

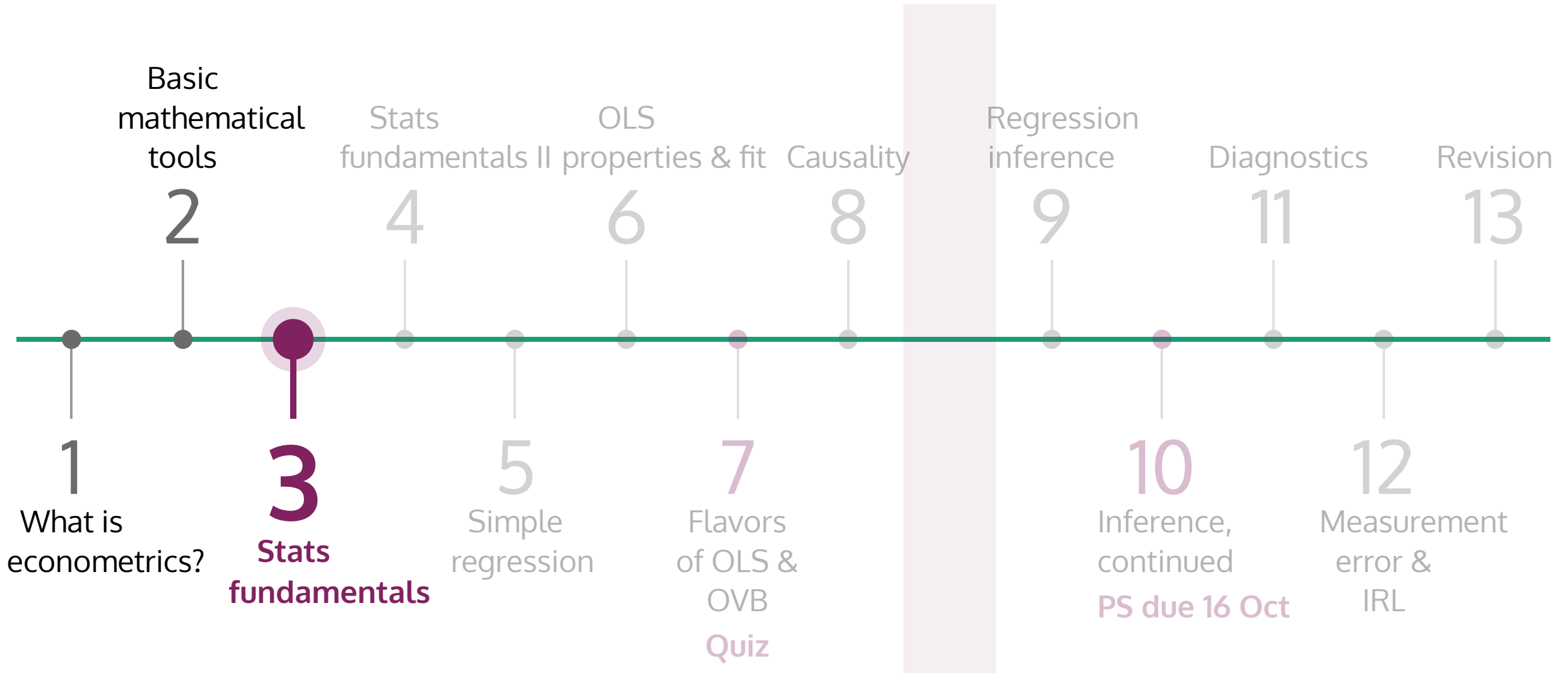


ECON 2041

Introductory Econometrics

Income & happiness

Plan for the semester



Happiness

Happiness

Cantril Ladder score

Source: [Gallup World Poll](#)

Please imagine a ladder, with steps numbered from 0 at the bottom to 10 at the top. The top of the ladder represents the best possible life for you, and the bottom of the ladder represents the worst possible life for you. On which step of the ladder would you say you personally feel you stand at this time?

GDP per capita

GDP per person, adjusted for inflation and purchasing power

- Total value added from the production of G&S in country
- Divided by population
- PPP-adjusted
- In "international dollars"
- Source: World Bank

Cross-sectional data

- 144 countries in 2024
- GDP per capita (X) & happiness (Y) are both continuous RVs
- Why? They're draws from a larger conceptual population

Experiment

- draw a set of respondents from each country
- calculate their average life satisfaction

Sample space

- set of all possible tuples of country averages you could get
- X maps each outcome of that process to a number

Now let's open the data!

Open this week's lecture notebook and follow along:

<https://emiliatjernstrom.com/econ2041/lectures/w03>

It will open directly in Colab

Click **Copy to Drive** first, so you can save any edits

The notebook reproduces every figure in today's slides

The mean and the median disagree about GDP

```
happy[['Happiness', 'GDP_pc']].describe()
```

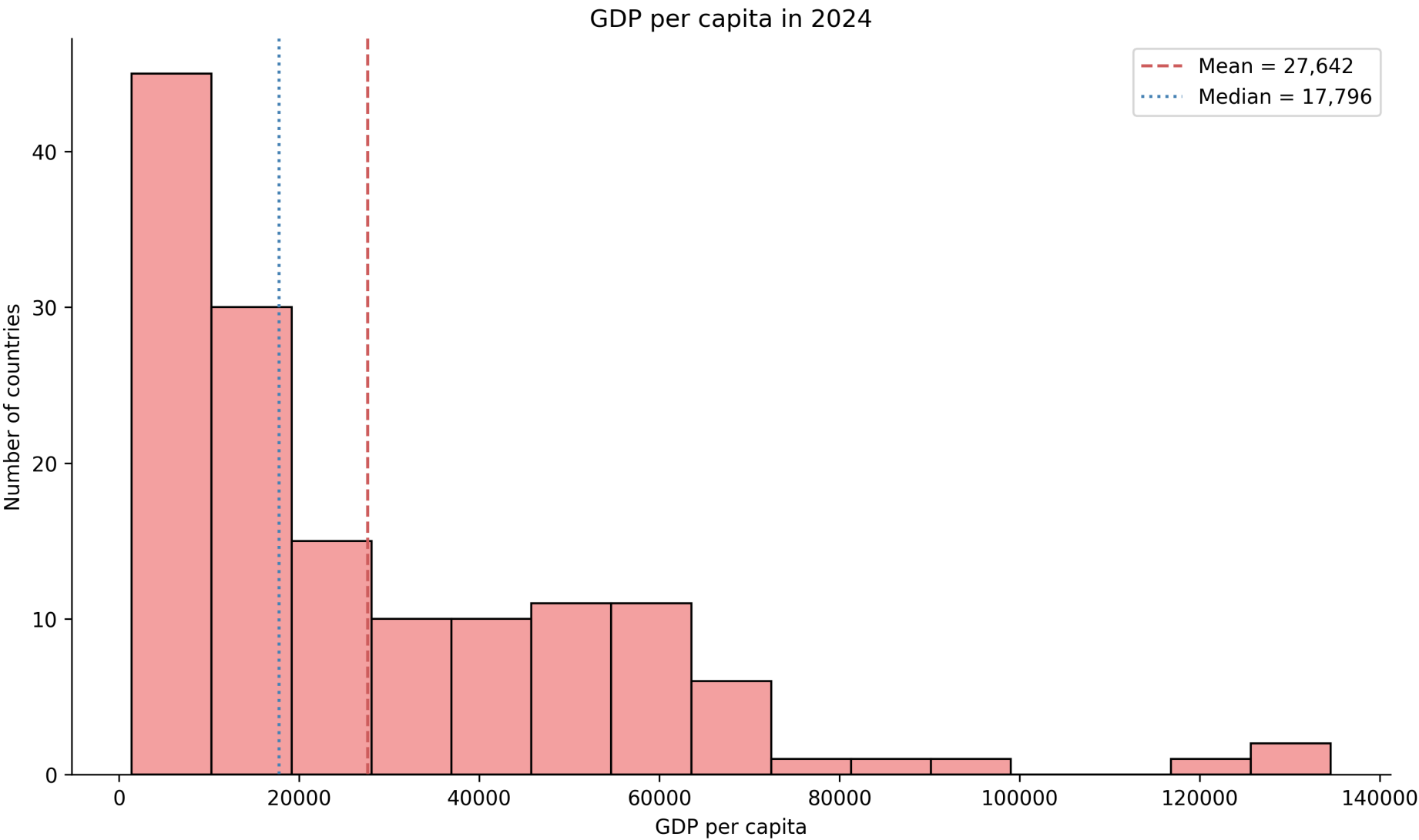
	count	mean	std	min	25%	50%	75%	max
Happiness	144	5.58	1.15	1.36	4.71	5.87	6.47	7.74
GDP_pc	144	27,642	26,296	1,409	7,057	17,796	42,378	134,549

