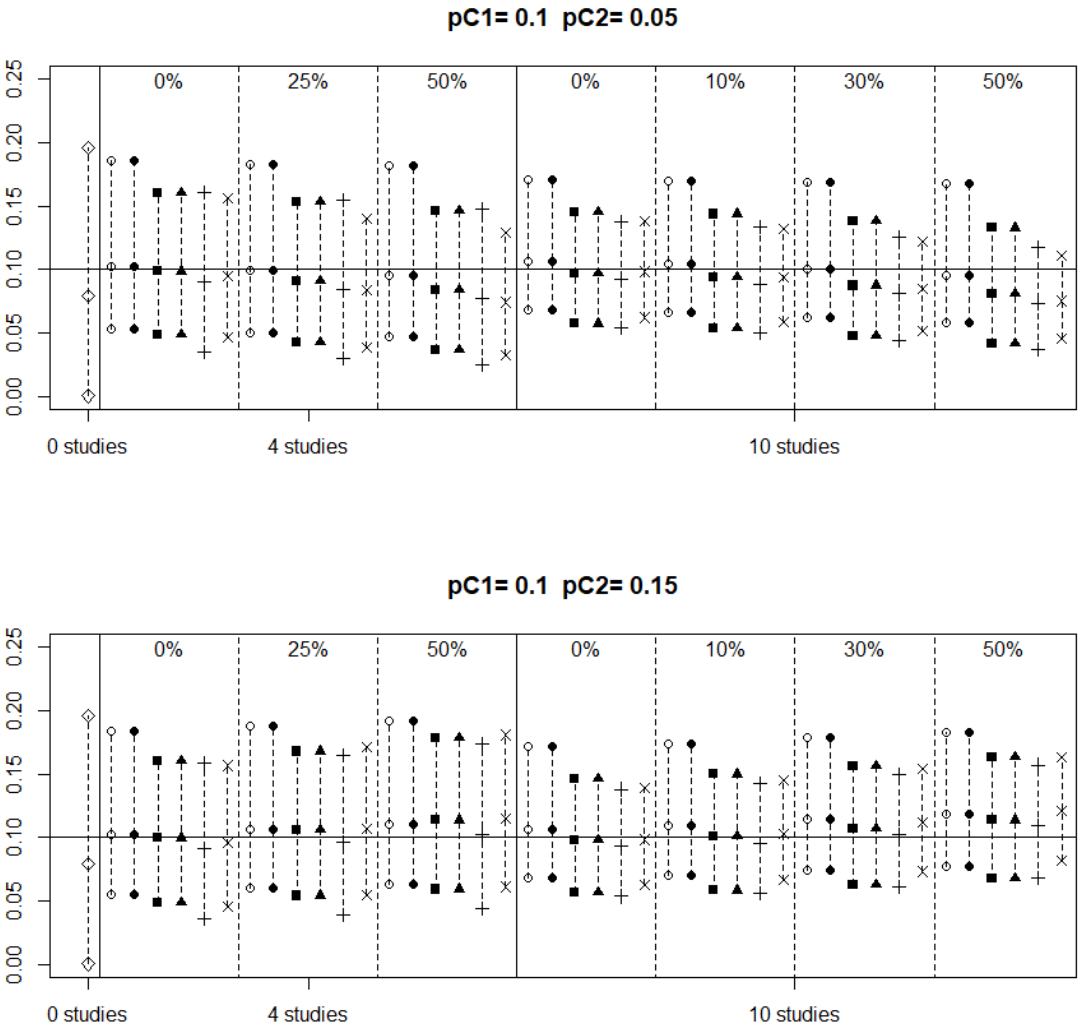

Figure S1. The posterior estimates (median, 2.5th percentile, and 97.5th percentile) of the response rate control parameter p_C, under Scenario 2 with nominal power 0.5. The percentage denotes the proportion of heterogeneous historical trials. The number of trials on the horizontal axis shows the number of historical trials. The diamonds, circles, black circles, black squares, black triangles, plus signs, and crosses denote the results of the Beta-binomial analysis, of the MAC approach, the MAP [Normal and Beta-binomial $(\lambda_0 = 100, 10)$] approach, the MJPP approach, and the MMPP approach, respectively.

