Hellenic Complex Systems Laboratory

Inferences about the Difference between Two Proportions

Technical Report XVIII

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2018

WOLFRAM Demonstrations Project

Inferences about the Difference between Two Proportions

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Search Terms: proportions, difference between proportions, confidence interval, inference, critical ratio statistic, statistical significance, statistics

Short Description of the Demonstration

This Demonstration explores statistical inferences regarding the difference between two proportions of populations obeying a condition (or trait). It calculates the statistical significance and the confidence intervals for the difference and plots the confidence intervals versus *p*-value. This is done for differing populations obeying a condition or without the condition and for differing *p*-values for the estimation of the confidence intervals.

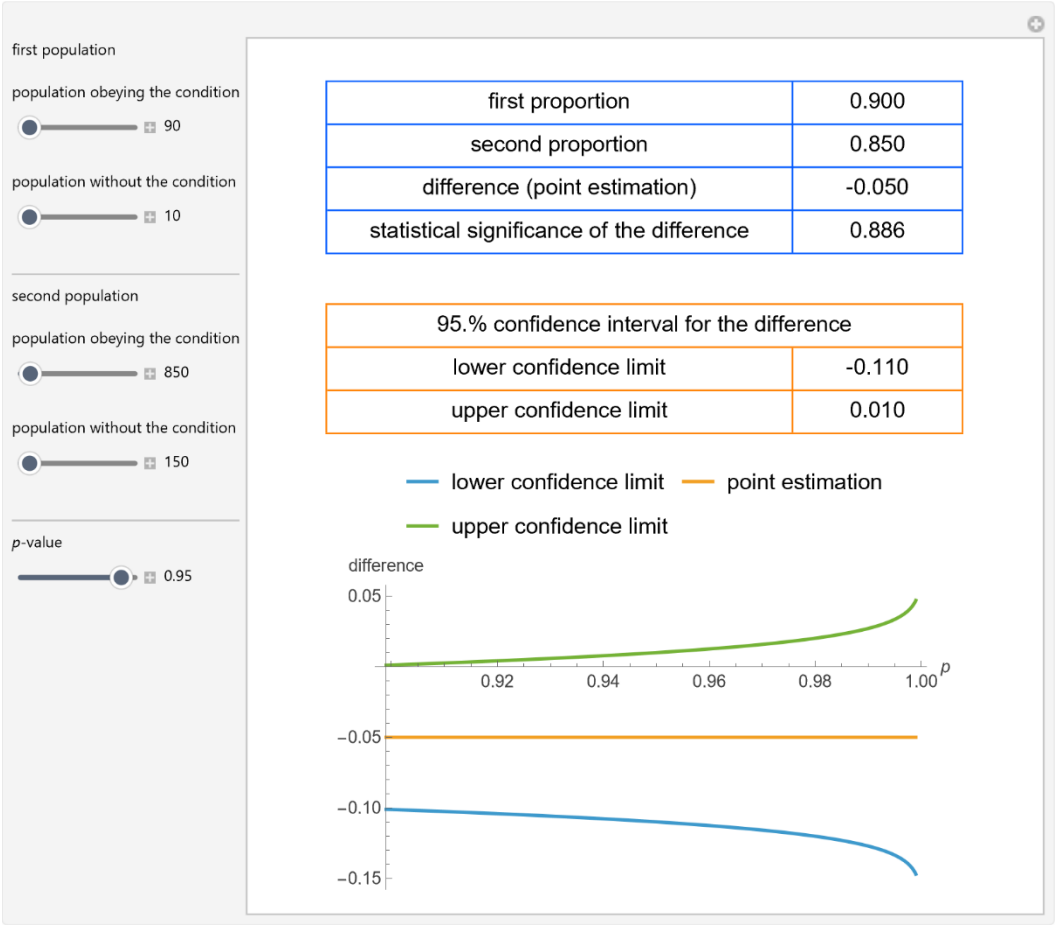

Figure 1: *Point estimation and 99% confidence interval for the difference of two proportions of populations obeying a condition, as well as their plots versus p-value, with the settings shown at the left.*