Most countries rate between 4 & 7



Data: Gallup World Poll & World Bank, via Our World in Data

GDP per capita is strongly right-skewed



Each picture is one line of code

```
sns.histplot(happy['GDP_pc'], bins=15)
```

Happiness, given GDP

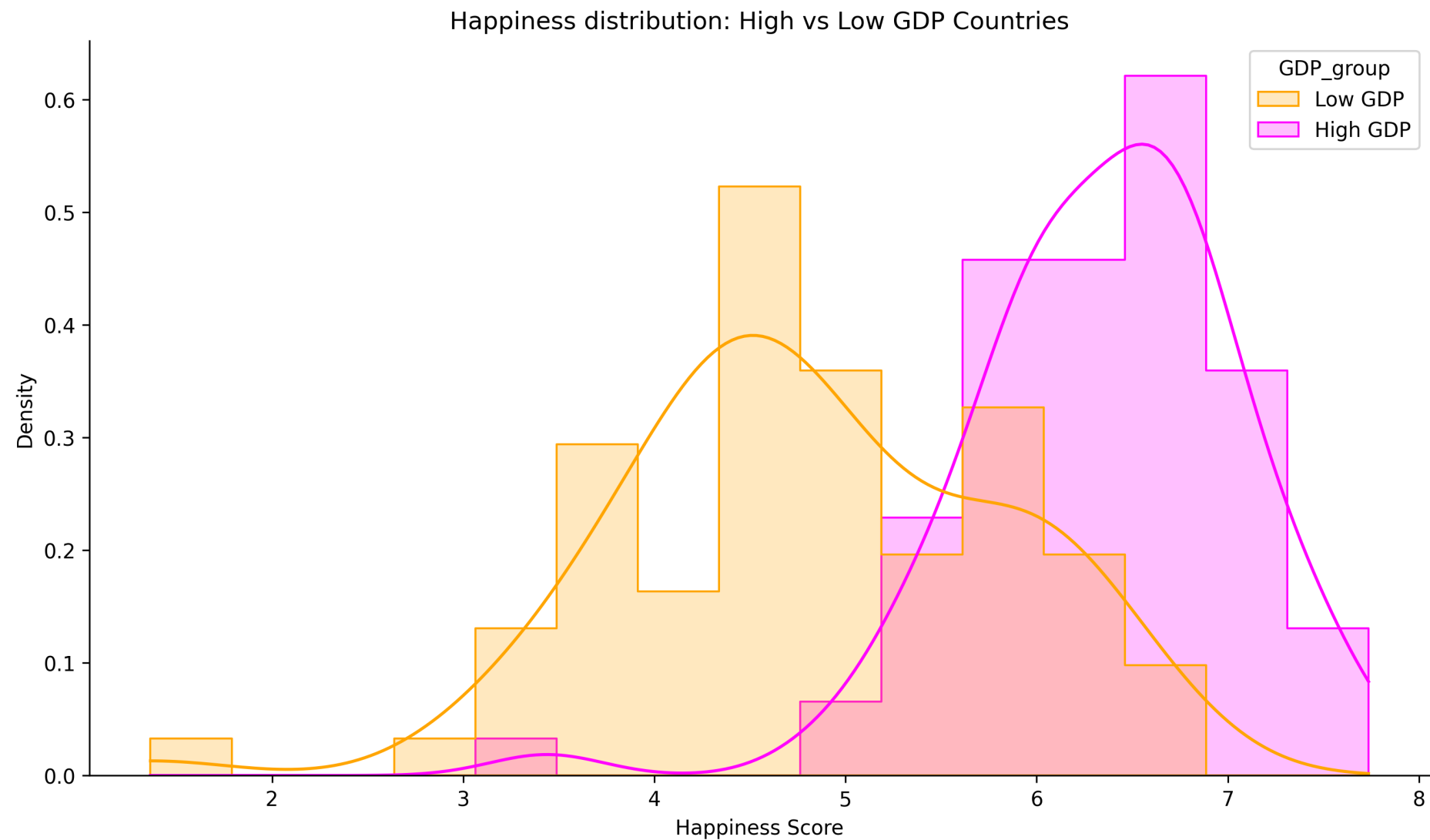
$$\mathbb{E}[\text{Happiness} \mid \text{GDP per capita}]$$