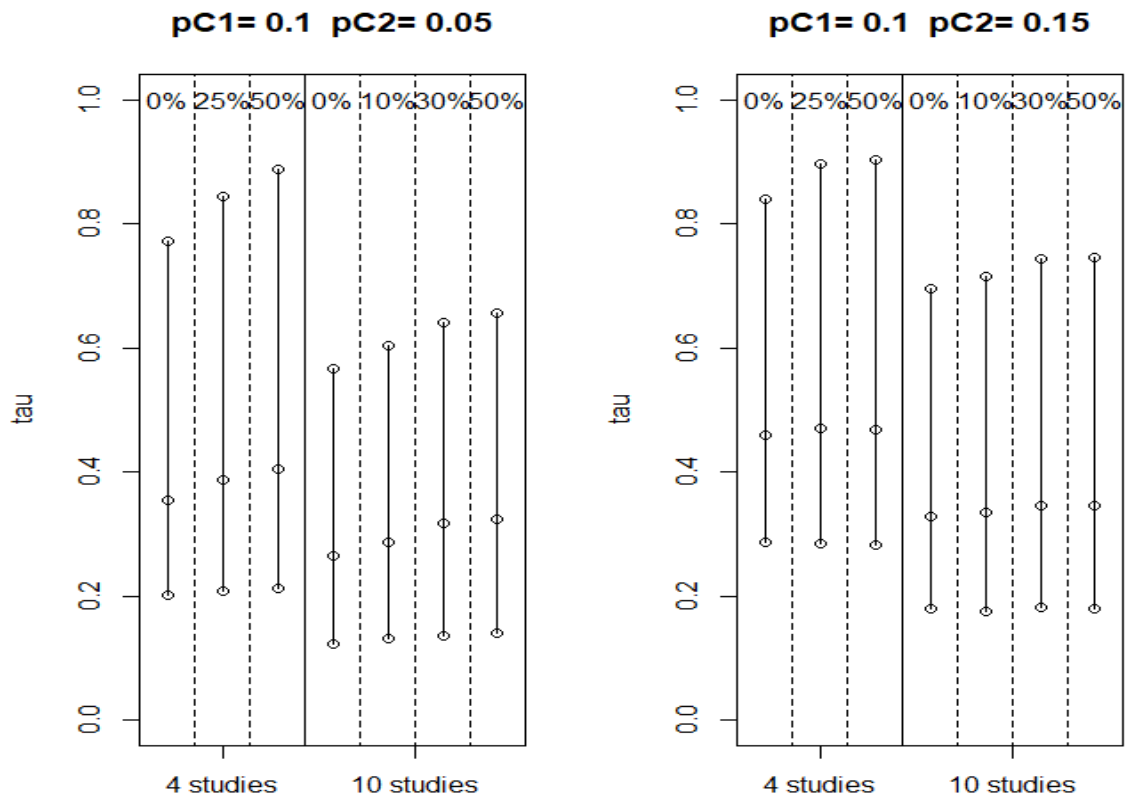

Figure S2. The posterior estimates (median, 2.5th percentile, 97.5th percentile) of the between-study SD parameter τ, in the MAC approach under Scenario 2 with nominal power of 0.5. The percentage denotes the proportion of heterogeneous historical trials.

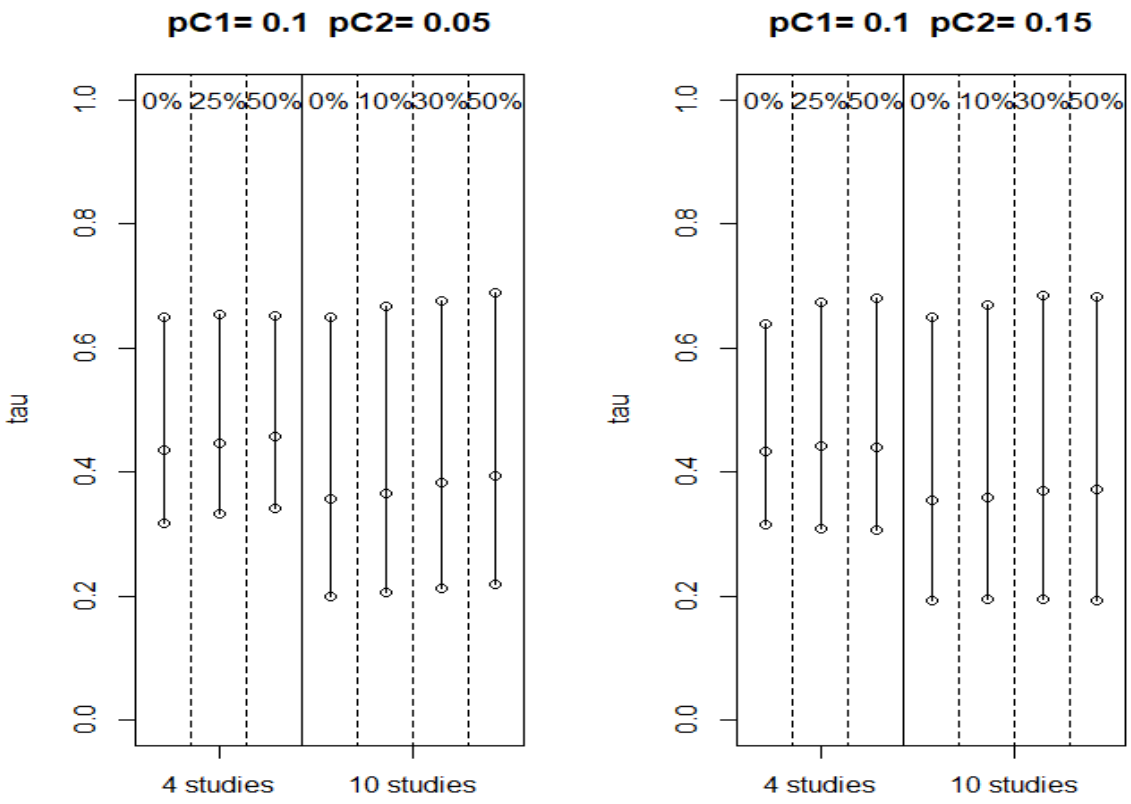

Figure S3. The posterior estimates (median, 2.5th percentile, 97.5th percentile) of the between-study SD parameter τ, in the MAP (Normal) approach under Scenario 2 with nominal power of 0.5. The percentage denotes the proportion of heterogeneous historical trials.

