SAS® GLOBAL FORUM 2019

USERS PROGRAM

APRIL 28 – MAY 1, 2019 | DALLAS, TX

Using SAS® Graph Template Language to Demonstrate Foundational Statistical Concepts

Aaron J. Myers
University of Arkansas

Introduction

- Teaching introductory statistics should focus on understanding of foundational statistical concepts (Cobb, 1992).
- Abstract concepts such as null and alternative distributions and null hypothesis statistical testing (NHST) are especially difficult to both teach and learn. In particular, concepts such as:
    - Statistical Power: the probability that a test results in correctly rejecting a false null hypothesis,
    - Type I error rate: the probability that a test results in incorrectly rejecting a true null hypothesis,
    - Type II error rate: the probability that a test results in incorrectly failing to reject a false null hypothesis,

  and their interrelations with the factors that affect them (e.g., sample size, alpha level, effect size) are difficult to conceptualize.
- Teaching these concepts is often limited to lecture and simple static visualizations.
- Creating clear and understandable visualizations can make teaching and learning abstract concepts accessible to everyone.
- Directly manipulable graphics that result in instantaneous change can further increase the effectiveness of data visualizations (Becker, Cleveland, & Wilks, 1987).

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Purpose

- The purpose of this project was to facilitate teaching and learning of abstract foundational statistical concepts by creating figures using SAS® Graph Template Language within a macro that:
    - Is easily manipulable
    - Illustrates null and alternative distributions
    - Provides a visual representation of Type I and II error and statistical Power
    - Illustrates the factors that influence Power (e.g., sample size, alpha) and how they do so.

Macros and Options

- *t* distribution
    - **%tPower**
        - Degrees of freedom
        - Alpha level
        - Mean difference
- *F* distribution
    - **%FPower**
        - Numerator degrees of freedom
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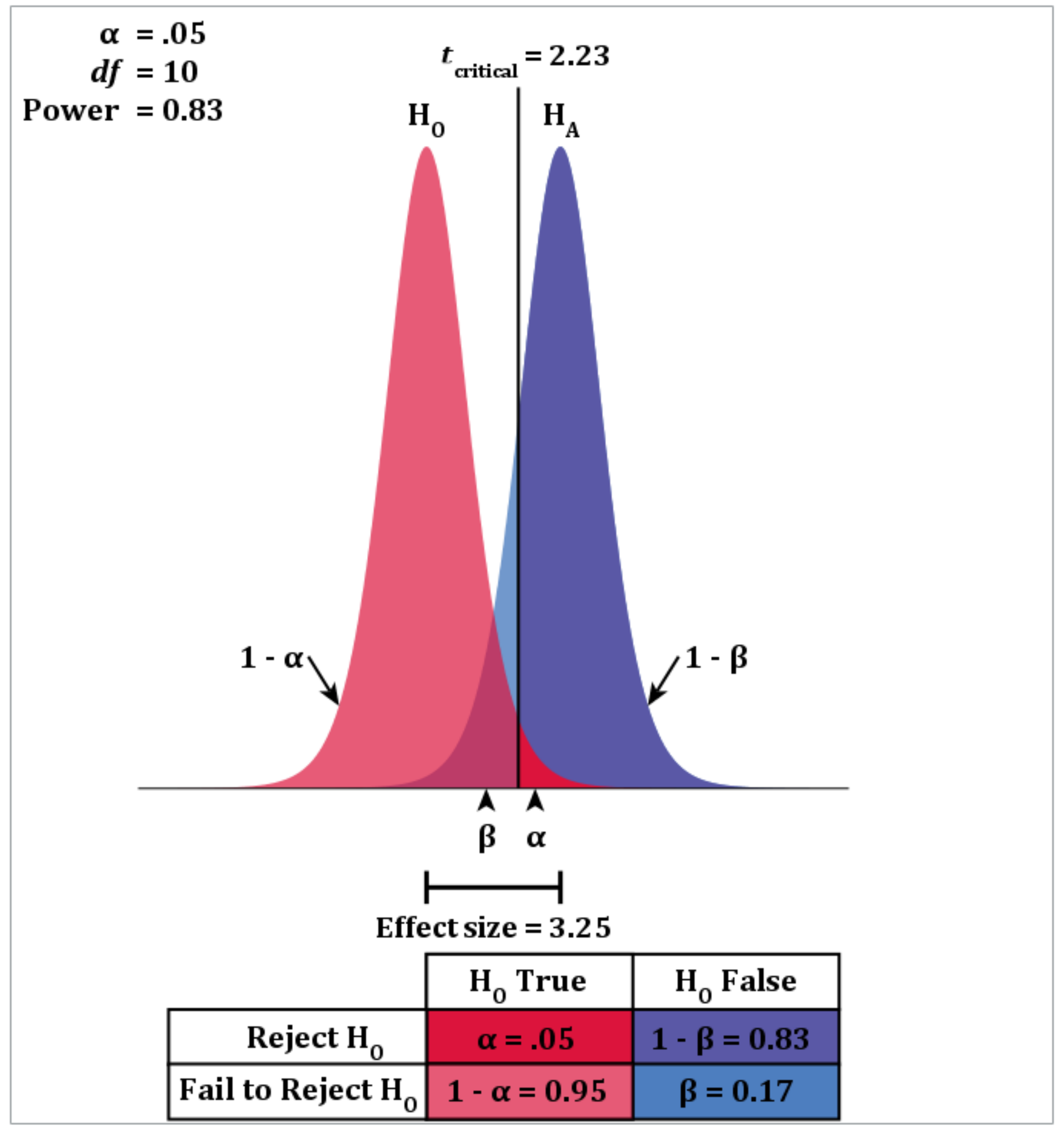

