−78.311
F	88.755
RMSE	0.53

5.2 Second discussion point

5.3 Third discussion point

5.4 Weaknesses and next steps

Weaknesses and next steps should also be included.

Appendix

A Additional data details

B Model details

B.1 Posterior predictive check

In **?@fig-ppcheckandposteriorvsprior-1** we implement a posterior predictive check. This shows…

In **?@fig-ppcheckandposteriorvsprior-2** we compare the posterior with the prior. This shows…

Examining how the model fits, and is affected
by, the data

B.2 Diagnostics

?@fig-stanareyouokay-1 is a trace plot. It shows… This suggests…

?@fig-stanareyouokay-2 is a Rhat plot. It shows… This suggests…

Checking the convergence of the MCMC algo-
rithm

References

Goodrich, Ben, Jonah Gabry, Imad Ali, and Sam Brilleman. 2022. "Rstanarm: Bayesian Applied Regression Modeling via Stan." https://mc-stan.org/rstanarm/.

Horst, Allison Marie, Alison Presmanes Hill, and Kristen B Gorman. 2020. *Palmerpenguins: Palmer Archipelago (Antarctica) Penguin Data*. https://doi.org/10.5281/zenodo.3960218.

R Core Team. 2023. *R: A Language and Environment for Statistical Computing*. Vienna, Austria: R Foundation for Statistical Computing. https://www.R-project.org/.

Wickham, Hadley, Mara Averick, Jennifer Bryan, Winston Chang, Lucy D'Agostino McGowan, Romain François, Garrett Grolemund, et al. 2019. "Welcome to the tidyverse." *Journal of Open Source Software* 4 (43): 1686. https://doi.org/10.21105/joss.01686.