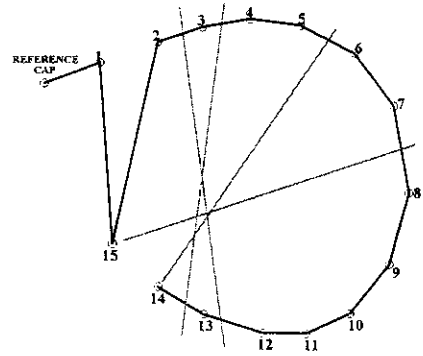
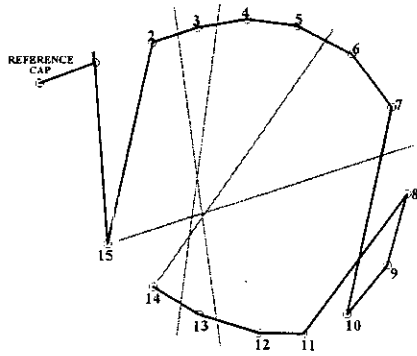
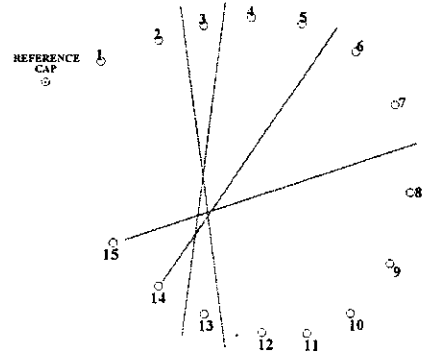
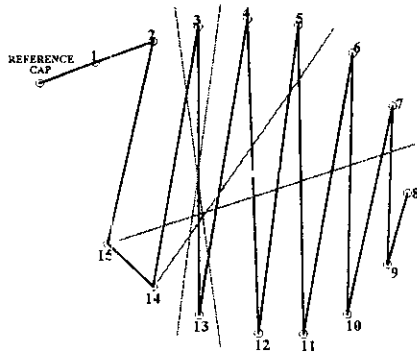


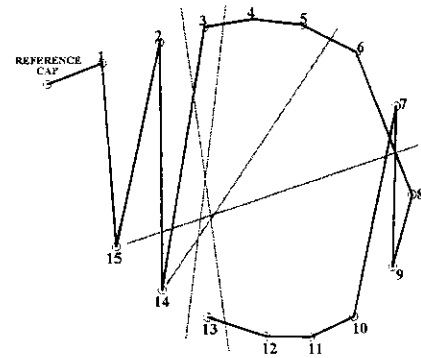
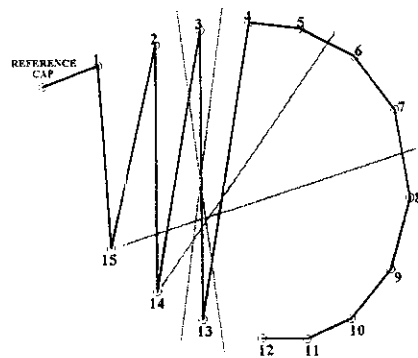
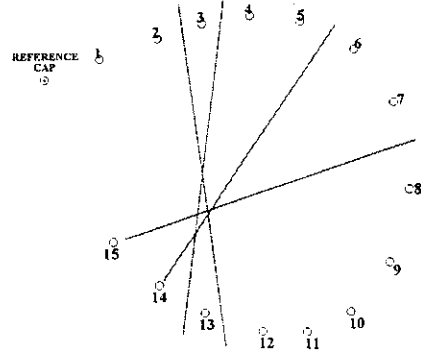
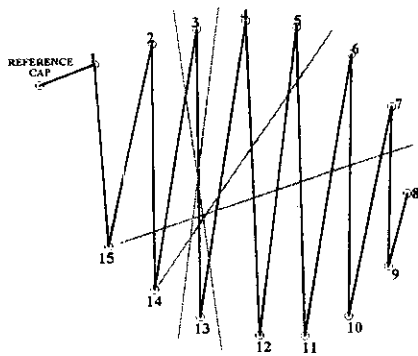
S.W.