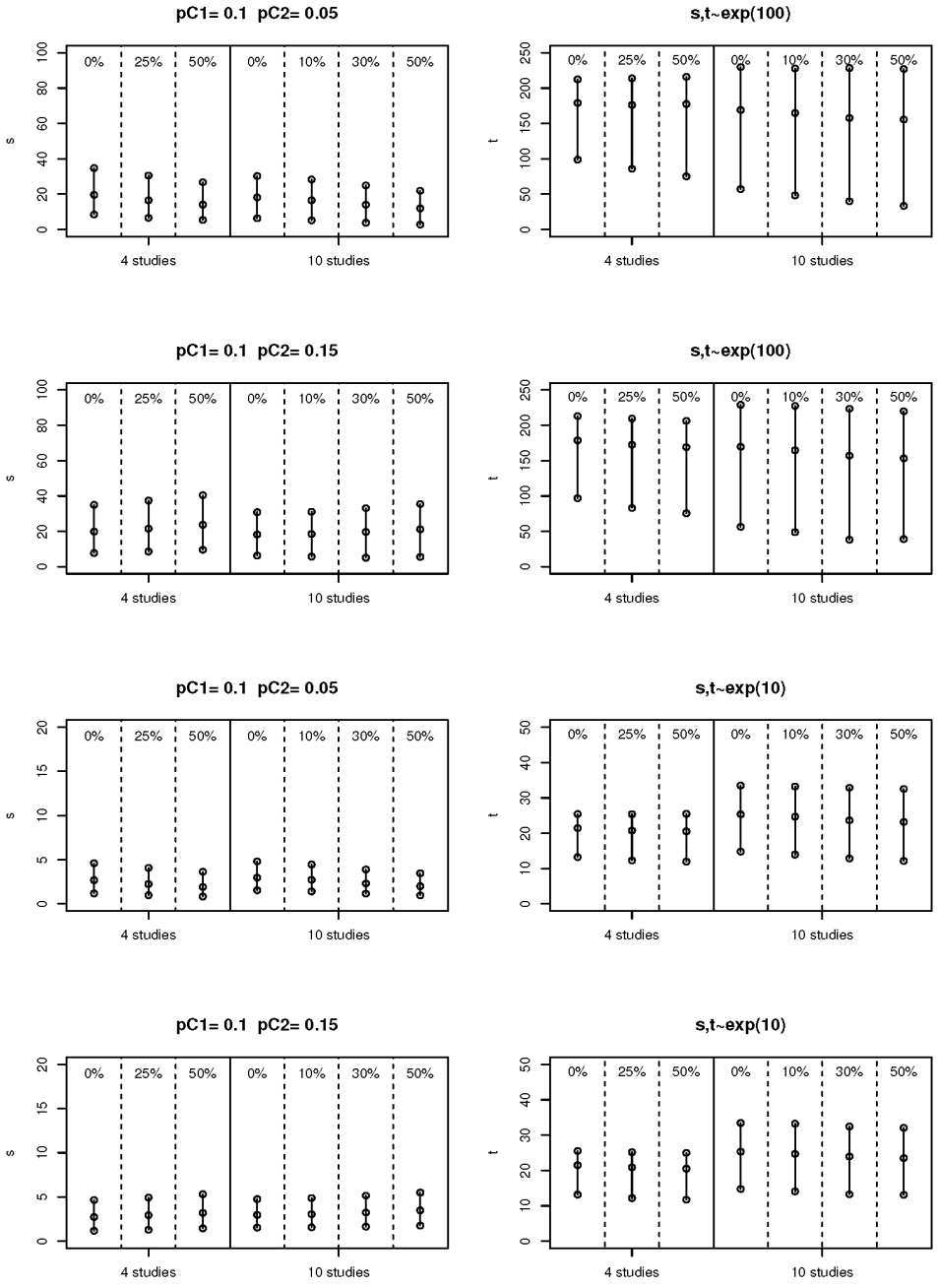

Figure S4. The posterior estimates (median, 2.5th percentile, and 97.5th percentile) of shape parameters s and t in the MAP (Beta-binomial) approach under Scenario 2 with nominal power of 0.5. The percentage shows the proportion of heterogeneous historical trials.