Conditioning is a Boolean

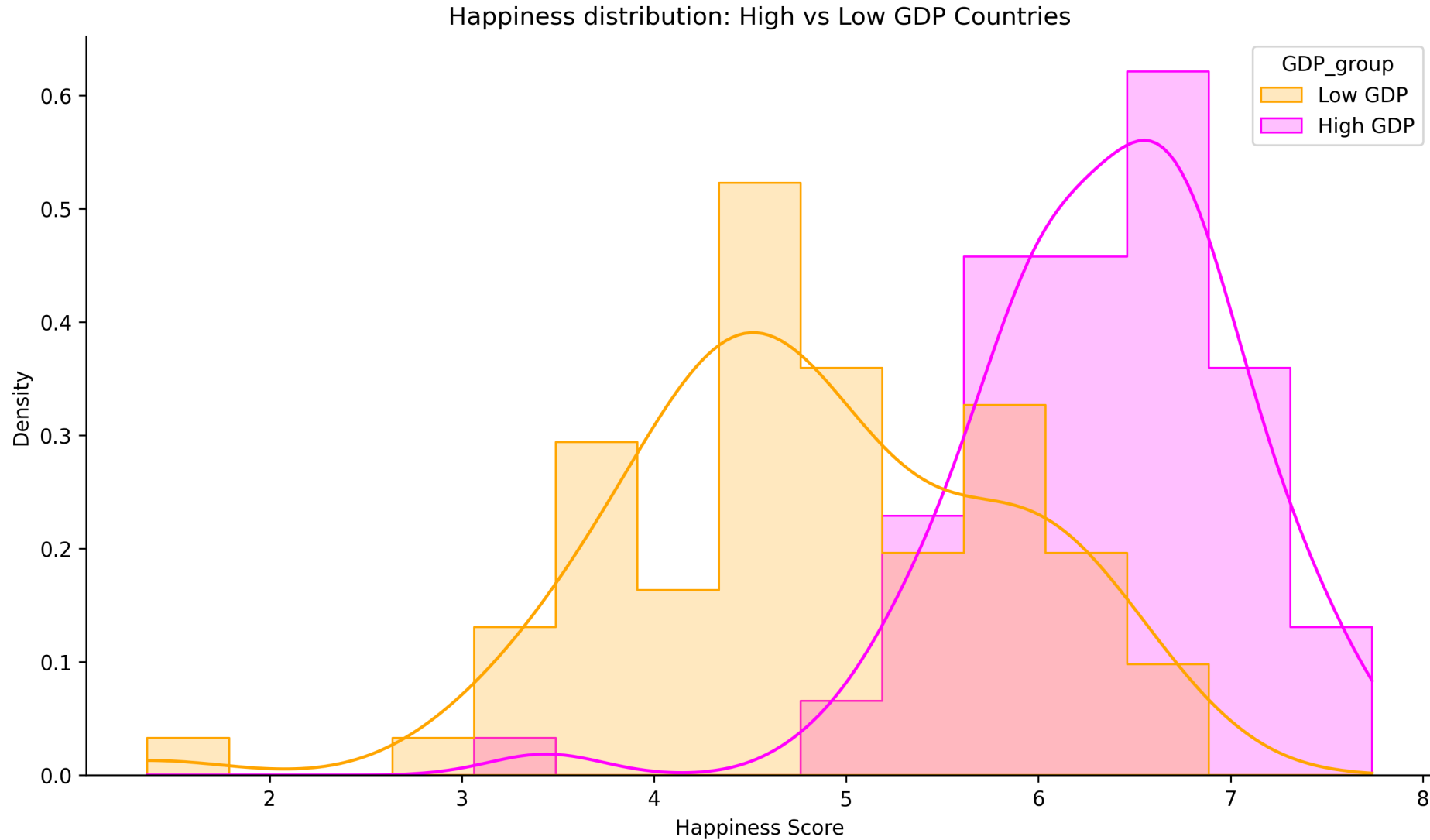
```
median_gdp = happy['GDP_pc'].median()  
mask = happy['GDP_pc'] > median_gdp
```

Entity	GDP_pc	mask
Afghanistan	1,964	False
Albania	21,641	True
Algeria	15,502	False
Argentina	26,772	True
Armenia	20,079	True

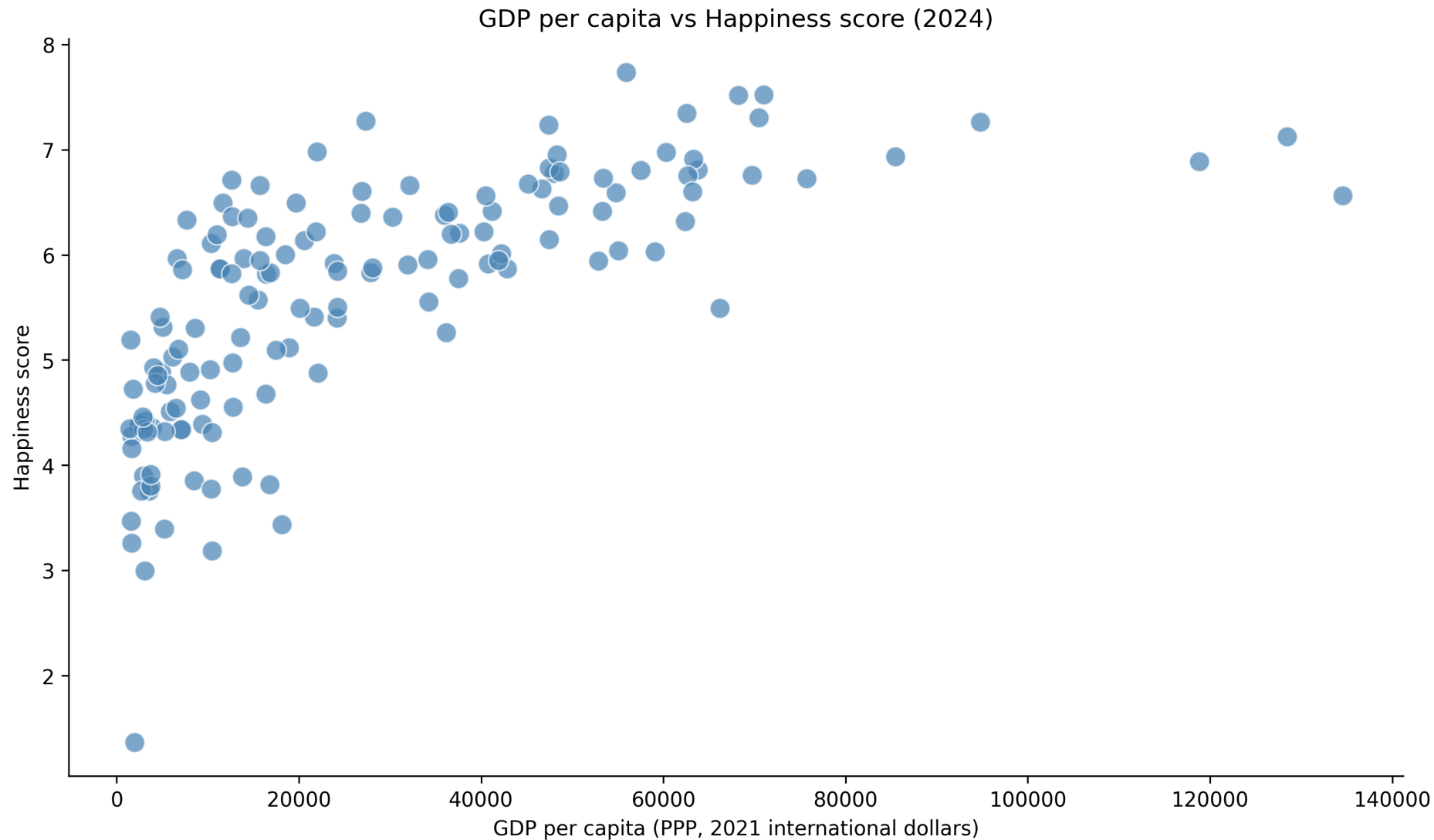
Happiness conditional on GDP



Happiness conditional on GDP: independent?