第2色弱



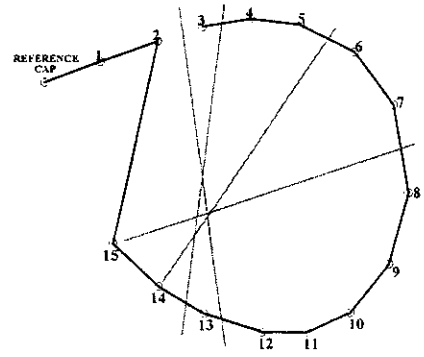
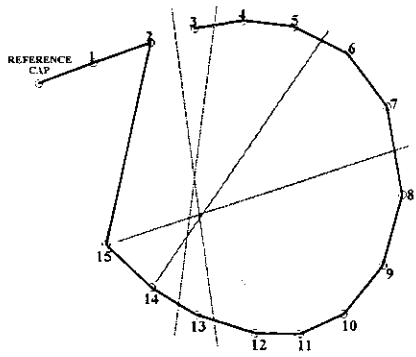
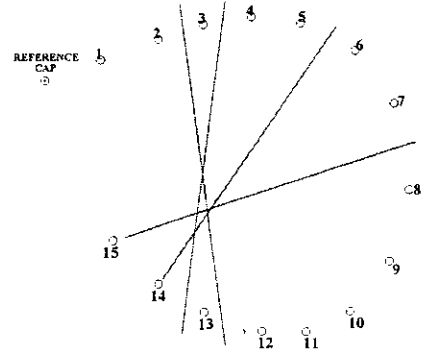
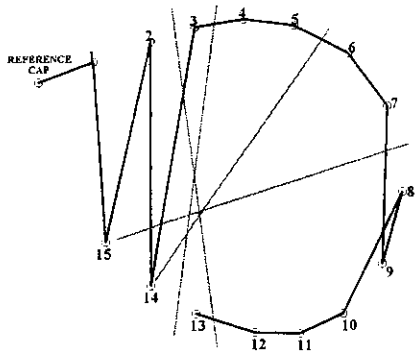
M.S.

第2色弱



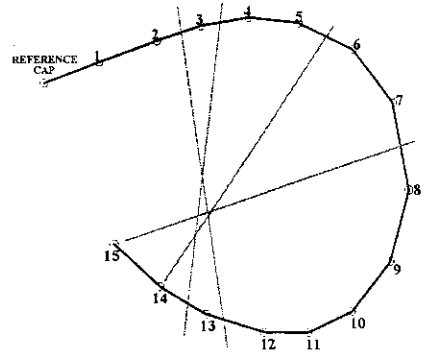
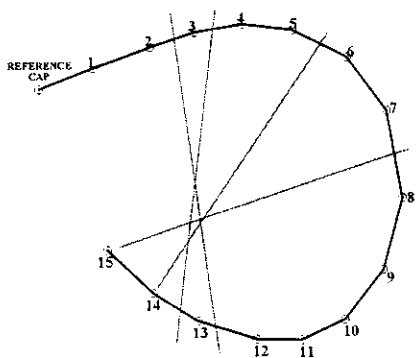
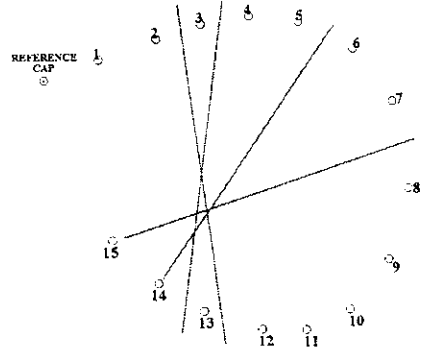
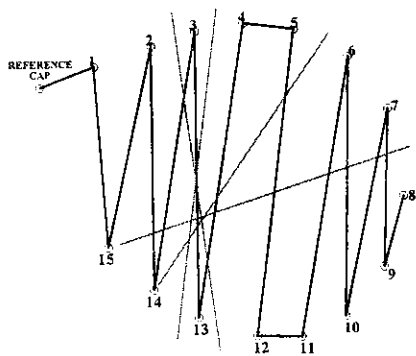
M.O.