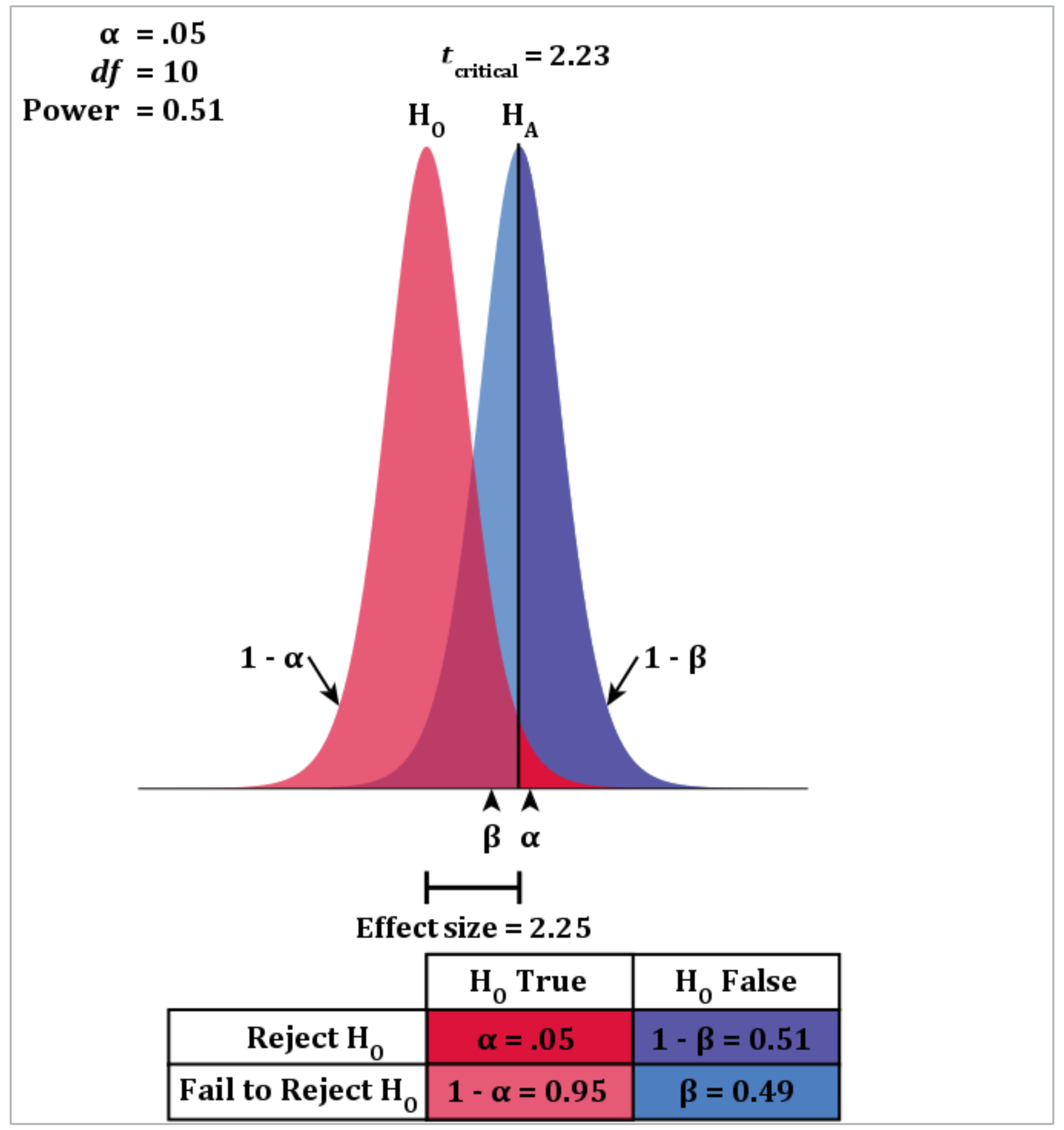