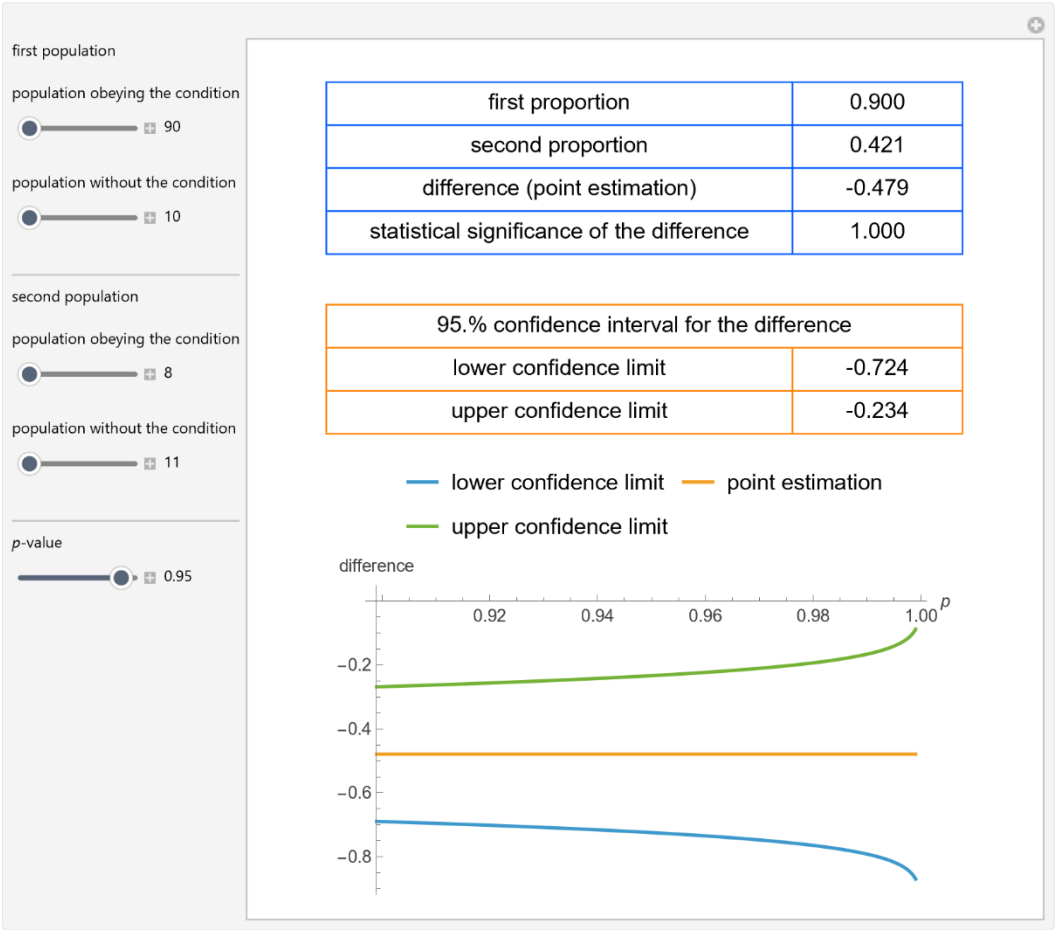

Figure 2: *Point estimation and 95% confidence interval for the difference of two proportions of populations obeying a condition, as well as their plots versus p-value, with the settings shown at the left.*