第2色弱



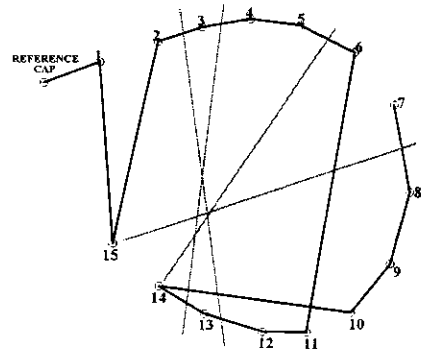
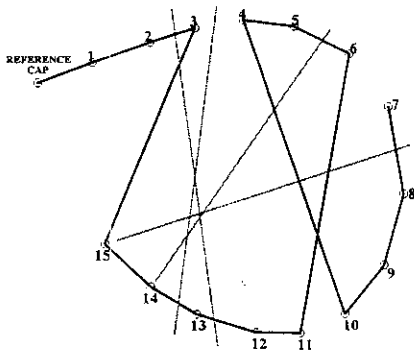
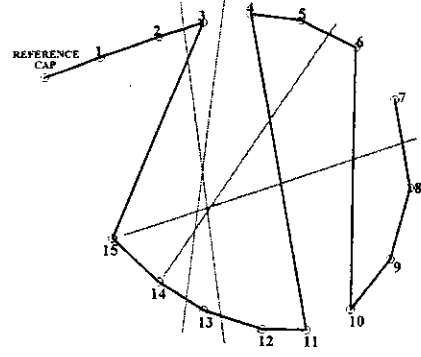
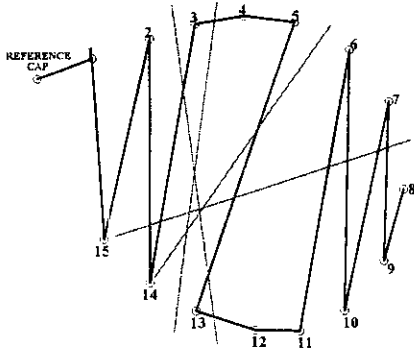
M.H.

第2色弱



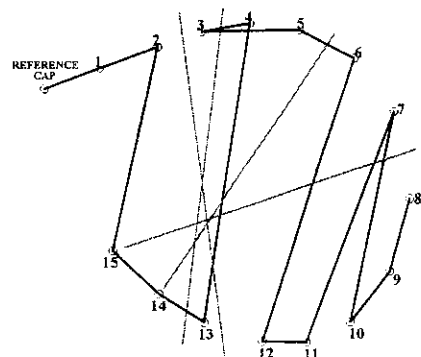
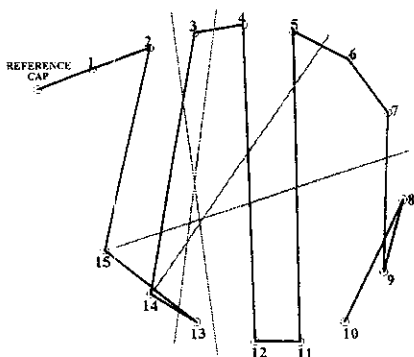
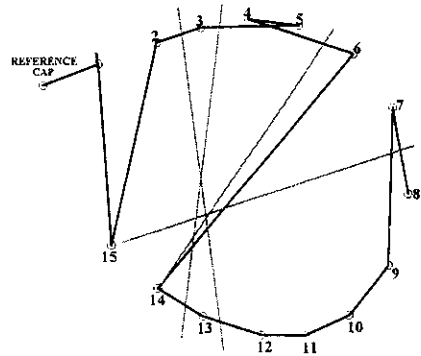
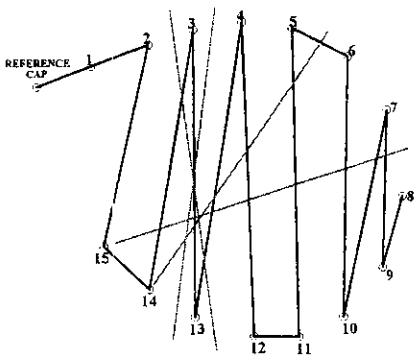
M.K.