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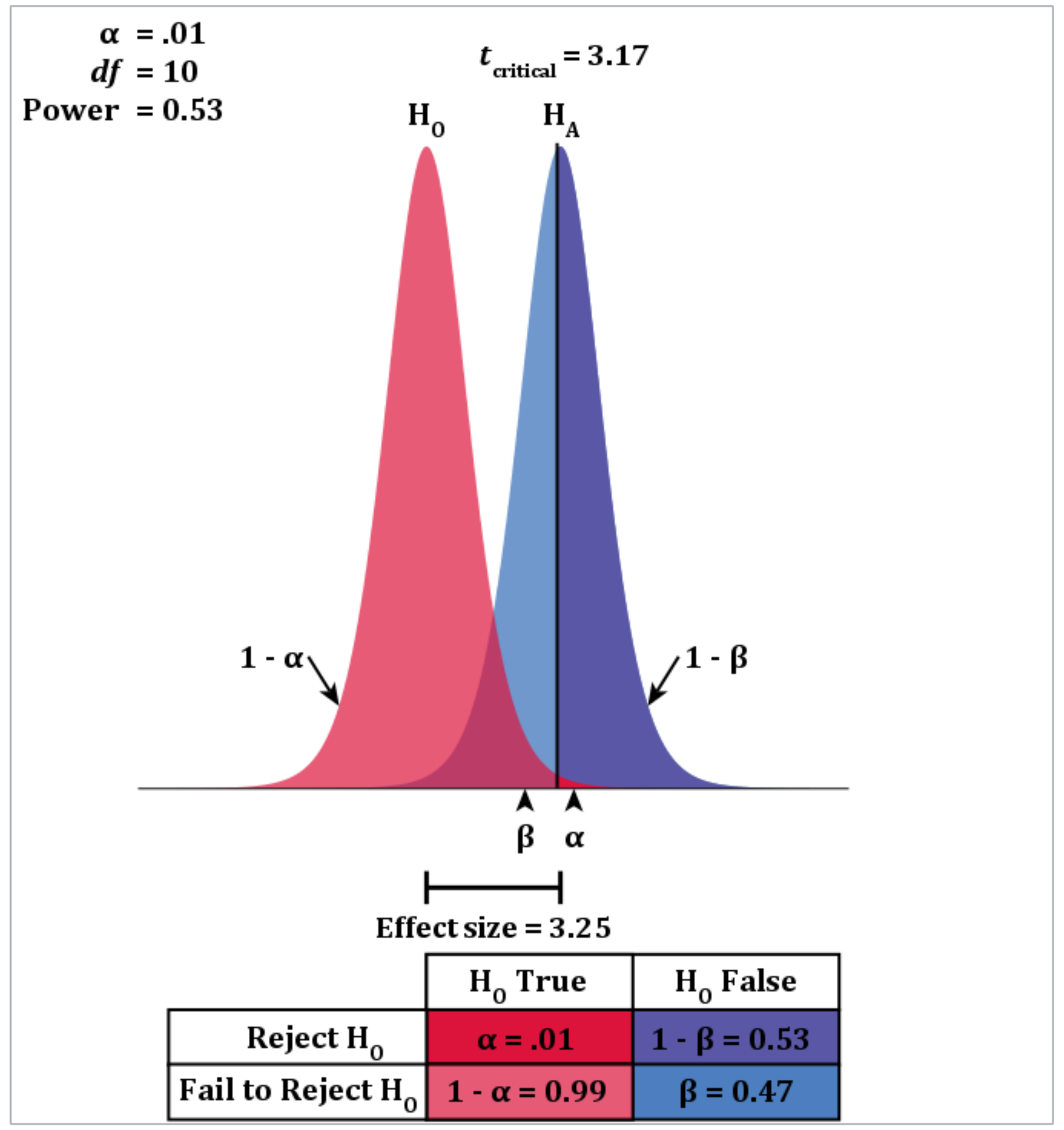