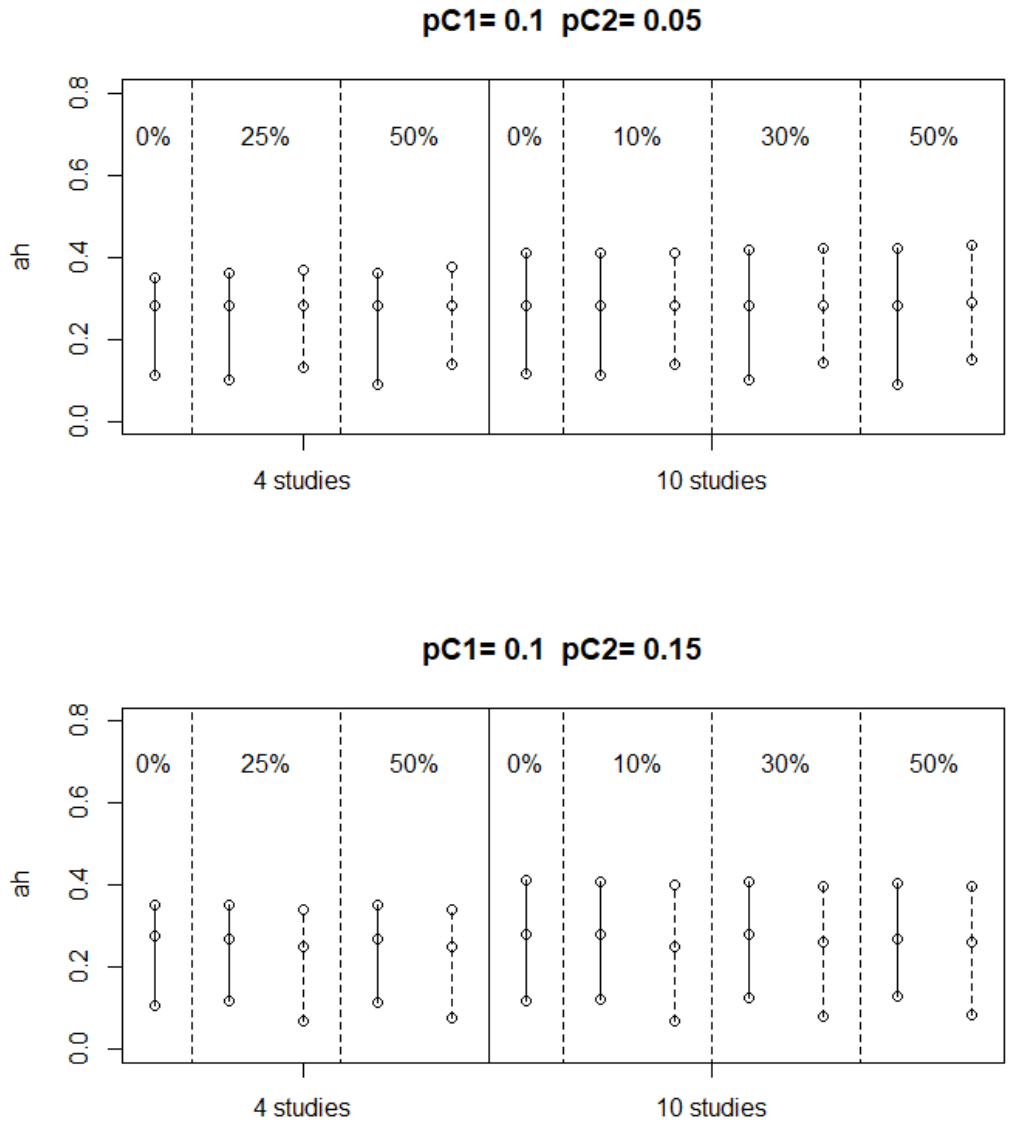

Figure S5. The means of the posterior estimates (median, 2.5th percentile, and 97.5th percentile) of the power parameter a_h, in homogeneous or heterogeneous historical trials according to the MJPP approach under Scenario 2 with nominal power of 0.5. The percentage represents the proportion of heterogeneous historical trials. The solid and dotted lines show the results of homogeneous and heterogeneous trials, respectively.

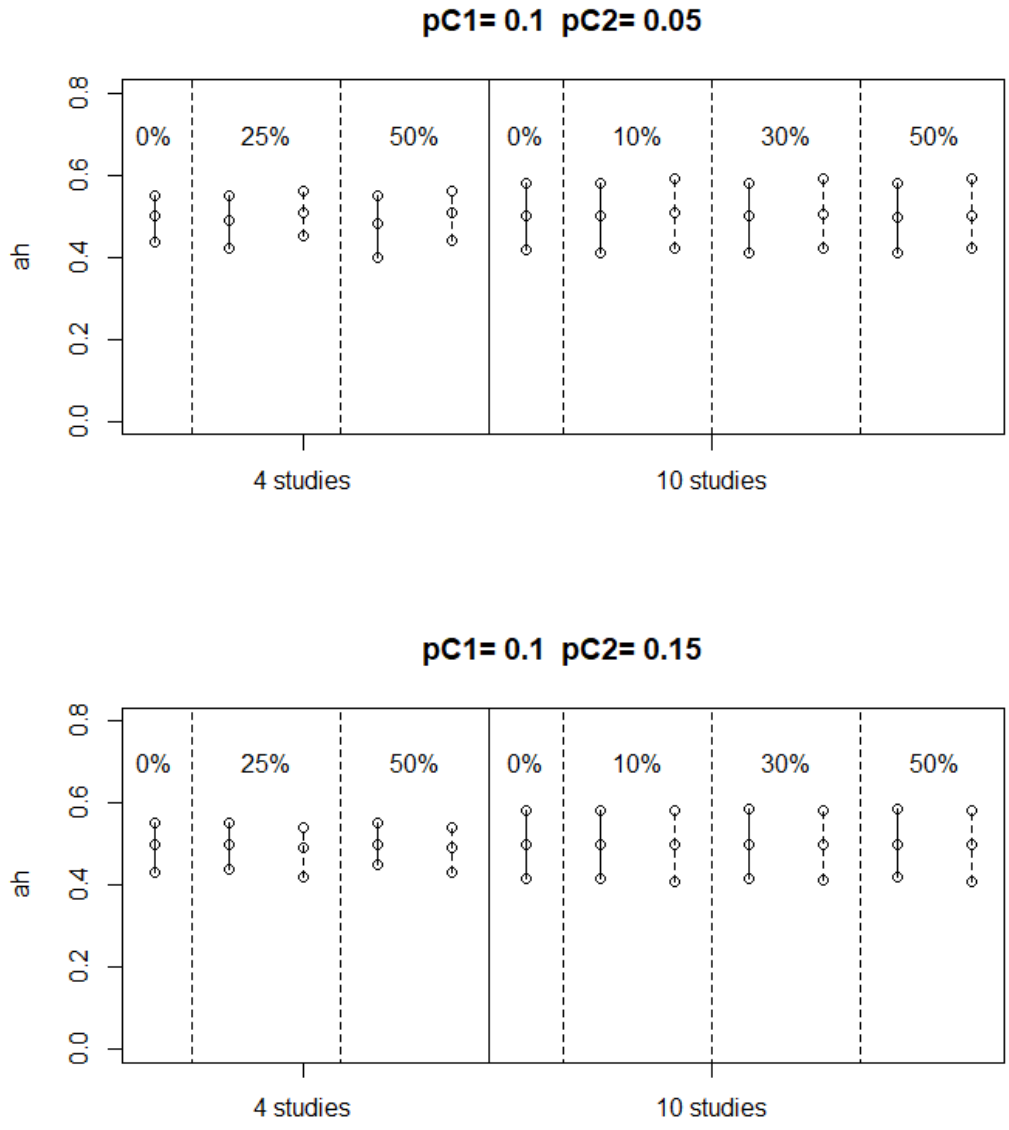

Figure S6. The means of the posterior estimates (median, 2.5th percentile, and 97.5th percentile) of the power parameter a_h, in homogeneous or heterogeneous historical trials according to the MMPP approach under Scenario 2 with nominal power of 0.5. The percentage represents the proportion of heterogeneous historical trials. The solid and dotted lines show the results of homogeneous and heterogeneous trials, respectively.