第2色弱



Y.W.

第2色弱

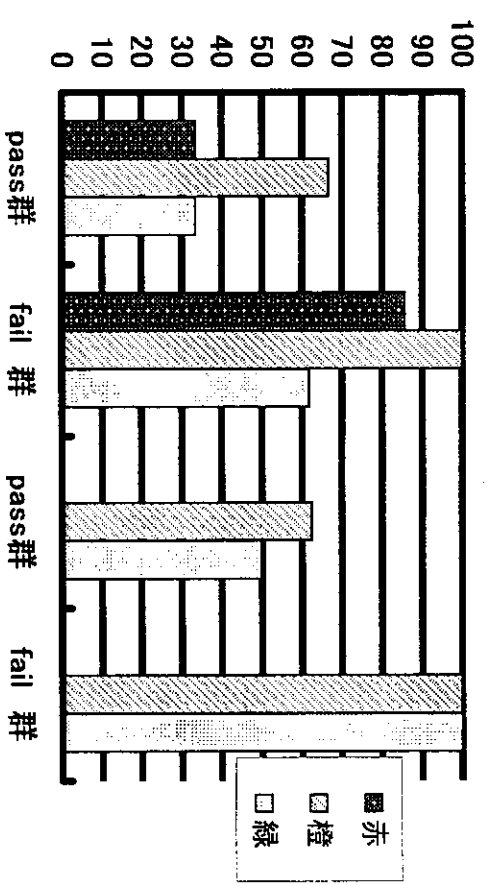


先天色覚異常者におけるLED電光掲示板色光の誤答率

| CASE | TYPE | 橙 正解 | 橙 黄 | 橙 赤 | 橙 緑 | 橙 ? | 橙 正解 | 橙 黄 | 橙 緑 | 橙 ? | 橙 正解 | 橙 赤 | 橙 緑 | 橙 ? | 橙 正解 | 橙 赤 | 橙 緑 | 橙 ? | |
|------|-------|---------|--------|--------|--------|--------|---------|--------|--------|--------|---------|--------|--------|--------|---------|--------|--------|--------|------|
| NK | D | 4 | 1 | 1 | 3 | 1 | 6 | 5 | 6 | 1 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| TT | D | 5 | 1 | 1 | 3 | 1 | 6 | 6 | 6 | 1 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| TF | D | 5 | 1 | 1 | 3 | 1 | 6 | 6 | 6 | 1 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| TN | D | 5 | 1 | 1 | 3 | 1 | 6 | 6 | 6 | 1 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| TT | D | 5 | 1 | 1 | 3 | 1 | 6 | 6 | 6 | 1 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| YO | D | 5 | 1 | 1 | 3 | 1 | 6 | 6 | 6 | 1 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| YT | D | 5 | 1 | 1 | 3 | 1 | 6 | 6 | 6 | 1 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| YY | D | 1 | 3 | 3 | 1 | 1 | 3 | 3 | 1 | 2 | 5 | 3 | 3 | 2 | 5 | 3 | 3 | 2 | 2 |
| NM | DA f | 1 | 4 | 4 | 1 | 1 | 6 | 6 | 6 | 1 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| SM | EDA f | 3 | 2 | 2 | 5 | 5 | 6 | 6 | 6 | 5 | 3 | 3 | 3 | 3 | 5 | 3 | 3 | 3 | 2 |
| MS | EDA f | 5 | 5 | 5 | 5 | 5 | 6 | 6 | 6 | 5 | 3 | 3 | 3 | 3 | 5 | 3 | 3 | 3 | 2 |
| KI | D | 5 | 5 | 5 | 5 | 5 | 6 | 6 | 6 | 5 | 3 | 3 | 3 | 3 | 5 | 3 | 3 | 3 | 2 |
| TF | D | 5 | 5 | 5 | 5 | 5 | 6 | 6 | 6 | 5 | 3 | 3 | 3 | 3 | 5 | 3 | 3 | 3 | 2 |
| ② | D | 5 | 5 | 5 | 5 | 5 | 6 | 6 | 6 | 5 | 3 | 3 | 3 | 3 | 5 | 3 | 3 | 3 | 2 |
| ④ | DA f | 4 | 2 | 2 | 1 | 3 | 6 | 6 | 6 | 4 | 5 | 3 | 3 | 3 | 5 | 3 | 3 | 3 | 2 |
| ⑤ | DA f | 5 | 2 | 2 | 3 | 3 | 6 | 6 | 6 | 5 | 3 | 3 | 3 | 3 | 5 | 3 | 3 | 3 | 2 |
| AH | DA f | 5 | 2 | 2 | 3 | 3 | 6 | 6 | 6 | 5 | 3 | 3 | 3 | 3 | 5 | 3 | 3 | 3 | 2 |