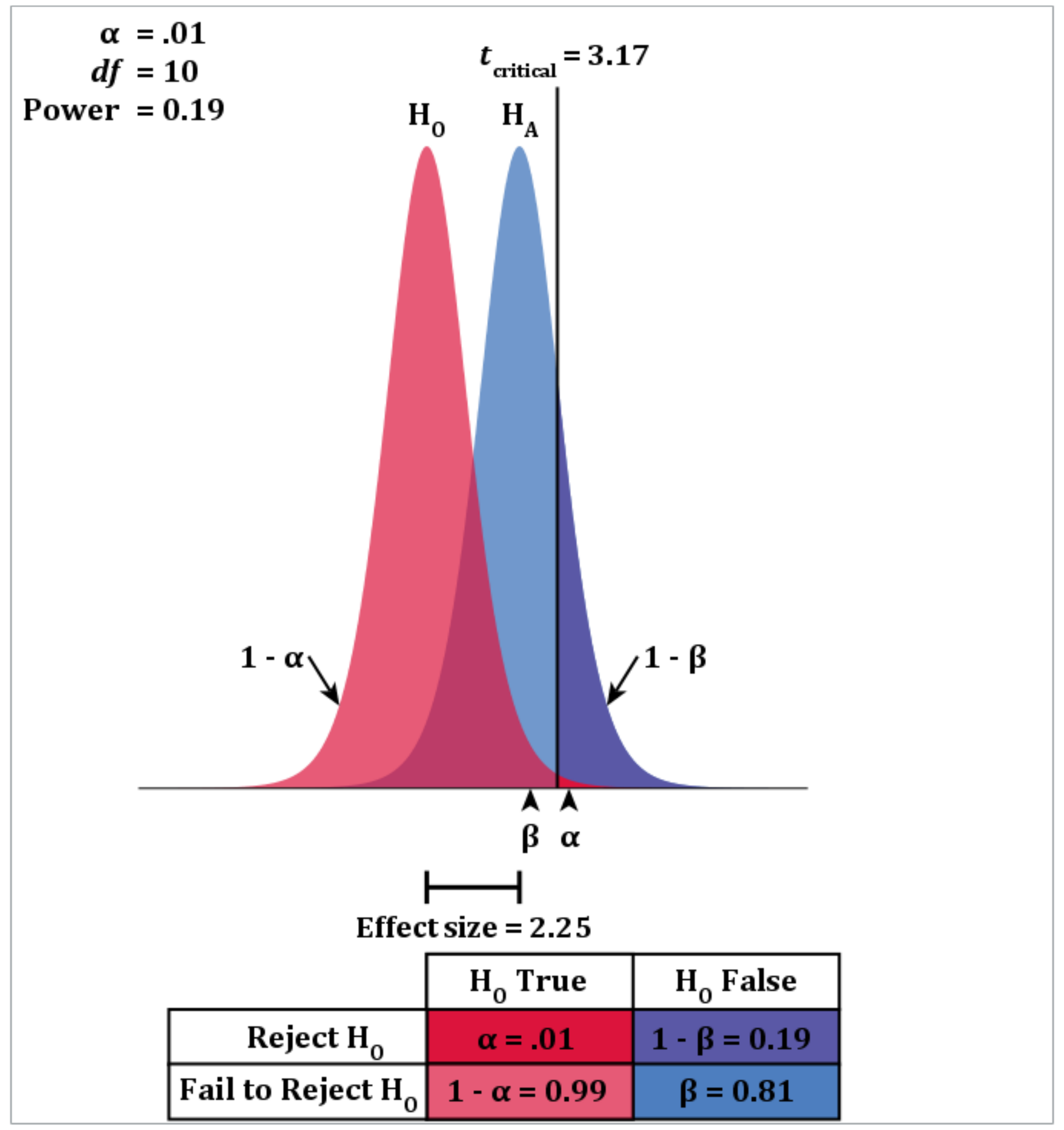