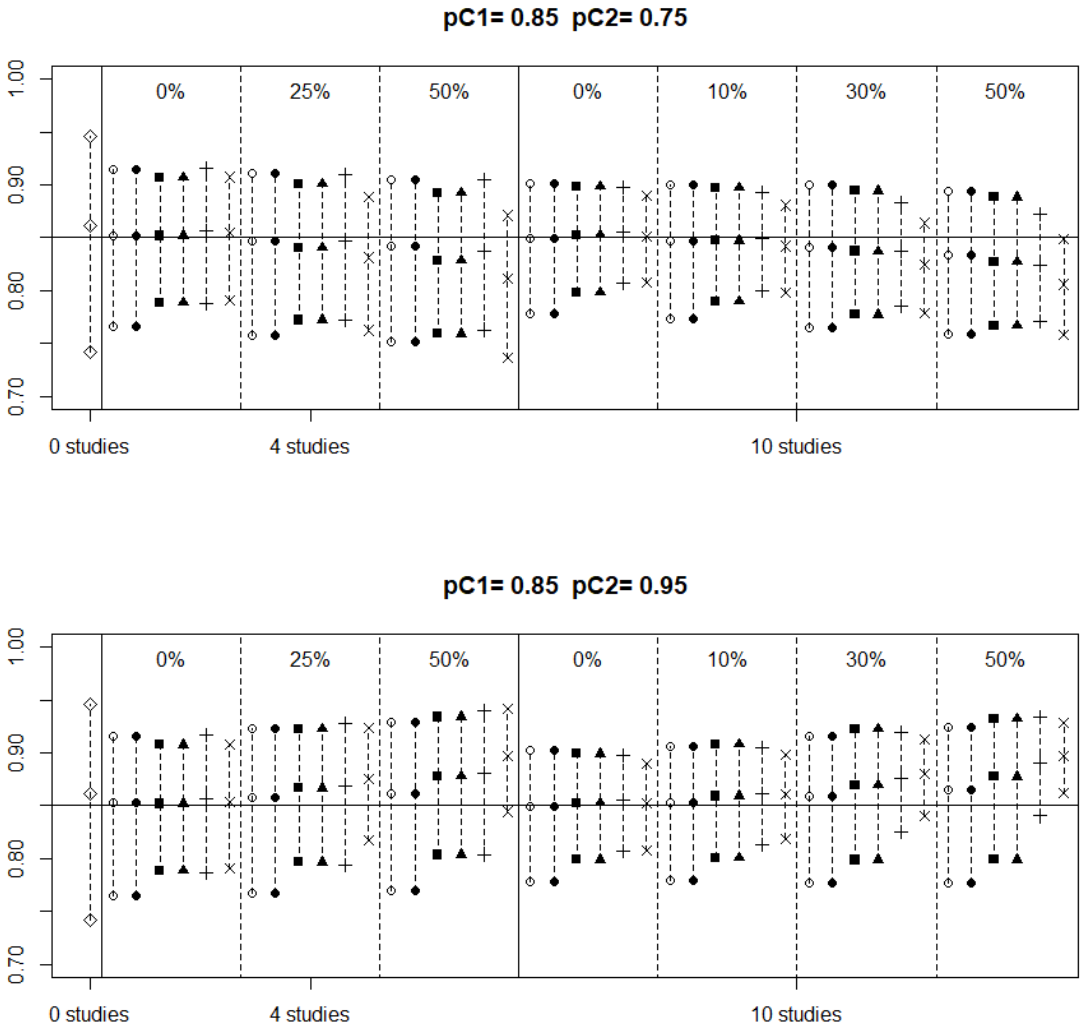

Figure S7. The posterior estimates (median, 2.5th percentile, and 97.5th percentile) of the response rate control parameter, p_C, under Scenario 3 with nominal power 0.5. The percentage denotes the proportion of heterogeneous historical trials. The diamonds, circles, black circles, black squares, black triangles, plus signs, and crosses denote the results of the Beta-binominal analysis, of the MAC approach, the MAP [Normal and Beta-binomial ($\lambda_0 = 100, 10$)] approach, the MJPP approach, and the MMPP approach, respectively.