The joint distribution: one dot per country

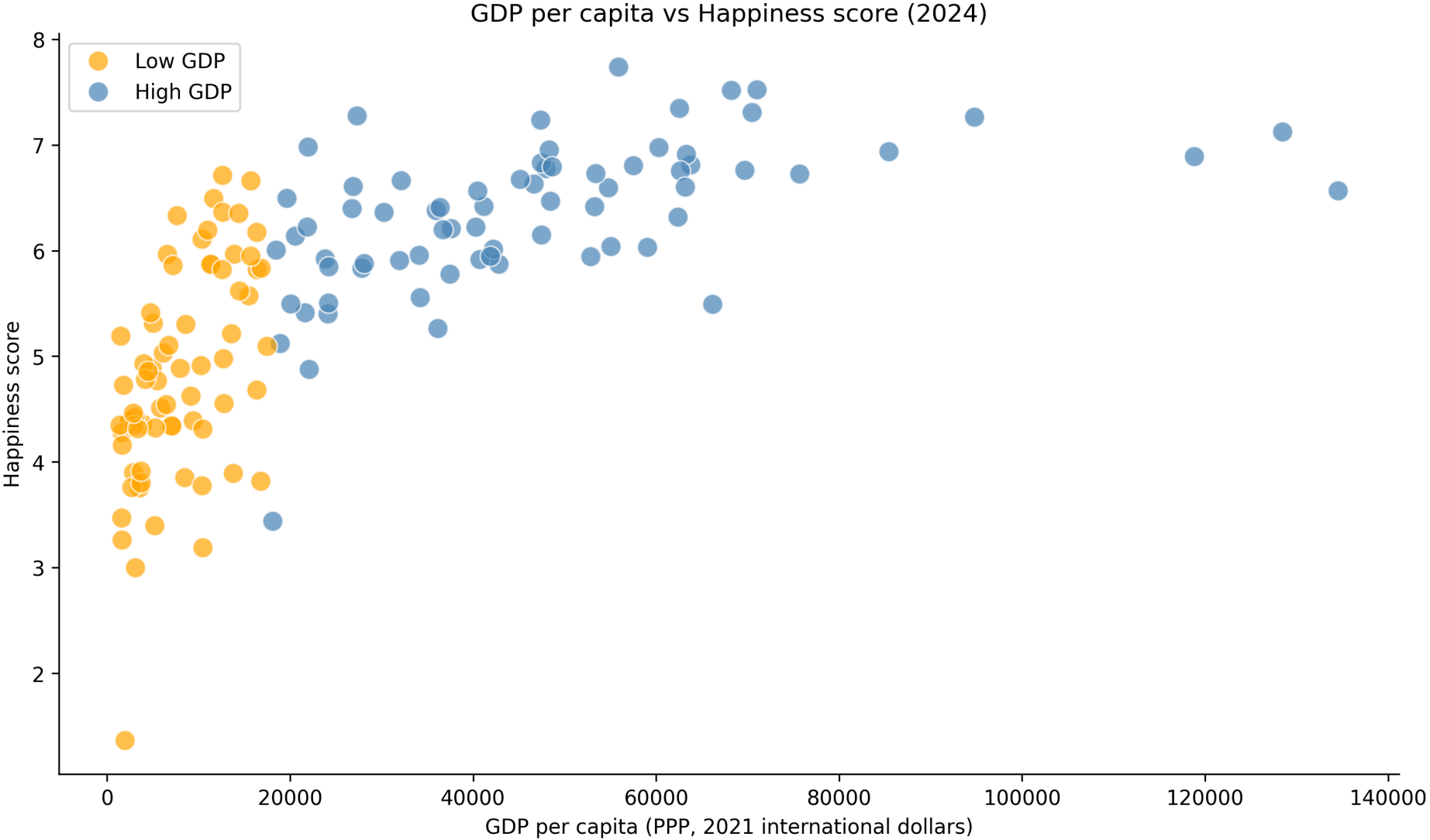


Data: Gallup World Poll & World Bank, via Our World in Data

The joint distribution is one line of code, too

```
sns.scatterplot(data=happy, x='GDP_pc', y='Happiness')
```

The median split, in color



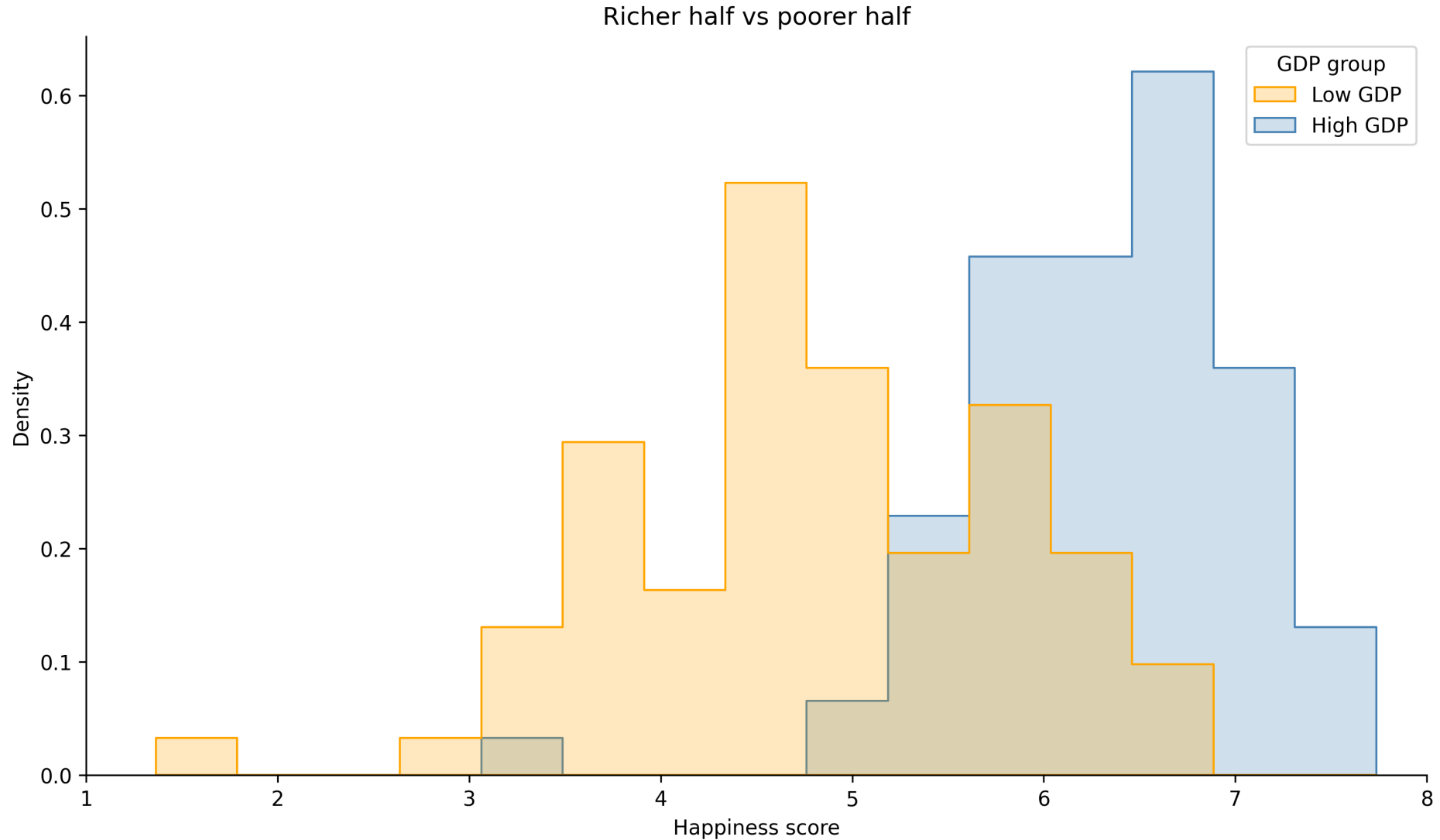
Is the median the right split?