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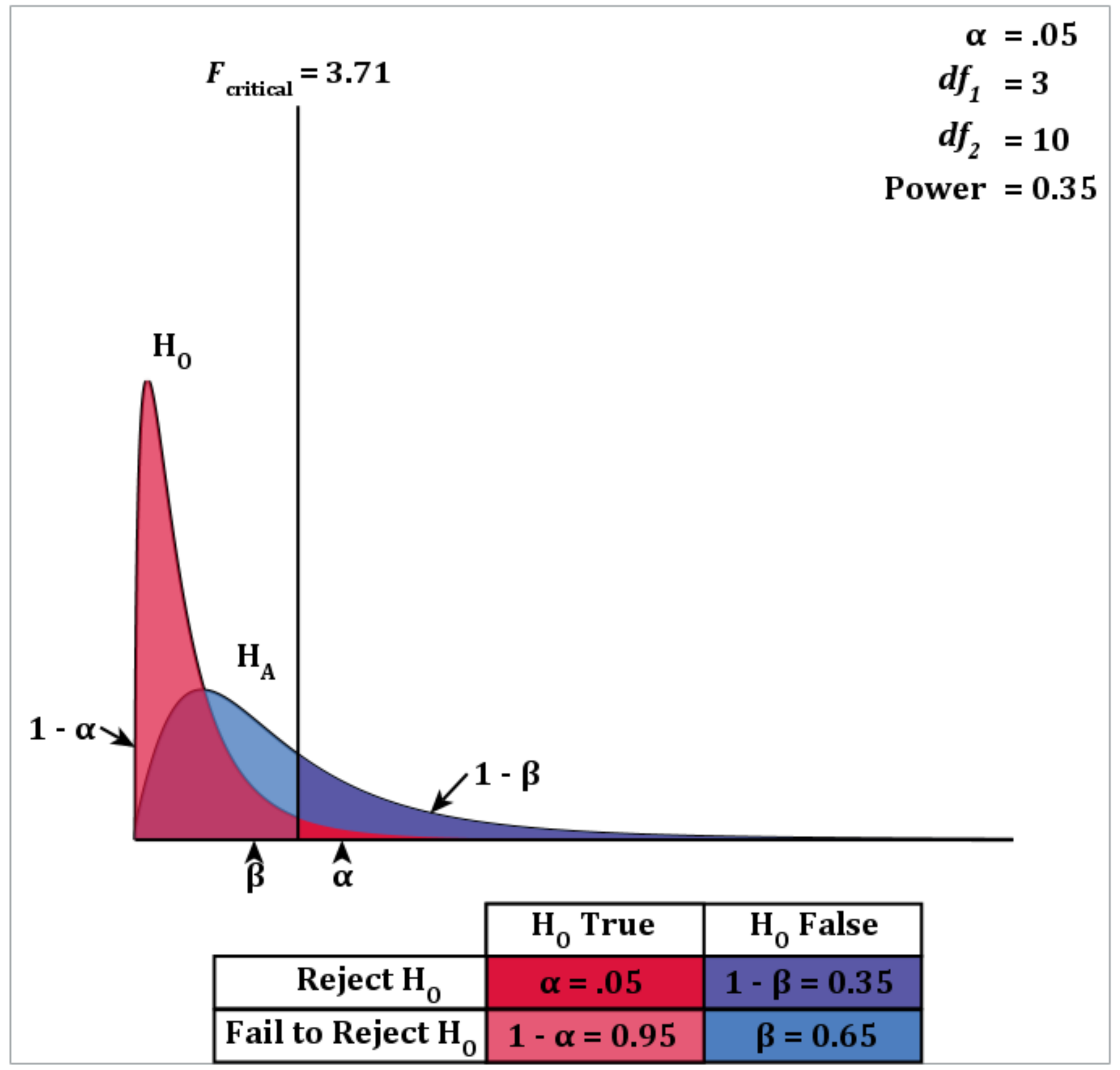