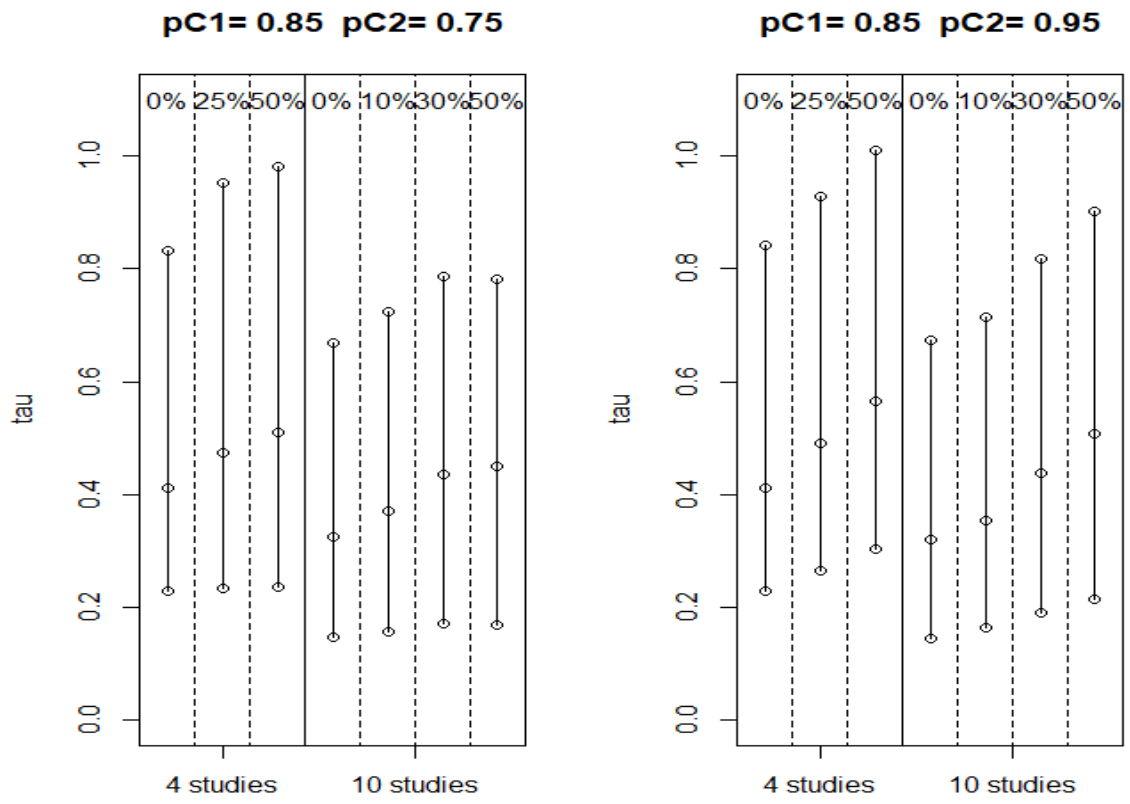

Figure S8. The posterior estimates (median, 2.5th percentile, 97.5th percentile) of the between-study SD parameter τ, in the MAC approach under Scenario 3 with nominal power of 0.5. The percentage denotes the proportion of heterogeneous historical trials.

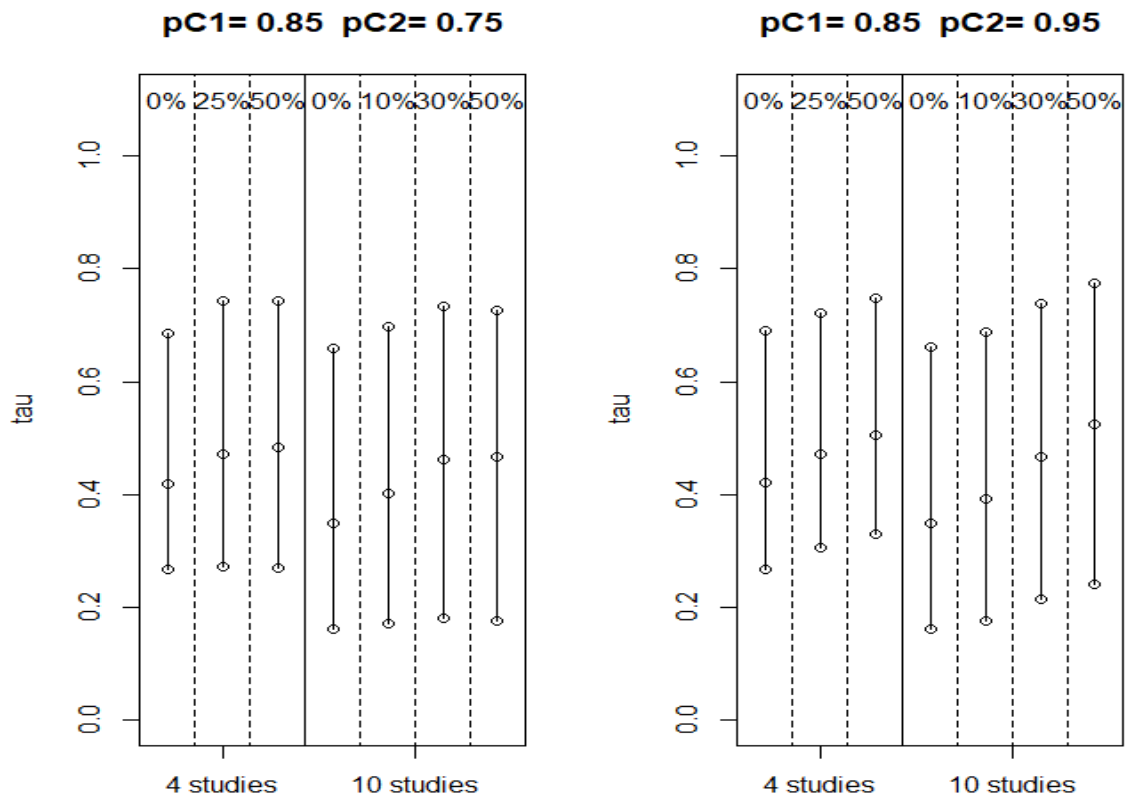

Figure S9. The posterior estimates (median, 2.5th percentile, 97.5th percentile) of the between-study SD parameter τ, in the MAP (Normal) approach under Scenario 3 with nominal power of 0.5. The percentage denotes the proportion of heterogeneous historical trials.