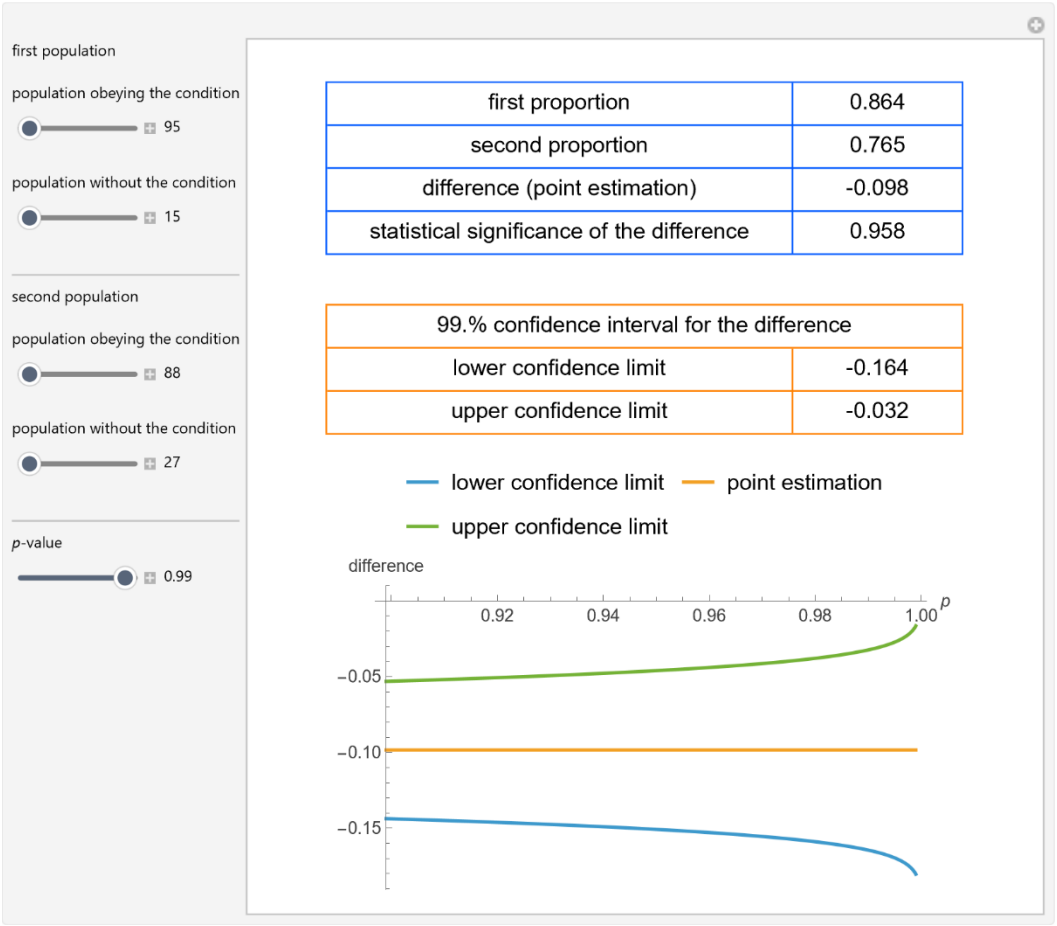

Figure 3: *Point estimation and 95% confidence interval for the difference of two proportions of populations obeying a condition, as well as their plots versus p-value, with the settings shown at the left.*