| KH | DA f | 5 | 2 | 2 | 3 | 3 | 6 | 6 | 6 | 5 | 3 | 3 | 3 | 3 | 5 | 3 | 3 | 3 | 2 |
| MK | DA f | 5 | 2 | 2 | 3 | 3 | 6 | 6 | 6 | 5 | 3 | 3 | 3 | 3 | 5 | 3 | 3 | 3 | 2 |
| TI | DA f | 5 | 2 | 2 | 3 | 3 | 6 | 6 | 6 | 5 | 3 | 3 | 3 | 3 | 5 | 3 | 3 | 3 | 2 |
| KK | DA f | 5 | 2 | 2 | 3 | 3 | 6 | 6 | 6 | 5 | 3 | 3 | 3 | 3 | 5 | 3 | 3 | 3 | 2 |
| DF計 | | 23 | 72 | 9 | 8.6% | 1 | 50 | 27 | 41 | 6 | 2 | 71 | 8 | 5 | 19 | 7 | 19 | 4 | 0.0% |
| | | 21.9% | 68.6% | 8.6% | 0.0% | 1.0% | 39.7% | 21.4% | 32.5% | 4.8% | 1.6% | 67.6% | 7.6% | 6.7% | 18.1% | 7.7% | 18.1% | 0.0% | |
| TO | DA P | 5 | 3 | 2 | 2 | 1 | 6 | 5 | 4 | 6 | 2 | 5 | 8 | 5 | 7 | 8 | 7 | 4 | 0.0% |
| MT | DA P | 5 | 3 | 2 | 2 | 1 | 6 | 5 | 4 | 6 | 2 | 5 | 8 | 5 | 7 | 8 | 7 | 4 | 0.0% |
| HK | DA P | 5 | 3 | 2 | 2 | 1 | 6 | 5 | 4 | 6 | 2 | 5 | 8 | 5 | 7 | 8 | 7 | 4 | 0.0% |
| KM | DA P | 5 | 3 | 2 | 2 | 1 | 6 | 5 | 4 | 6 | 2 | 5 | 8 | 5 | 7 | 8 | 7 | 4 | 0.0% |
| TE | DA P | 5 | 3 | 2 | 2 | 1 | 6 | 5 | 4 | 6 | 2 | 5 | 8 | 5 | 7 | 8 | 7 | 4 | 0.0% |
| YA | DA P | 5 | 3 | 2 | 2 | 1 | 6 | 5 | 4 | 6 | 2 | 5 | 8 | 5 | 7 | 8 | 7 | 4 | 0.0% |
| KT | DA P | 5 | 3 | 2 | 2 | 1 | 6 | 5 | 4 | 6 | 2 | 5 | 8 | 5 | 7 | 8 | 7 | 4 | 0.0% |
| YN | DA P | 5 | 3 | 2 | 2 | 1 | 6 | 5 | 4 | 6 | 2 | 5 | 8 | 5 | 7 | 8 | 7 | 4 | 0.0% |
| MO | DA P | 5 | 3 | 2 | 2 | 1 | 6 | 5 | 4 | 6 | 2 | 5 | 8 | 5 | 7 | 8 | 7 | 4 | 0.0% |
| ① | DA P | 2 | 2 | 1 | 3 | 1 | 6 | 6 | 3 | 3 | 3 | 4 | 3 | 3 | 4 | 3 | 3 | 2 | 0.0% |
| ② | DA P | 2 | 2 | 1 | 3 | 1 | 6 | 6 | 3 | 3 | 3 | 4 | 3 | 3 | 4 | 3 | 3 | 2 | 0.0% |
| ③ | DA P | 1 | 1 | 1 | 3 | 1 | 6 | 6 | 3 | 3 | 3 | 4 | 3 | 3 | 4 | 3 | 3 | 2 | 0.0% |
| ⑤ | DA P | 23 | 26 | 11 | 18.3% | 0.0% | 72 | 26 | 43 | 6 | 0.0% | 53 | 2 | 1 | 4 | 2 | 4 | 0.0% | |
| D計 | | 38.3% | 43.3% | 18.3% | 0.0% | 0.0% | 100.0% | 0.0% | 0.0% | 0.0% | 0.0% | 88.3% | 3.3% | 1.7% | 6.7% | 3.3% | 6.7% | 0.0% | |

