I have a question about the settings for a one-sided Bayesian 2 x 2 chi-square test.

In an Experiment, participants took part in two performance tests. The outcome is accurate (1) or inaccurate (0). In these performance tests, participants’ perspective at encoding and test was either matching (1) or mismatching (0). We hypothesized that accuracy would be higher under the matching than the mismatching condition. Thus, my alternative hypothesis is that group 1 < group 2.

I am unsure which "Bayes Factor" settings to choose, because my findings suggest a different interpretation in the classical chi-square test than the Bayesian chi-square test.

These are the results of the two classical chi-square tests for the two performance tests:

**PerformanceTest 1**

| **Contingency Tables** | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | | **Perspective** | | | |  | |
| **Accuracy** | | **Mismatch** | | **Match** | | **Total** | |
| Inaccurate |  | 27 |  | 14 |  | 41 |  |
| Accurate |  | 51 |  | 64 |  | 115 |  |
| Total |  | 78 |  | 78 |  | 156 |  |
|  | | | | | | | |

| **Chi-Squared Tests** | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | | **Value** | | **df** | | **p** | |
| Χ² |  | 5.592 |  | 1 |  | 0.018 |  |
| N |  | 156 |  |  |  |  |  |
|  | | | | | | | |

**Performance Test 2**

| **Contingency Tables** | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | | **Perspective** | | | |  | |
| **Accuracy** | | **Mismatch** | | **Match** | | **Total** | |
| Inaccurate |  | 38 |  | 30 |  | 68 |  |
| Accurate |  | 40 |  | 48 |  | 88 |  |
| Total |  | 78 |  | 78 |  | 156 |  |
|  | | | | | | | |

| **Chi-Squared Tests** | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | | **Value** | | **df** | | **p** | |
| Χ² |  | 1.668 |  | 1 |  | 0.196 |  |
| N |  | 156 |  |  |  |  |  |
|  | | | | | | | |

The results show a statistically significant result for performance test 1, but not for performance test 2.

Now I conduced the Bayesian chi-square test with group 1 < group 2 and BF01. These are Bayes Factors:

**PerformanceTest 1**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | **Bayesian Contingency Tables Tests (BF01)** | | | | | --- | --- | --- | --- | |  | | **Value** | | | BF₀₋ Independent multinomial |  | 18.233 |  | | N |  | 156 |  | |  | | | | | *Note.*  For all tests, the alternative hypothesis specifies that group *Mismatch* is less than *Match* . | | | |   **Performance Test 2** | | | |
| **Bayesian Contingency Tables Tests (BF01)** | | | |
|  | | **Value** | |
| BF₀₋ Independent multinomial |  | 11.102 |  |
| N |  | 156 |  |
|  | | | |
| *Note.*  For all tests, the alternative hypothesis specifies that group *Mismatch* is less than *Match* . | | | |

For both performance tests, the Bayes Factor suggests that there is strong evidence for the null hypothesis – but that this evidence is even stronger evidence for performance test 1 than performance test 2. This confuses me because the classical chi-square test showed a smaller p-value and larger effect size for performance test 1 than performance test 2. This is what makes me wonder if any of my settings are incorrect.

Thanks a lot in advance!