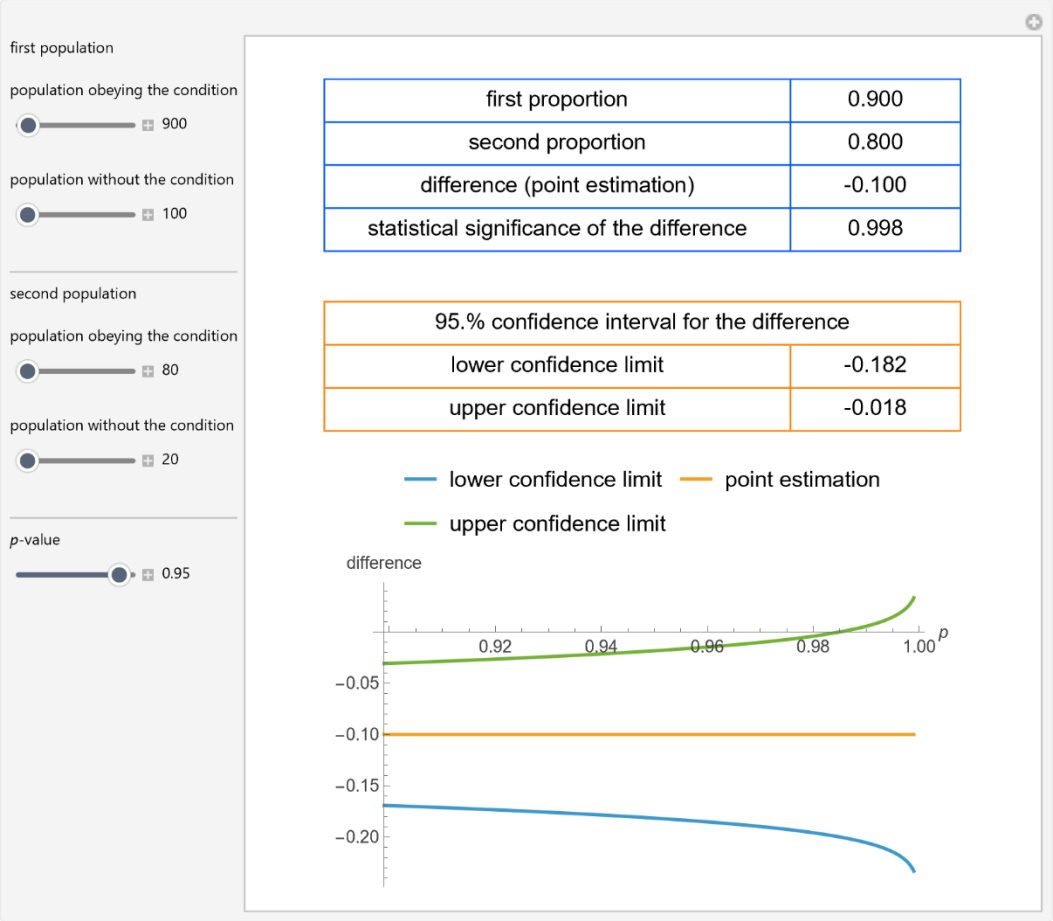

Figure 4: *Point estimation and 99% confidence interval for the difference of two proportions of populations obeying a condition, as well as their plots versus p-value, with the settings shown at the left.*

Details

The statistical significance of the difference between the two proportions is assessed by means of the *z*-score (or critical ratio statistic) [1]. The confidence interval for the difference between the proportions is calculated as in [2].

References

[1] J. L. Fleiss, B. Levin and M. C. Paik. Methods for Generating a Fourfold Table. *Statistical Methods for Rates and Proportions*, 3rd ed., Hoboken, NJ: J. Wiley, 2003 pp. 51–52.

[2] J. L. Fleiss, B. Levin and M. C. Paik. A Simple Confidence Interval for the Difference between Two Independent Proportions. *Statistical Methods for Rates and Proportions*, 3rd ed., Hoboken, NJ: J. Wiley, 2003 pp. 60–61.

Source Code

Programming language: Wolfram Language

Availability: The updated source code is available at:

https://www.hcsl.com/Tools/Demonstrations/InferencesAboutTheDifferenceBetweenTwoProportions.nb

Software Requirements

Operating systems: Microsoft Windows, Linux, Apple macOS and iOS

Other software requirements: Wolfram Player®, freely available at: https://www.wolfram.com/player/ or Wolfram Mathematica®.

System Requirements

Processor: x86-64 compatible CPU.

System memory (RAM): 4GB+ recommended.

Permanent Citation:

Chatzimichail T, Hatjimihail AT. Inferences about the Difference between Two Proportions. Wolfram Demonstrations Project, Champaign: Wolfram Research, Inc., 2018. Available at:
https://demonstrations.wolfram.com/InferencesAboutTheDifferenceBetweenTwoProportions/

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First Published: August 2, 2018

Revised: October 10, 2025