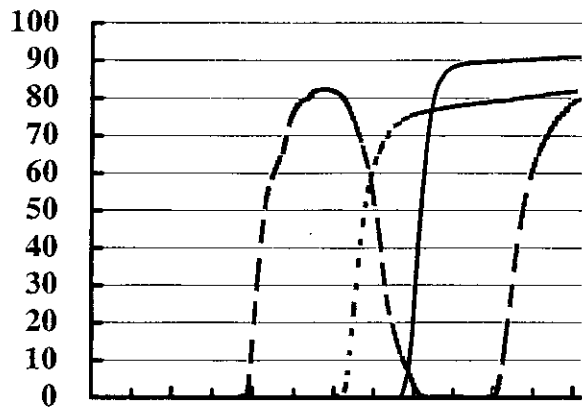
| 群 | 赤 | | 橙 | | 緑 | |
|-----------|-------|-------|-------|-------|-------|-------|
| | 正答(人) | 誤答(人) | 正答(人) | 誤答(人) | 正答(人) | 誤答(人) |
| 第2異常pass群 | 8 | 4 | 4 | 8 | 8 | 4 |
| fail群 | 3 | 18 | 0 | 21 | 8 | 13 |
| 誤答率(%) | 33 | 86 | 100 | 100 | 33 | 62 |
| 第1異常pass群 | 8 | 0 | 3 | 5 | 4 | 4 |
| fail群 | 10 | 0 | 0 | 10 | 10 | 10 |
| 誤答率(%) | 0 | 0 | 63 | 100 | 100 | 50 |

| 群 | 赤 | | 橙 | | 緑 | |
|--------|-------|-------|-------|-------|-------|-------|
| | 正答(人) | 誤答(人) | 正答(人) | 誤答(人) | 正答(人) | 誤答(人) |
| pass群 | 33 | 66 | 33 | 66 | 33 | 66 |
| fail群 | 85 | 71 | 42 | 86 | 100 | 61 |
| 誤答率(%) | 33 | 66 | 67 | 90 | 100 | 76 |
| pass群 | 0 | 0 | 62 | 5 | 50 | 5 |
| fail群 | 0 | 100 | 100 | 100 | 100 | 100 |
| 誤答率(%) | 0 | 100 | 100 | 100 | 100 | 100 |



