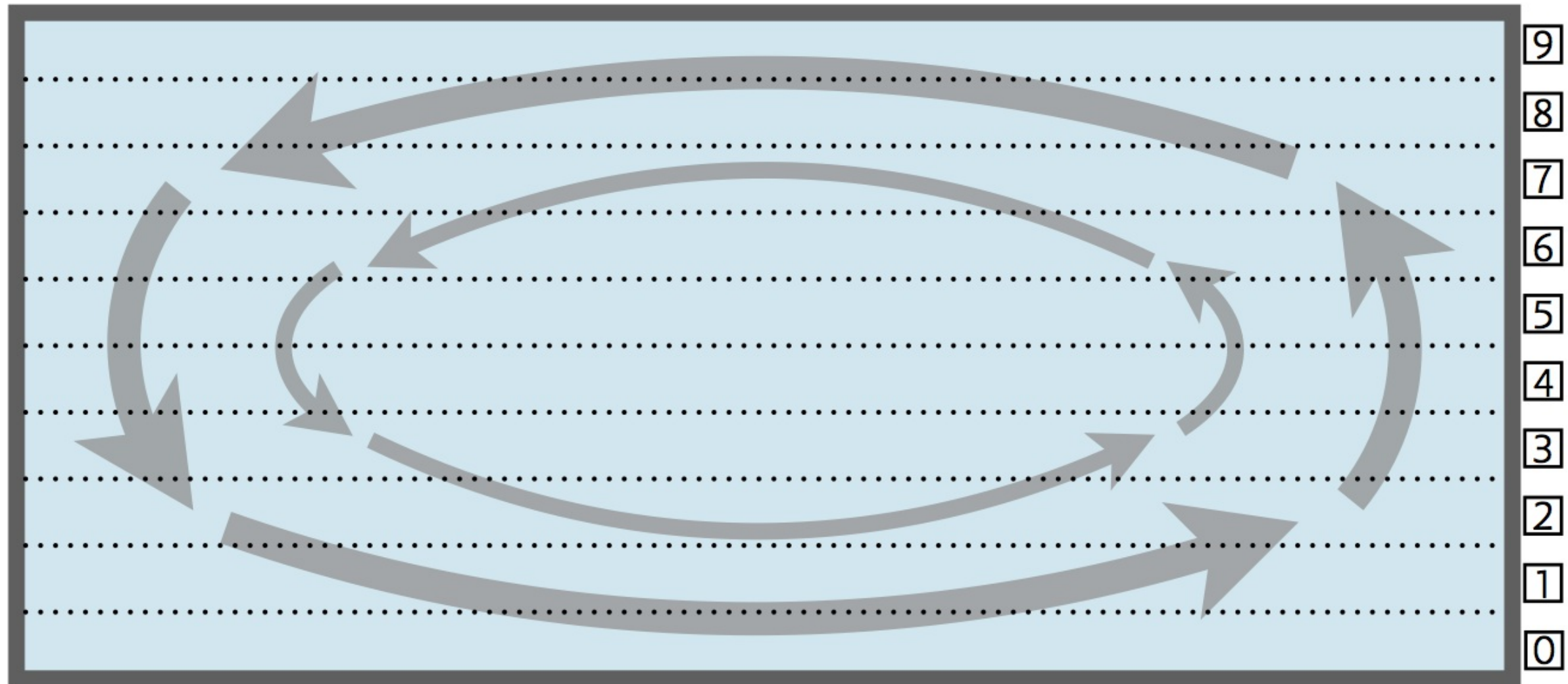CASE STUDIES IN STATISTICAL THINKING

Introduction to the Current Controversy

Justin Bois
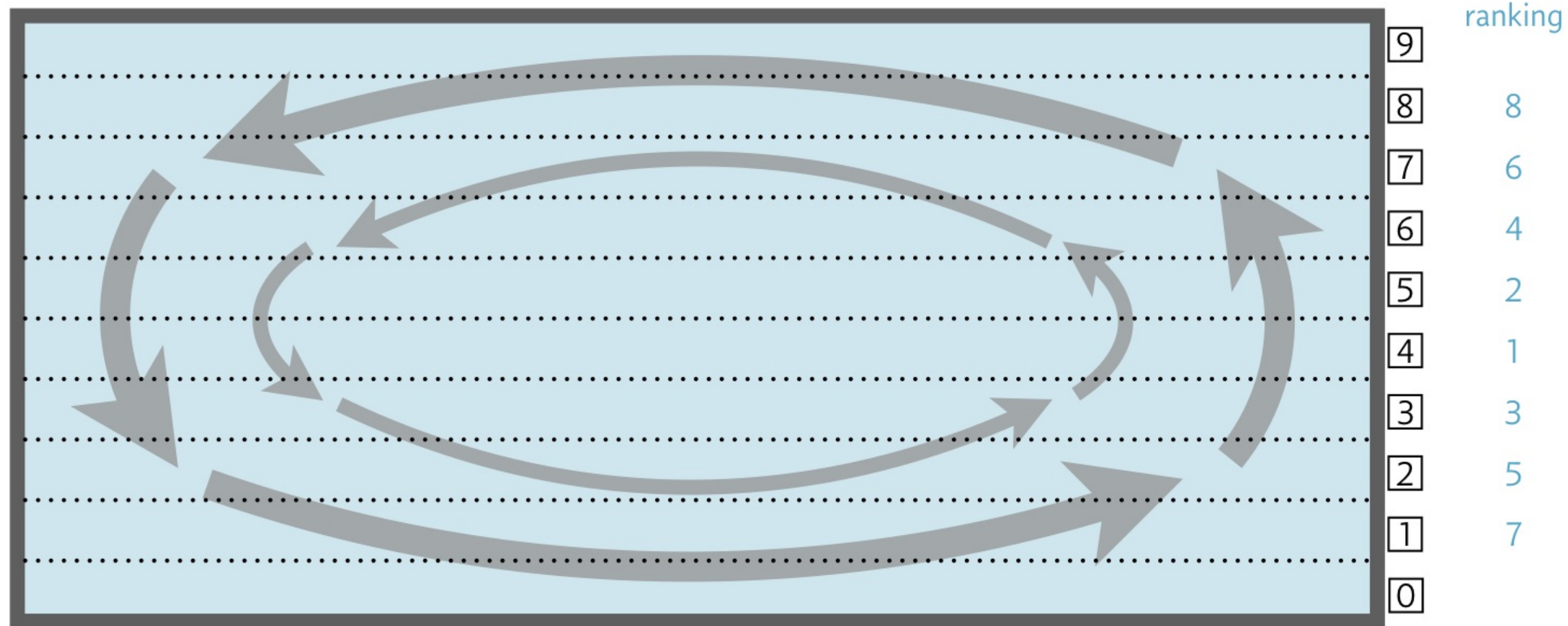Lecturer, Caltech

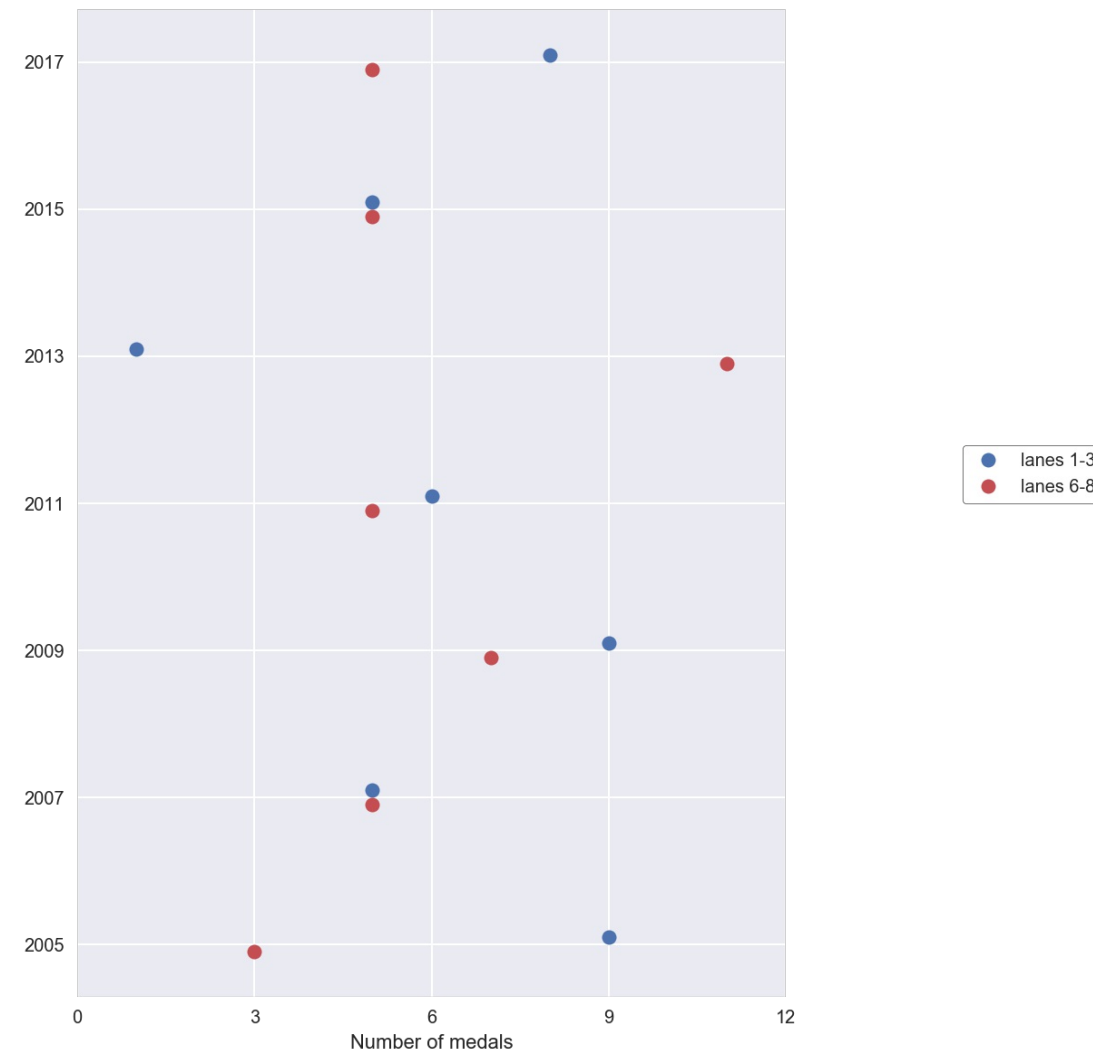# The Current Controversy

Citation

A. Cornett, C. Brammer, J. Stager, Current Controversy: Analysis of the 2013 FINA World Swimming Championships, *Medicine and Science in Sport Exercise*, **47**, 649-654, 2015

The Current Controversy

Medal counts

How probable is it?

```
In [1]: binom_draws = np.random.binomial(12, 0.5, size=100000)

In [2]: np.sum(binom_draws <= 1) / 100000
Out[2]: 0.0033600000000000001
```

Your tasks

- Investigate improvement of individual swimmers moving from low- to high-numbered lanes in 50 m events

- Compute the size of the effect

- Test the hypothesis that on average there is no difference between low- and high-numbered lanes