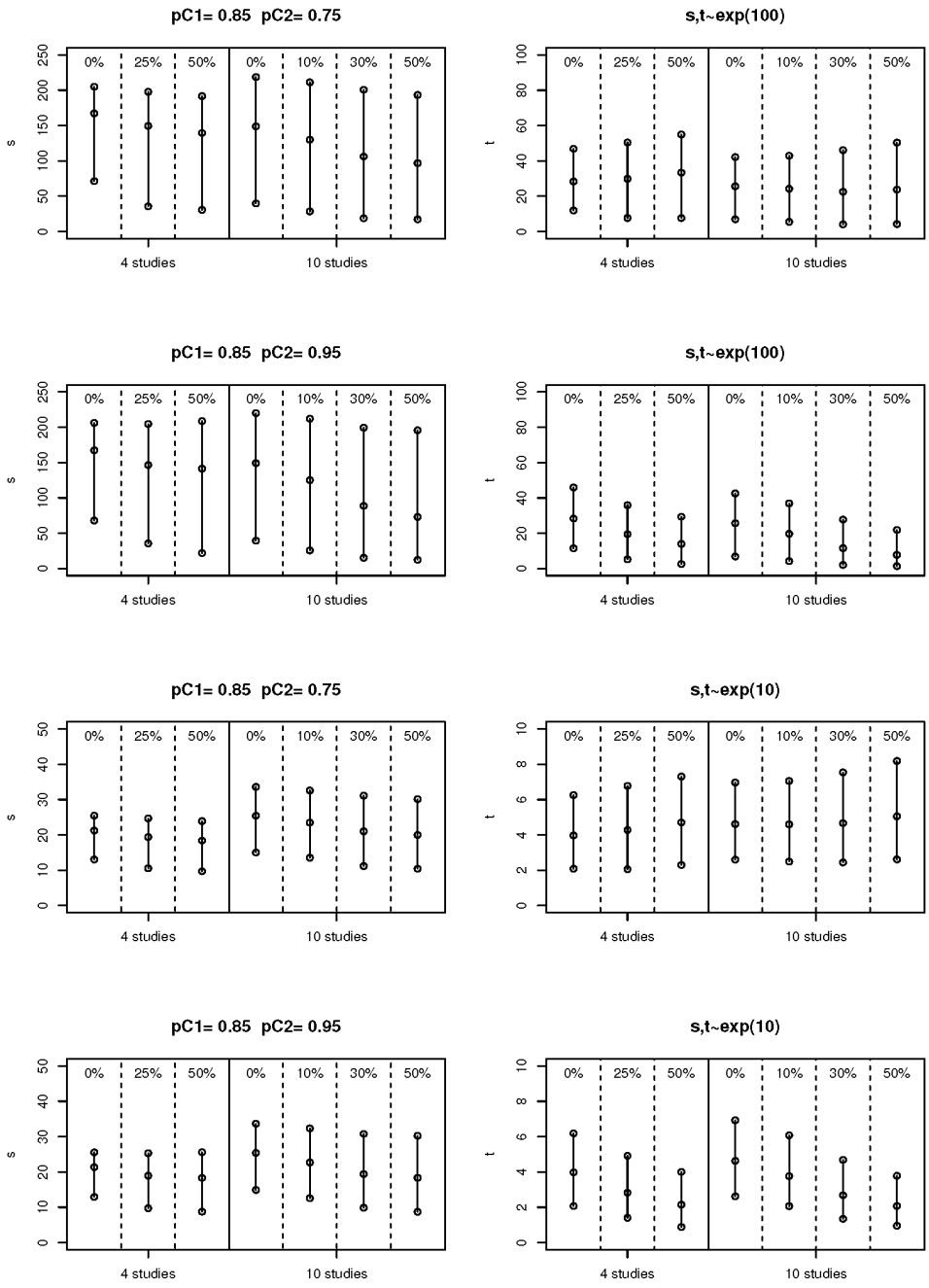

Figure S10. The posterior estimates (median, 2.5th percentile, and 97.5th percentile) of shape parameters s and t in the MAP (Beta-binomial) approach under Scenario 3 with nominal power of 0.5. The percentage shows the proportion of heterogeneous historical trials.