- Richer half vs poorer half
- Top third vs bottom third
- Top quarter vs bottom quarter
- Top tenth vs bottom tenth

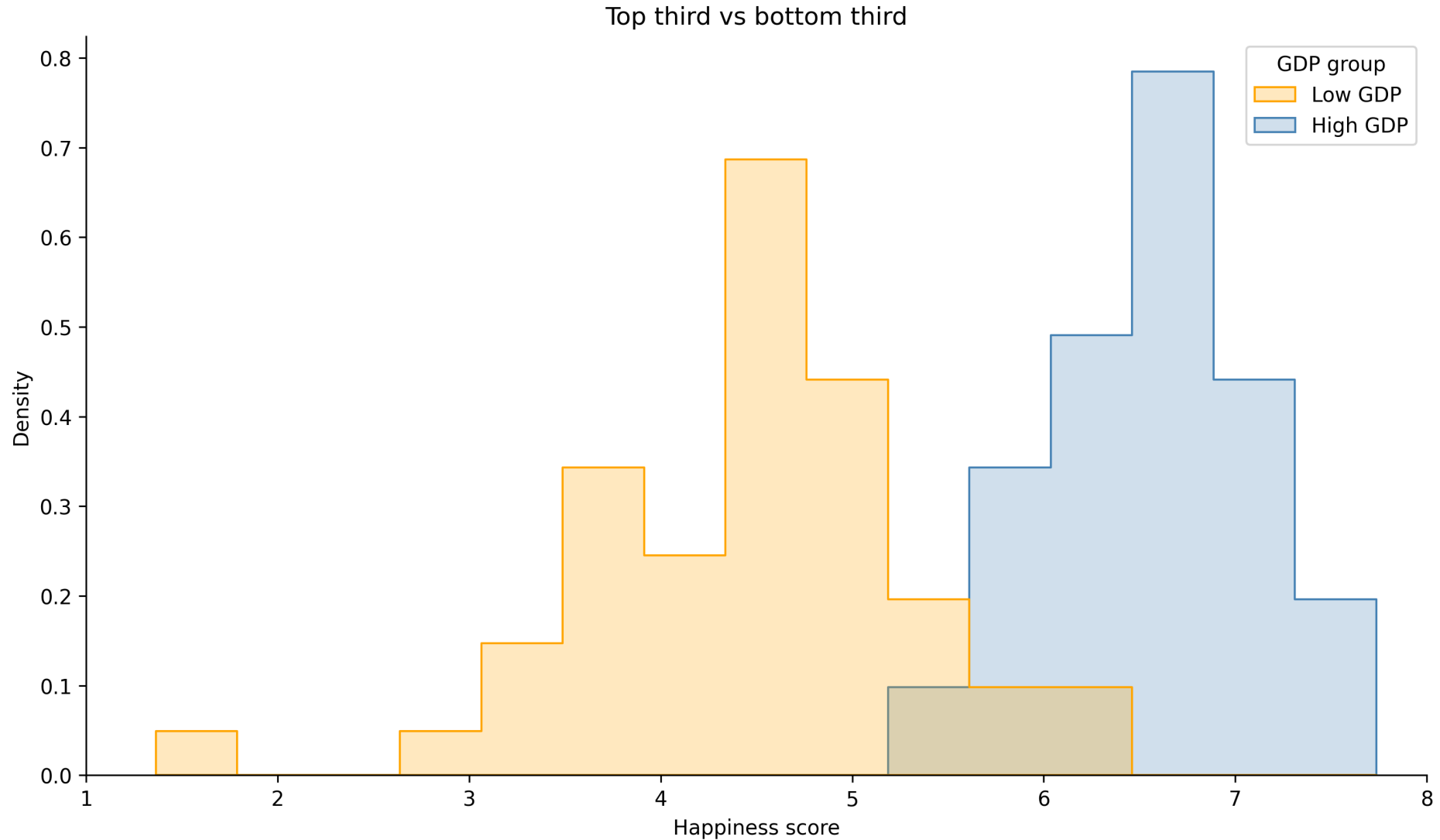
More extreme comparisons

Rule	N high	N low	Mean high	Mean low	Gap	s.e.(gap)
Richer half vs poorer half	72	72	6.35	4.82	1.53	0.14
Top third vs bottom third	48	48	6.58	4.47	2.11	0.14
Top quarter vs bottom quarter	36	36	6.73	4.33	2.41	0.16
Top tenth vs bottom tenth	15	15	6.88	4.03	2.85	0.26