CASE STUDIES IN STATISTICAL THINKING
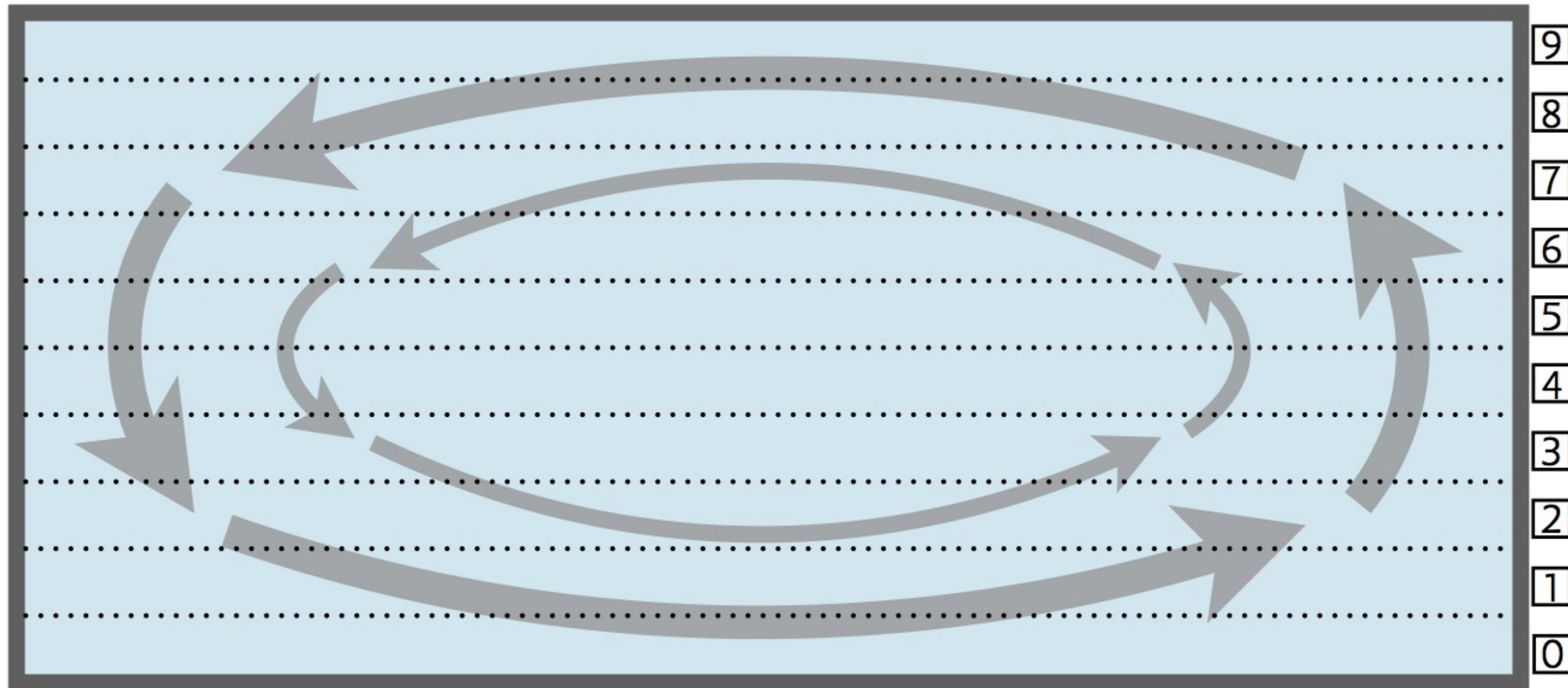
Let's practice!

