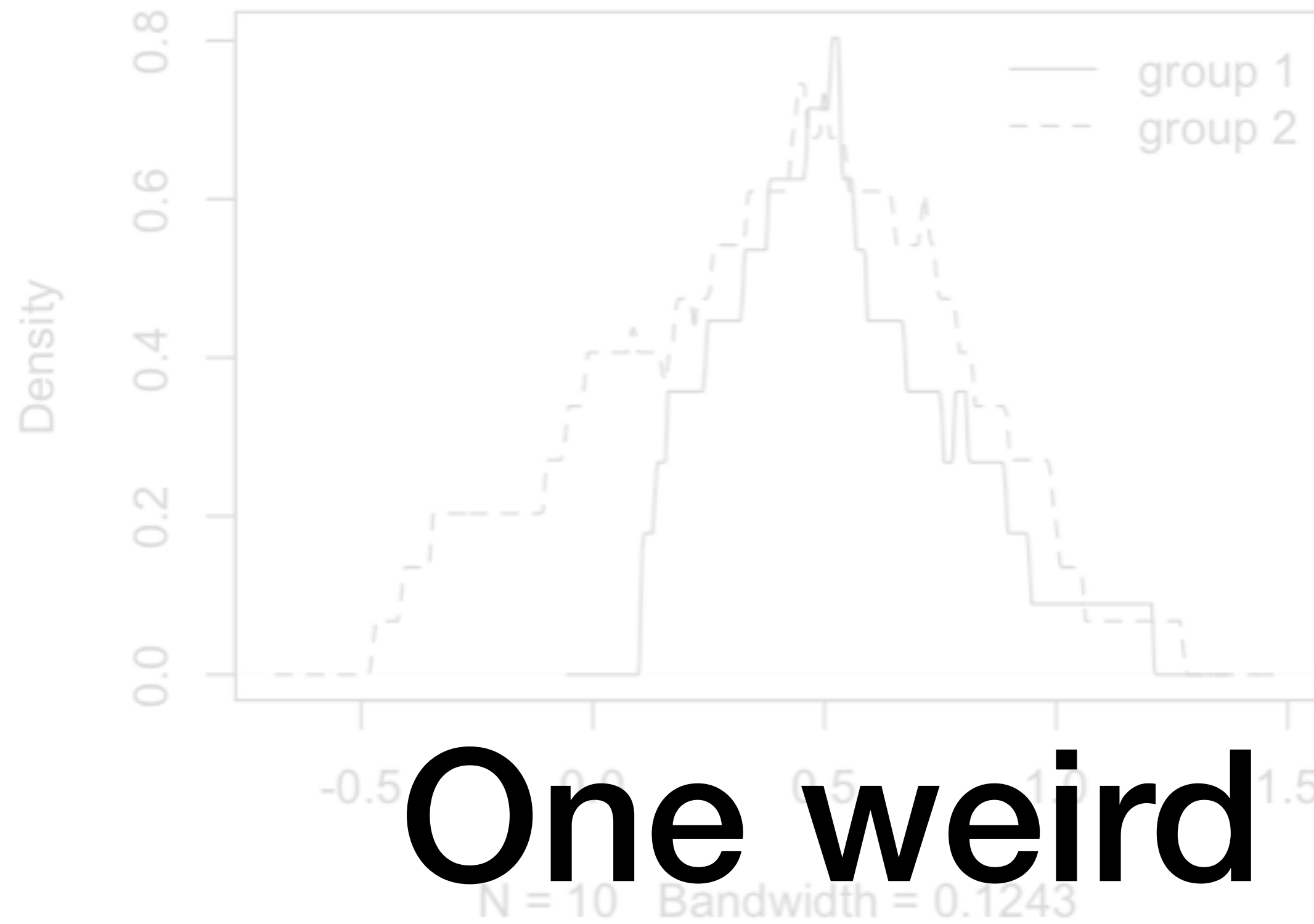
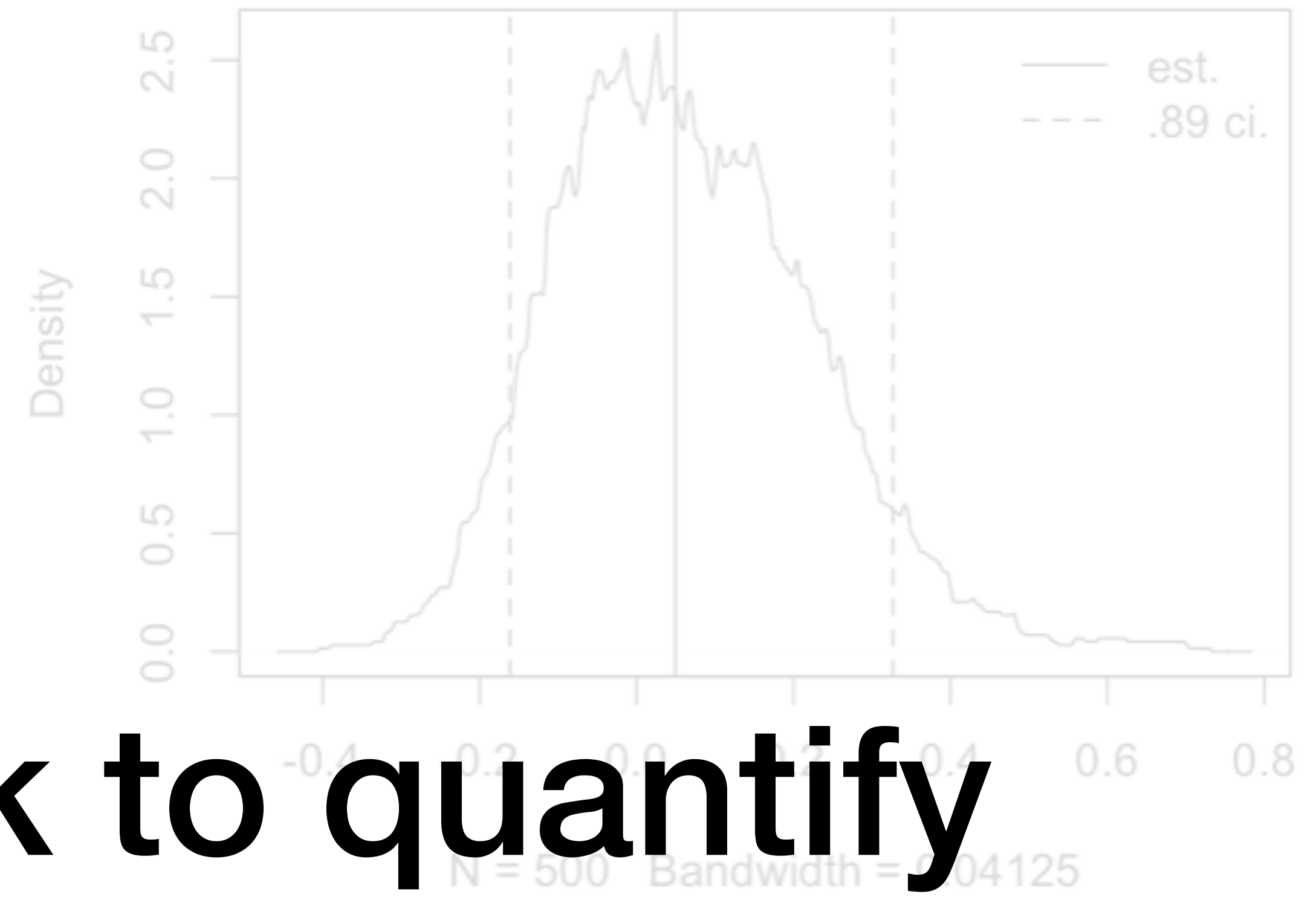


Densities for two groups



Bootstrap estimates



**One weird trick to quantify  
uncertainty**

Statisticians hate him!

**Practical demonstration:**

$$y = (1, 1, 3, 0, 2, 1)$$

[http://bit.ly/boot\\_ly](http://bit.ly/boot_ly)

# A Leisurely Look at the Bootstrap, the Jackknife, and Cross-Validation

BRADLEY EFRON and GAIL GONG\*

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This is an invited expository article for *The American Statistician*. It reviews the nonparametric estimation of statistical error, mainly the bias and standard error of an estimator, or the error rate of a prediction rule. The presentation is written at a relaxed mathematical level, omitting most proofs, regularity conditions, and technical details.

validation? For a quick answer, before we begin the main exposition, we consider a problem where none of the three methods are necessary, estimating the standard error of a sample average.

The data set consists of a random sample of size  $n$  from an unknown probability distribution  $F$  on the real line,

$$X_1, X_2, \dots, X_n \sim F \quad (1)$$