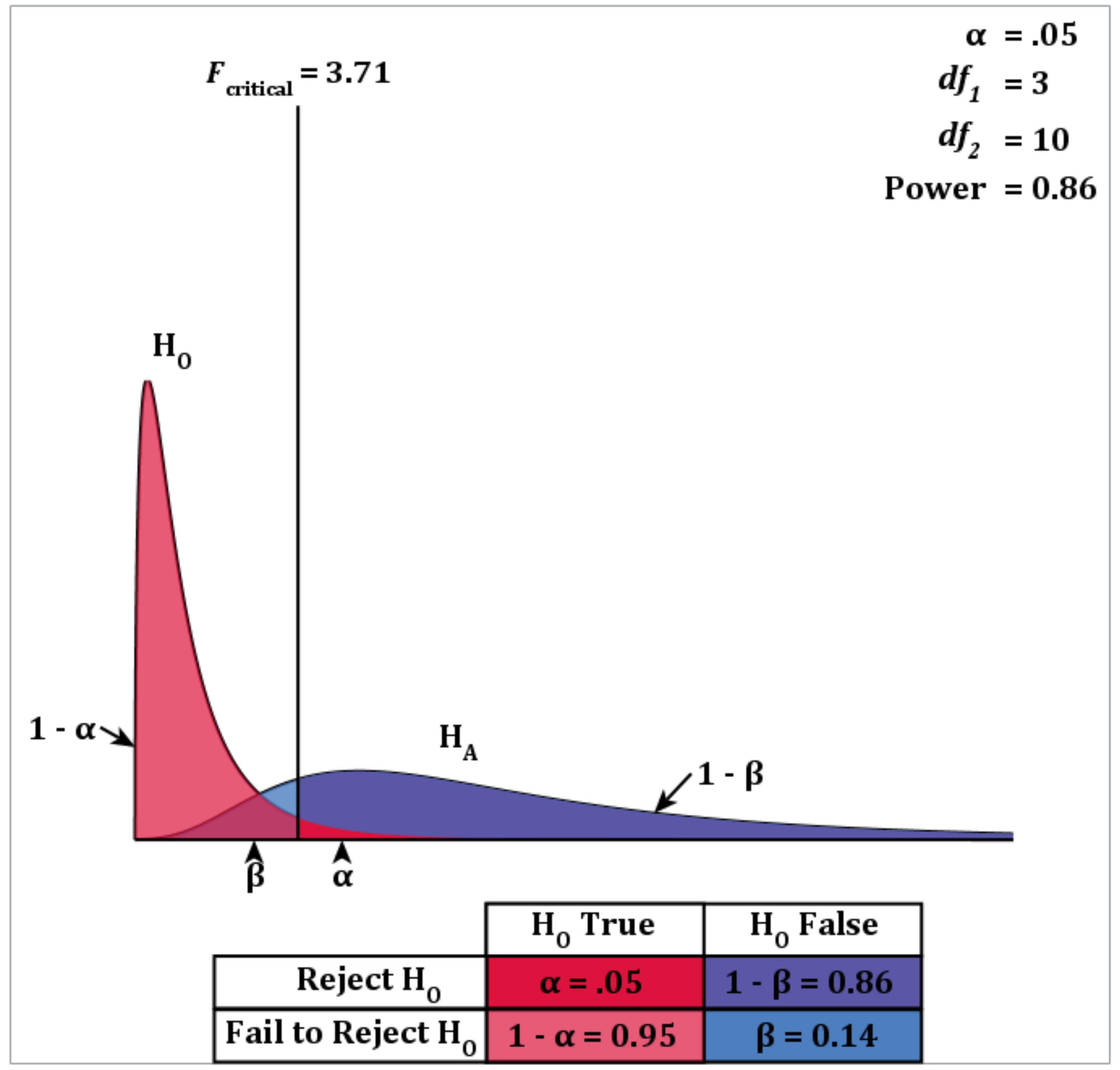