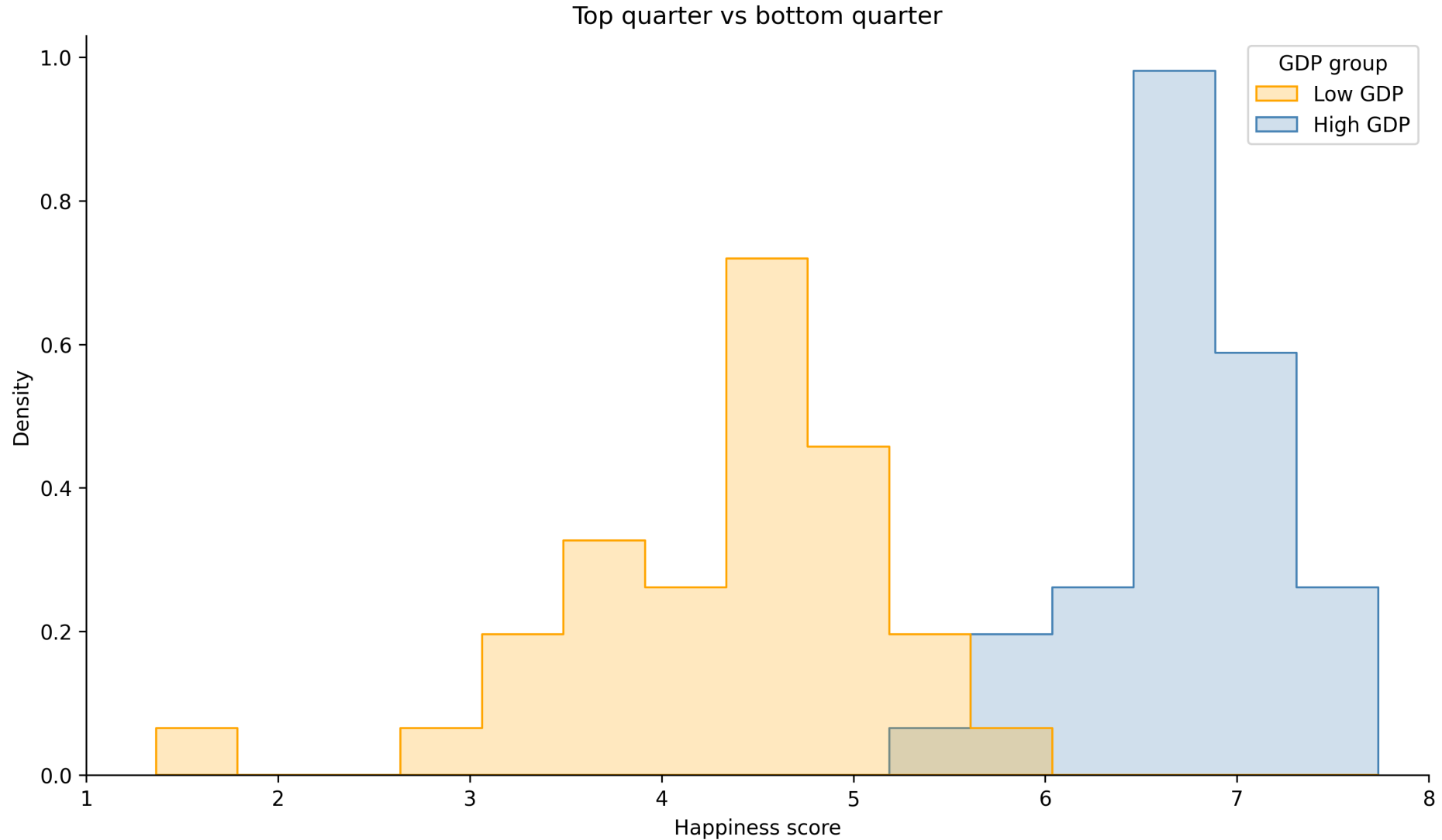
The humps pull apart, and get bumpier



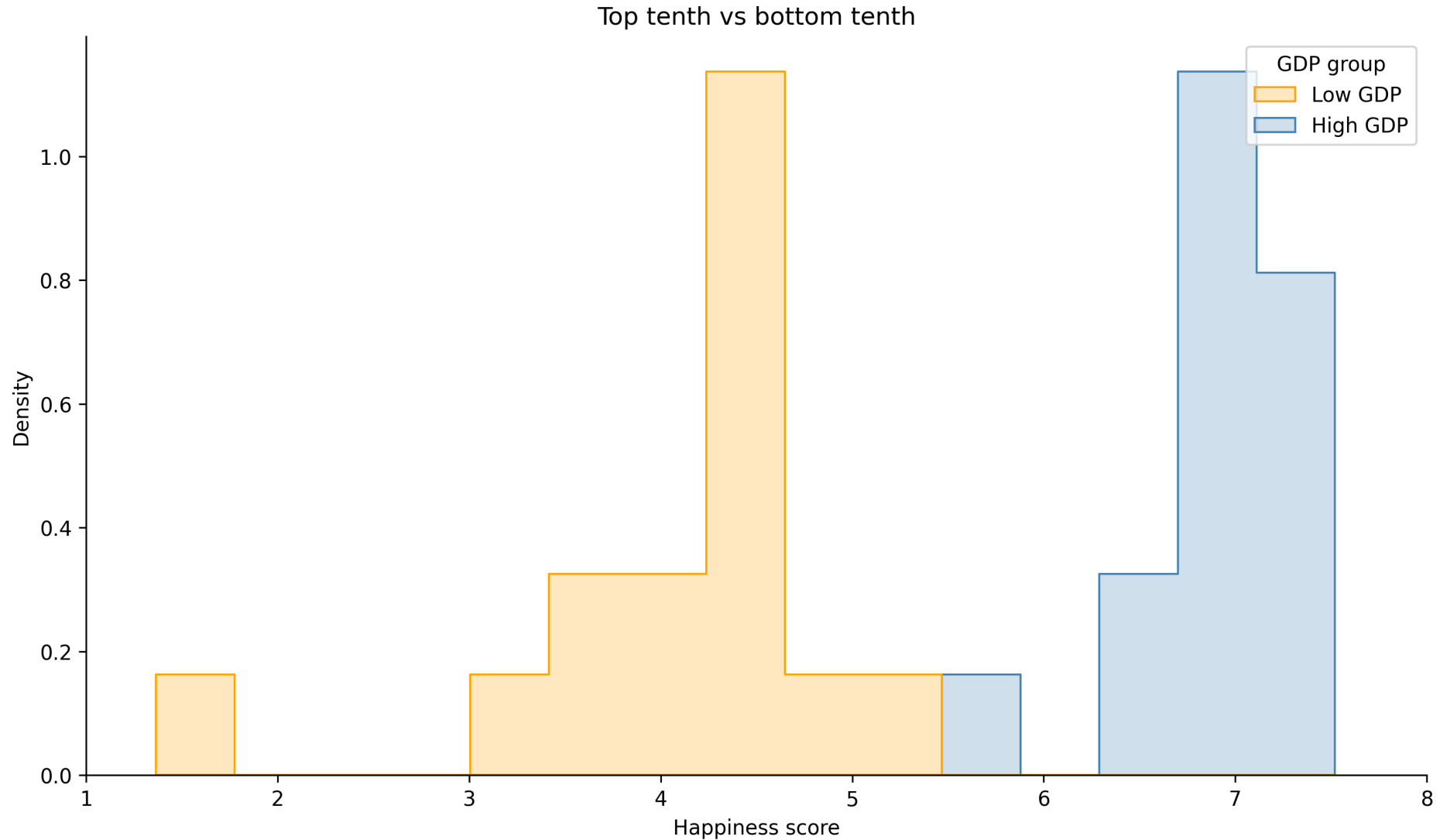
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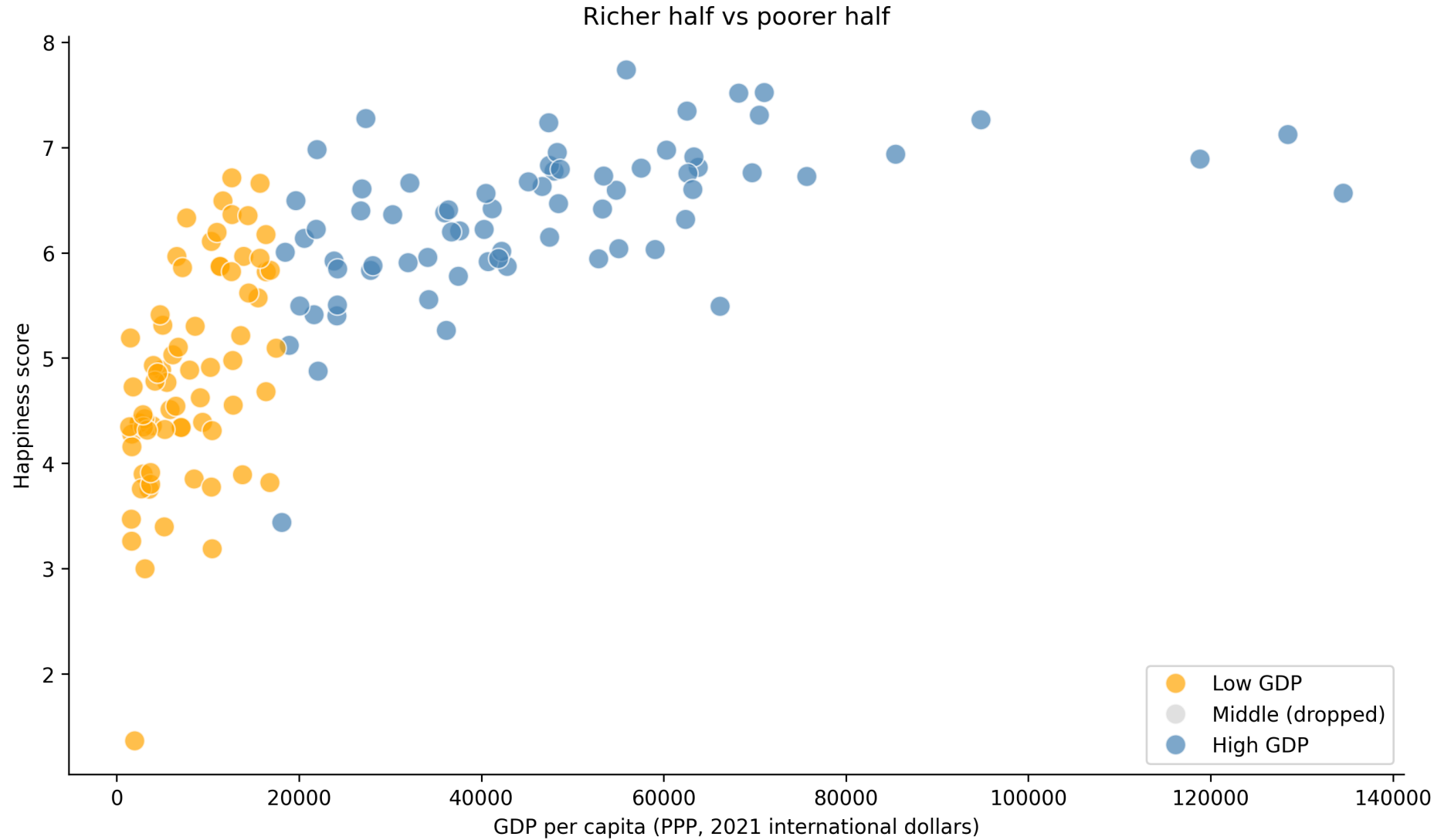