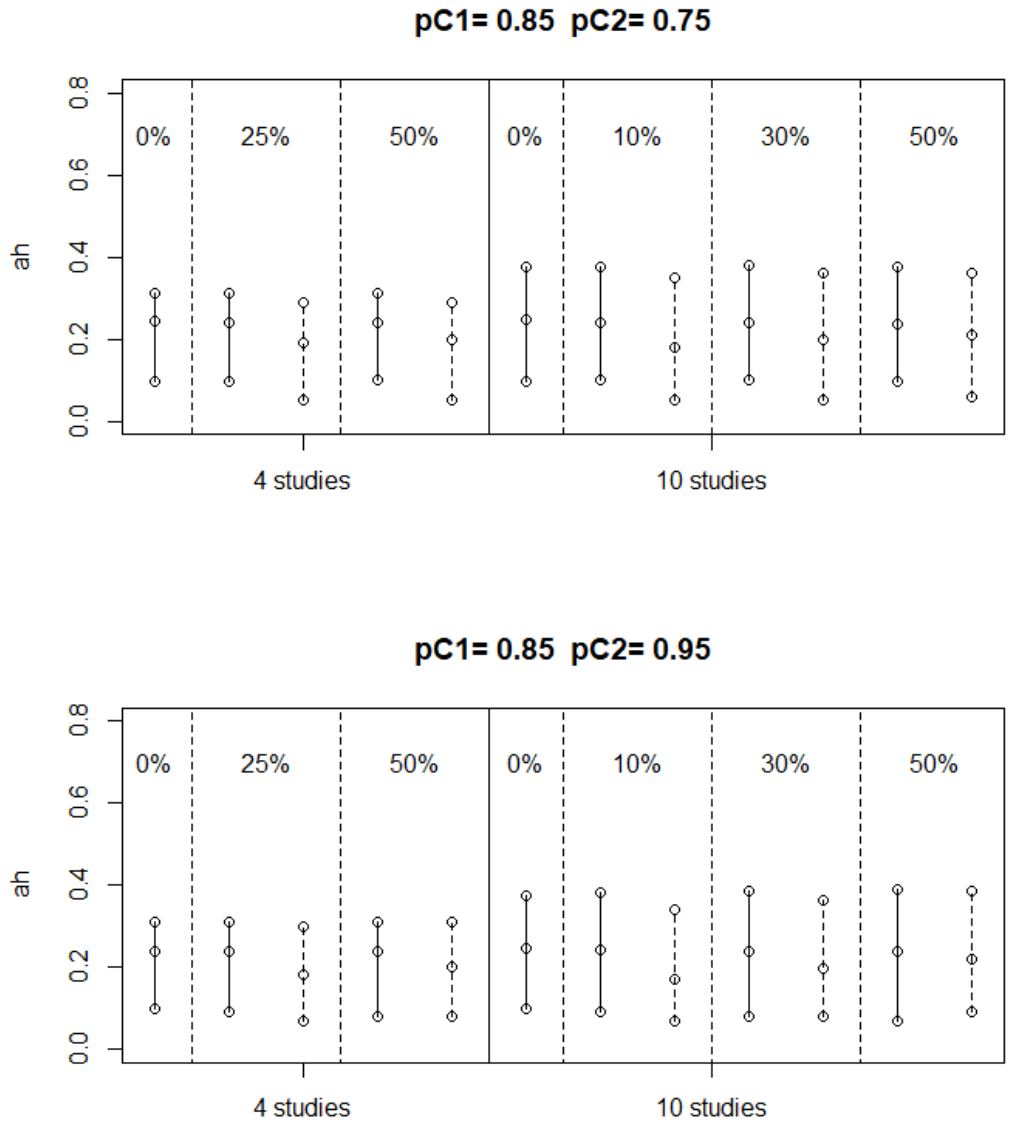

Figure S11. The means of posterior estimates (median, 2.5th percentile, and 97.5th percentile) of the power parameter a_h, in homogeneous or heterogeneous historical trials according to the MJPP approach under Scenario 3 with nominal power of 0.5. The percentage represents the proportion of heterogeneous historical trials. The solid and dotted lines show the results of homogeneous and heterogeneous trials, respectively.

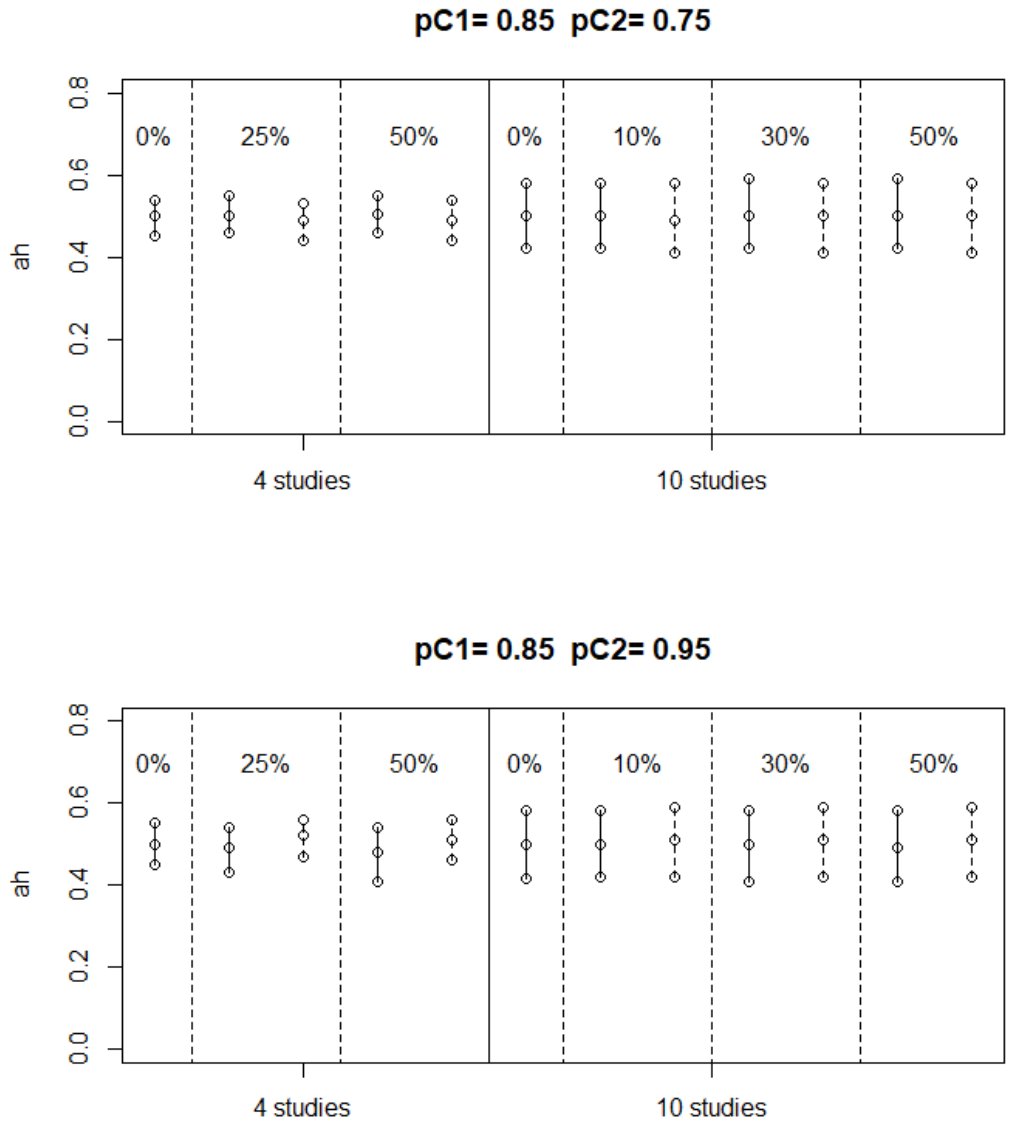

Figure S12. The means of posterior estimates (median, 2.5th percentile, and 97.5th percentile) of the power parameter a_h, in homogeneous or heterogeneous historical trials according to the MMPP approach under Scenario 3 with nominal power of 0.5. The percentage represents the proportion of heterogeneous historical trials. The solid and dotted lines show the results of homogeneous and heterogeneous trials, respectively.