CASE STUDIES IN STATISTICAL THINKING
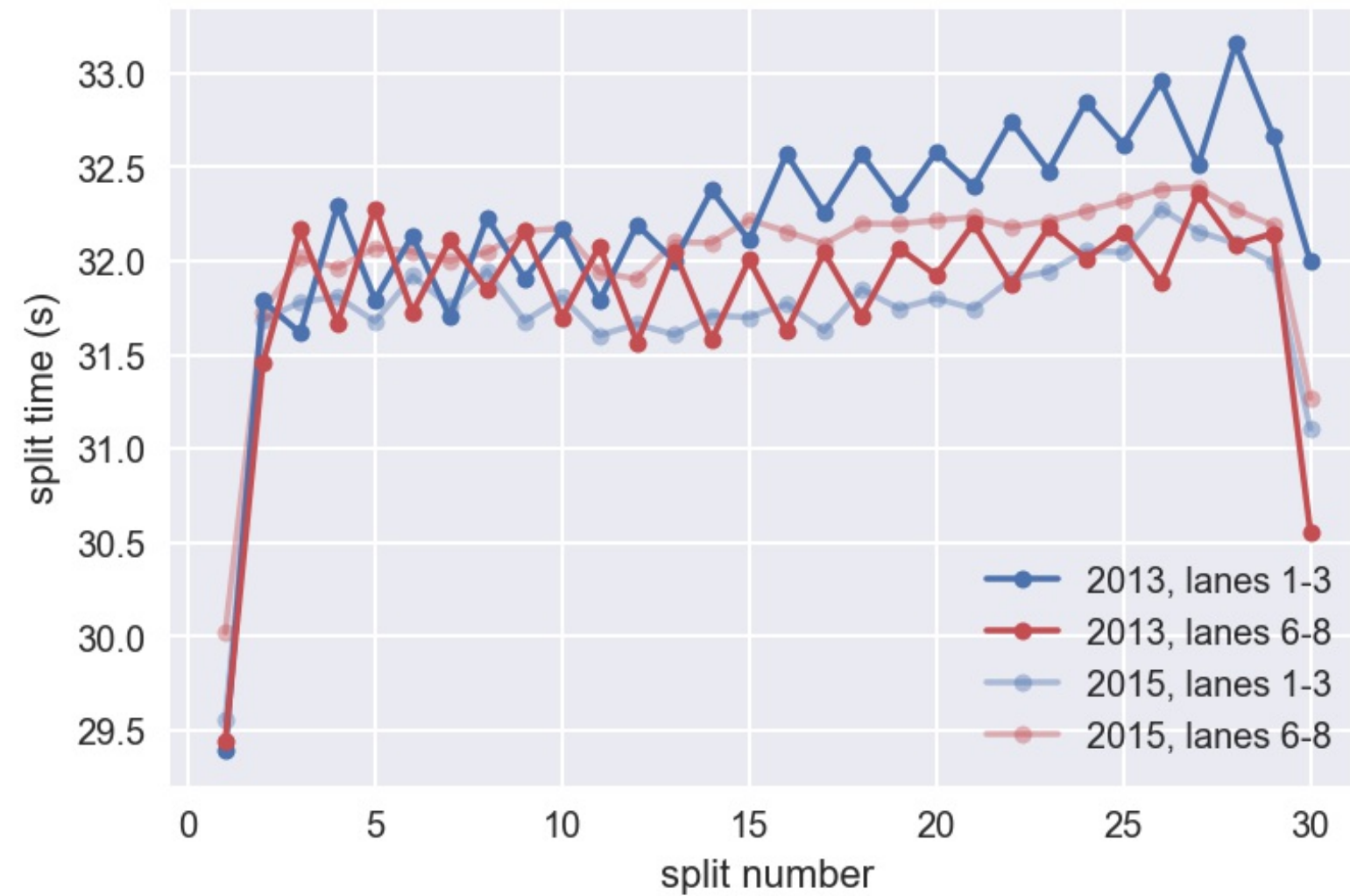
The zigzag effect

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Lecturer, Caltech

The current and longer swims

1500 m splits and the zigzag effect

CASE STUDIES IN STATISTICAL THINKING

Let's practice!

CASE STUDIES IN STATISTICAL THINKING

Recap of swimming analysis

Justin Bois
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Statistical inference pipeline

- Exploratory data analysis

  - Sharpen the question

- Optimal parameter calculation with confidence interval

- Hypothesis test

CASE STUDIES IN STATISTICAL THINKING

Keep it up!