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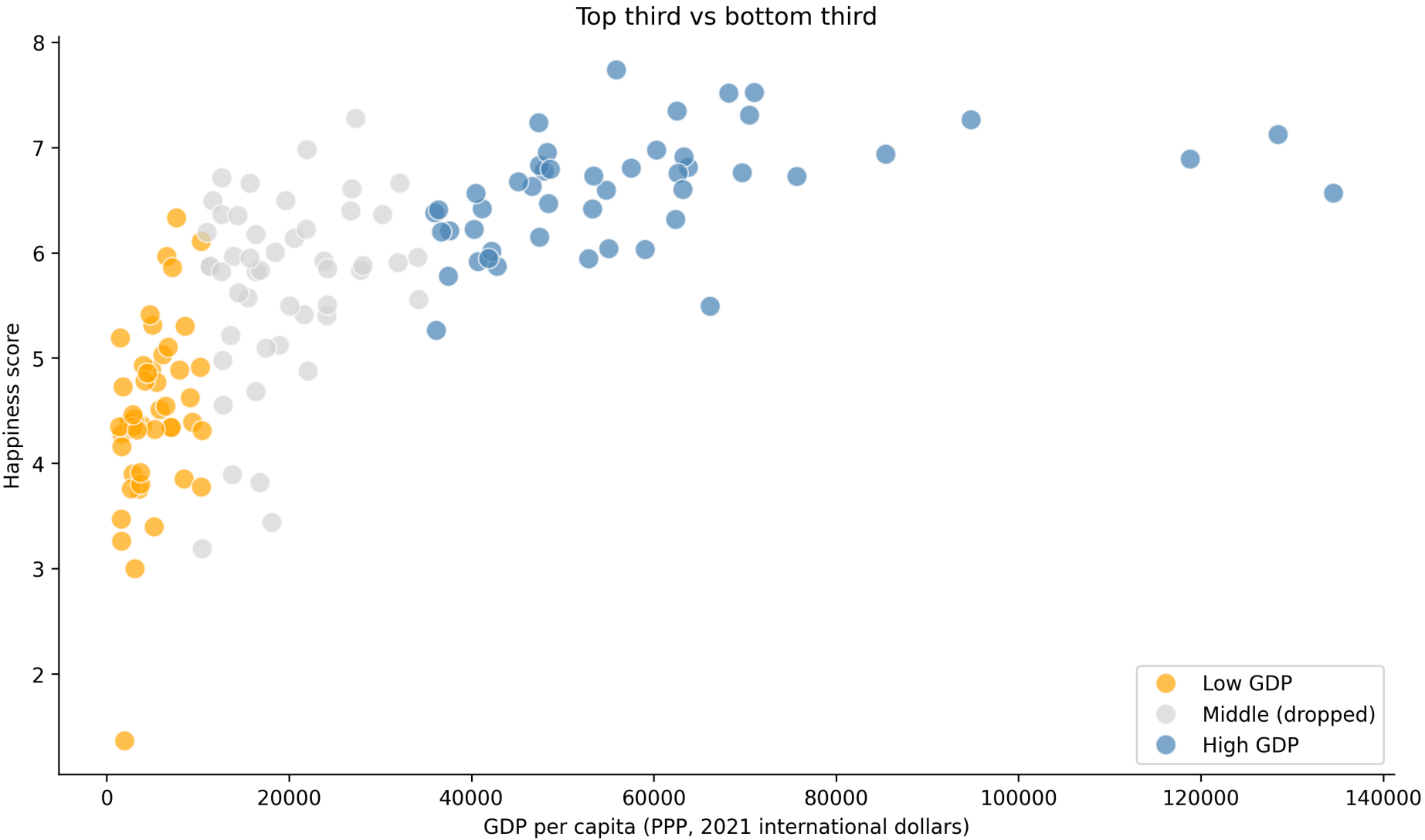
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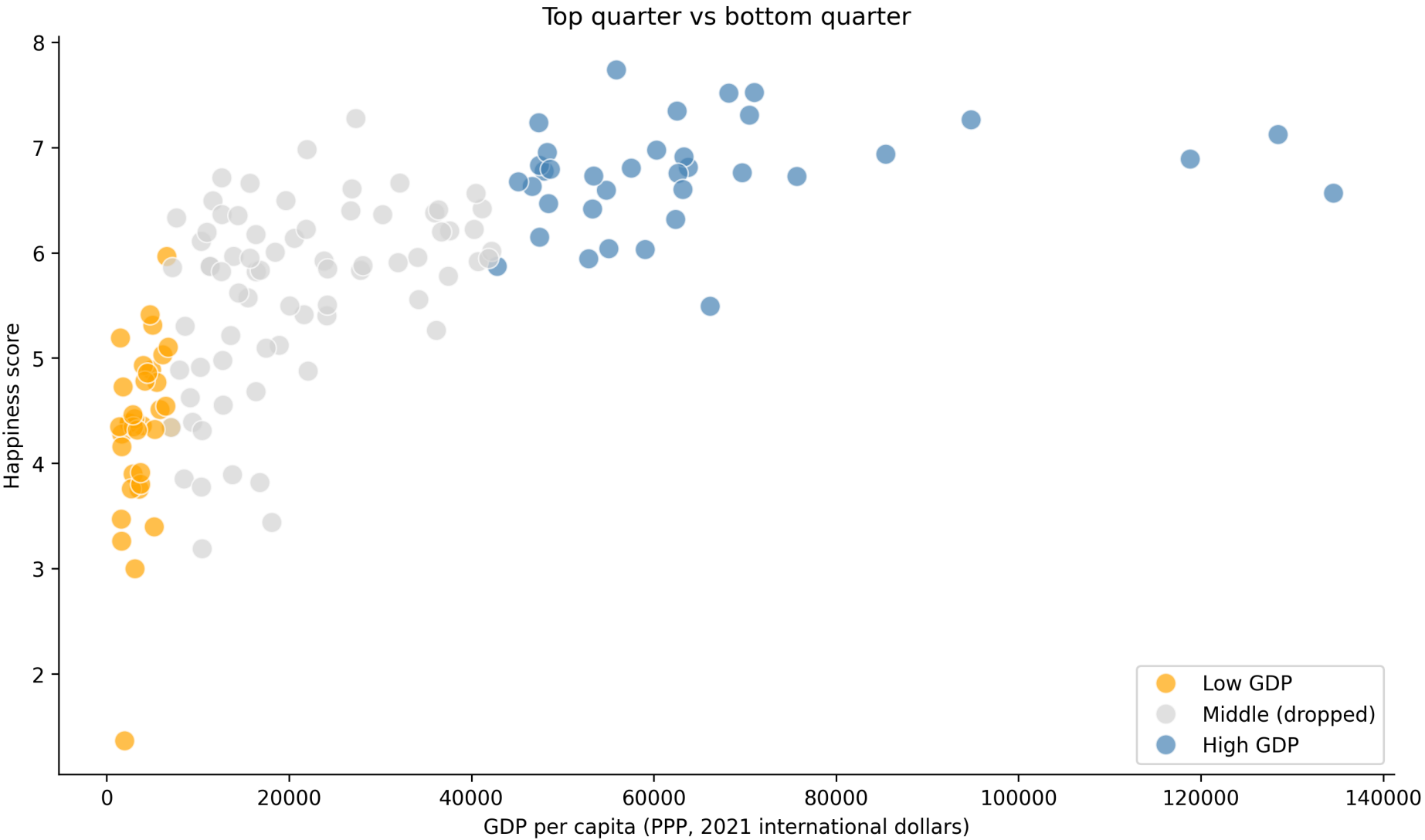
What each rule throws away