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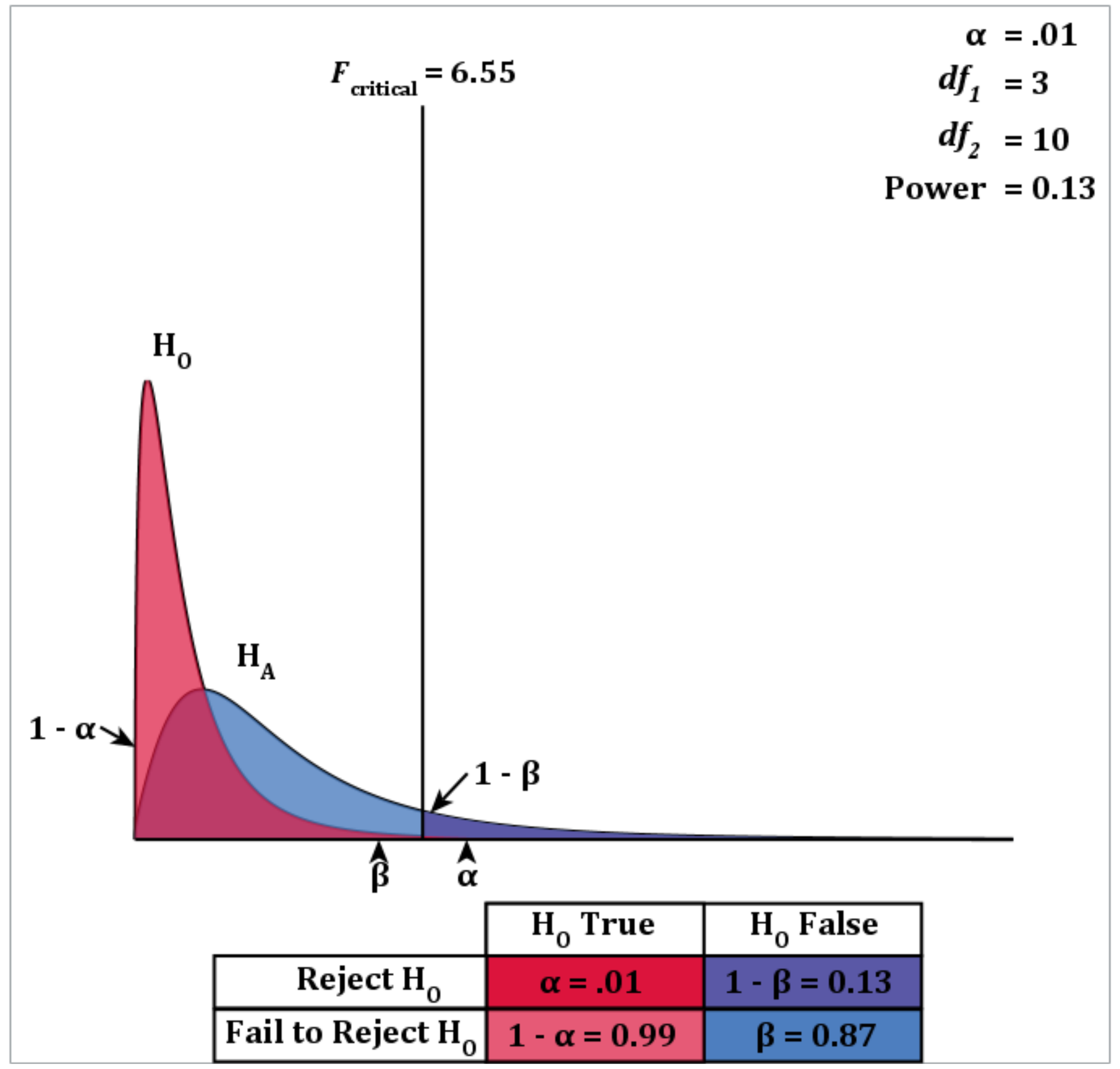