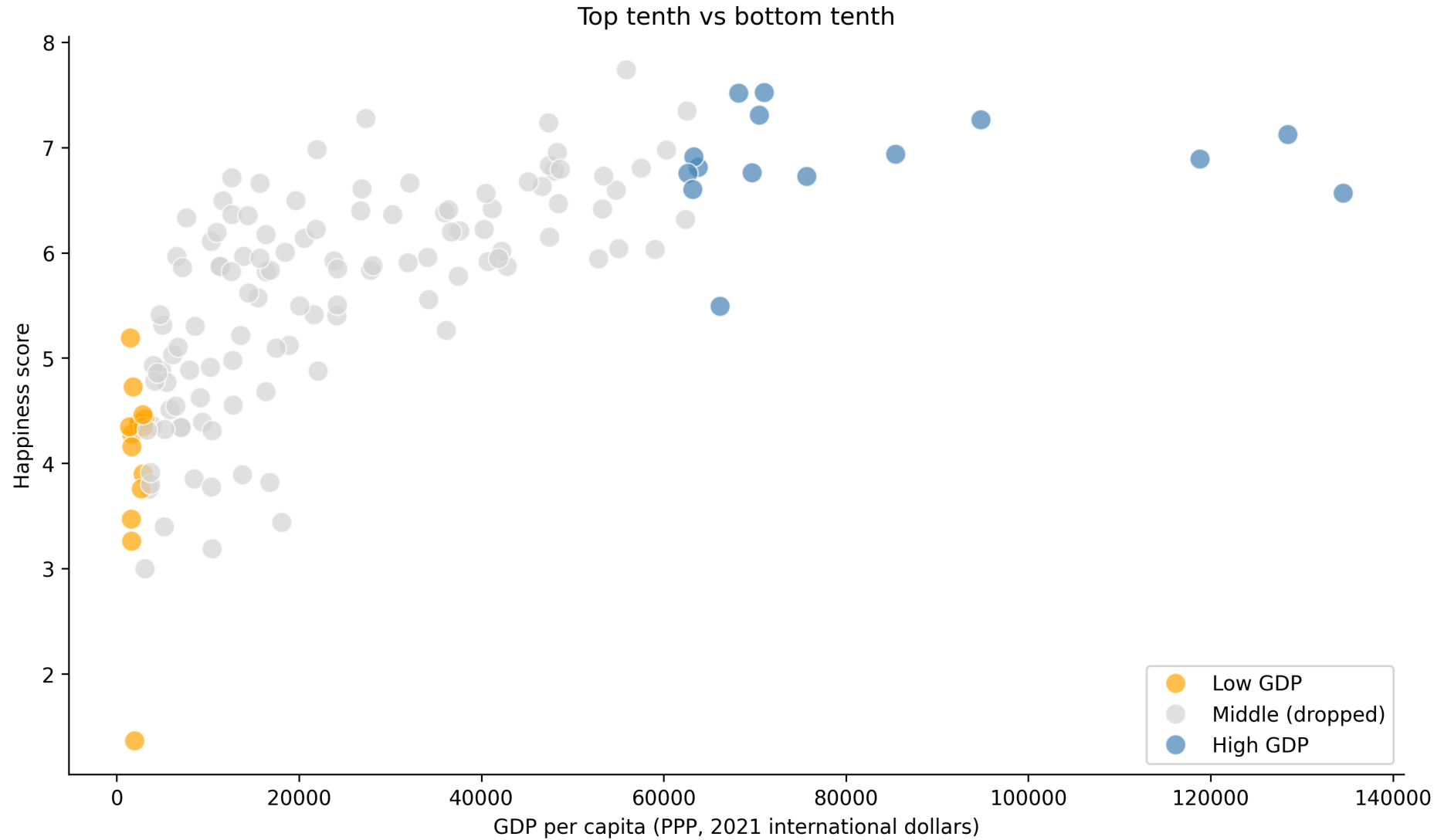
What each rule throws away



What each rule throws away



What each rule throws away



Nothing in the data tells you
which cut is correct

Some take-aways

- We can tell stories with data
- Visualization is powerful
- Always explore first

Before you go: forecast your semester

One more portal round, open now

1. Open your portal link

<https://emiliatjernstrom.com/econ2041/portal.html>

OR scan the QR code, then enter your code

2. Forecast your own final mark, then judge three hypothetical students



Portal answers are anonymous & ungraded

Results revealed next week

The SES survey

Shapes Macquarie's teaching, support, and services

- Results affect university rankings, which in turn affects how employers view us... and you!
- You can win \$1,000!
- Open until 30 August
- Link in your student email
(from ses@srcentre.com.au), or scan the code