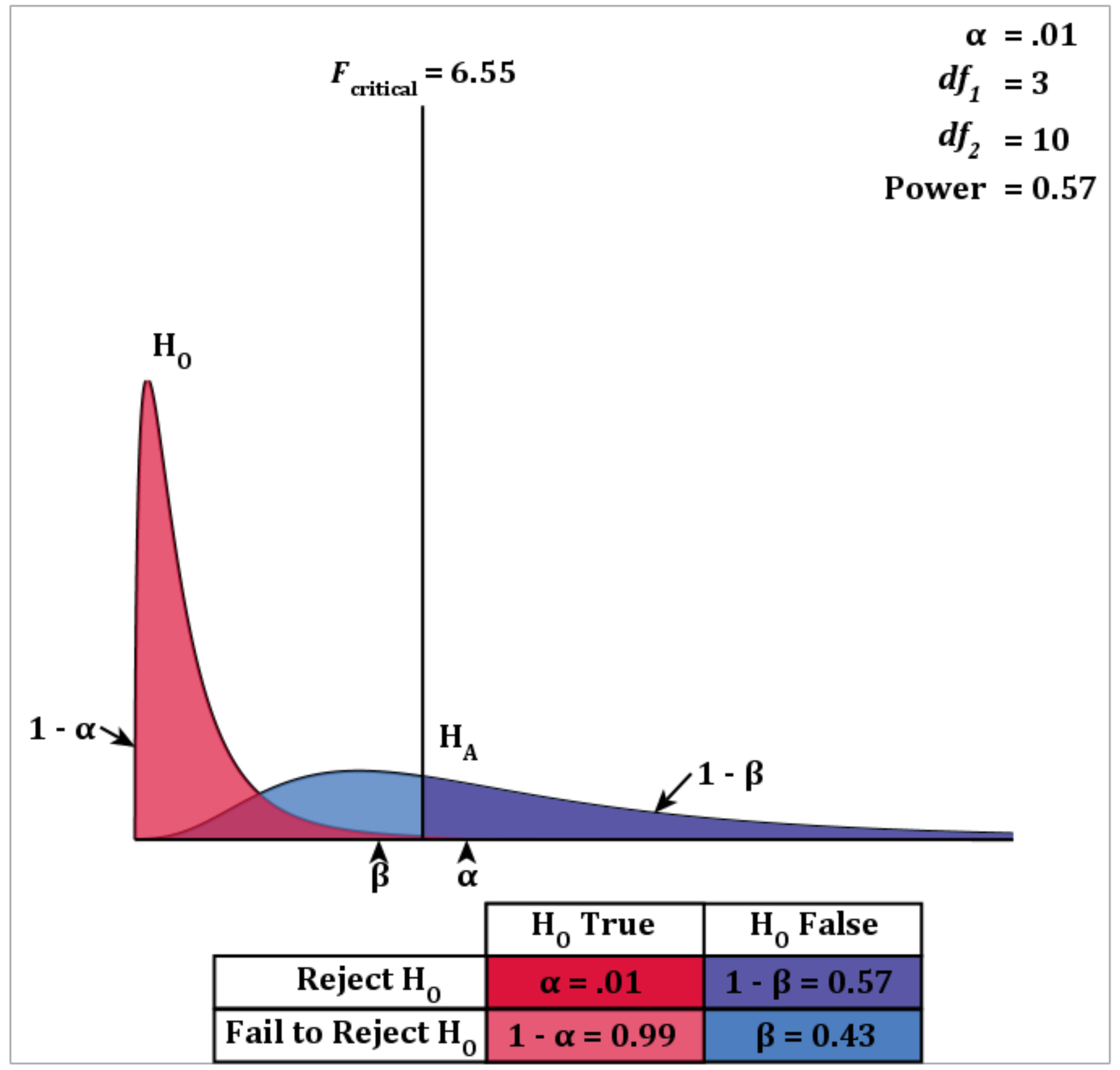


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