研究に使用した電球式道路交通信号灯の色フィルターの分光透過率

| 波長 | 赤色 | 黄色 | 緑色 |
|-----|-------|-------|-------|
| 200 | 0 | 0 | 0 |
| 210 | 0 | 0 | 0 |
| 220 | 0 | 0 | 0 |
| 230 | 0 | 0 | 0 |
| 240 | 0 | 0 | 0 |
| 250 | 0 | 0 | 0 |
| 260 | 0 | 0 | 0 |
| 270 | 0 | 0 | 0 |
| 280 | 0 | 0 | 0 |
| 290 | 0 | 0 | 0 |
| 300 | 0 | 0 | 0 |
| 310 | 0 | 0 | 0 |
| 320 | 0 | 0 | 0 |
| 330 | 0 | 0 | 0 |
| 340 | 0 | 0 | 0 |
| 350 | 0 | 0 | 0 |
| 360 | 0 | 0 | 0 |
| 370 | 0 | 0 | 0 |
| 380 | 0 | 0 | 0 |
| 390 | 0 | 0 | 1.79 |
| 400 | 0 | 0 | 30.19 |
| 410 | 0 | 0 | 51.66 |
| 420 | 0 | 0 | 60.29 |
| 430 | 0 | 0 | 65.61 |
| 440 | 0 | 0 | 74.82 |
| 450 | 0 | 0 | 78.5 |
| 460 | 0 | 0 | 79.78 |
| 470 | 0 | 0 | 81.82 |
| 480 | 0 | 0 | 82.25 |
| 490 | 0 | 0 | 82 |
| 500 | 0 | 0 | 80.98 |
| 510 | 0 | 2.77 | 78.28 |
| 520 | 0 | 23.58 | 73.23 |
| 530 | 0 | 46.05 | 66.7 |
| 540 | 0 | 58.66 | 57.79 |
| 550 | 0 | 65.59 | 44.48 |
| 560 | 0 | 69.73 | 26.91 |
| 570 | 0.01 | 72.41 | 17.11 |
| 580 | 0.73 | 74.19 | 10.47 |
| 590 | 11.03 | 75.29 | 5.87 |
| 600 | 40.89 | 75.97 | 1.12 |
| 610 | 67.84 | 76.47 | 0.08 |
| 620 | 80.93 | 76.85 | 0.15 |
| 630 | 85.84 | 77.22 | 0.24 |
| 640 | 87.94 | 77.49 | 0.14 |
| 650 | 88.83 | 77.87 | 0.1 |
| 660 | 89.22 | 78.16 | 0.01 |
| 670 | 89.44 | 78.43 | 0 |
| 680 | 89.62 | 78.7 | 0 |
| 690 | 89.76 | 78.94 | 0 |
| 700 | 89.88 | 79.12 | 1.48 |
| 710 | 89.98 | 79.36 | 15.26 |
| 720 | 90.22 | 79.7 | 33.96 |
| 730 | 90.28 | 80.03 | 48.63 |
| 740 | 90.34 | 80.33 | 58.54 |
| 750 | 90.5 | 80.52 | 65.1 |



0

先天色覚異常者における夜間点滅信号灯色光の誤答率

| イニシャル | 年齢 | 類型 | PD-15 | 点滅赤 | 点滅黄 |
|-------|----|----|-------|-----------|-----------|
| YU | 19 | 1弱 | pass | 100% | 80% 緑1 |
| YK | 21 | 1弱 | pass | 20% 橙4 | 80% 黄緑1 |
| TI | 25 | 1弱 | pass | 100% | 100% |
| KS | 27 | 1弱 | pass | 100% | 100% |
| HW | 30 | 1弱 | pass | 100% | 100% |
| AK | 30 | 1弱 | pass | 100% | 100% |
| KI | 31 | 1弱 | pass | 100% | 0% 緑5 |
| HI | 34 | 1弱 | pass | 100% | 100% |
| ST | 21 | 1弱 | fail | 100% | 100% |
| SI | 21 | 1盲 | fail | 100% | 100% |
| SO | 22 | 1弱 | fail | 100% | 100% |
| ST | 23 | 1盲 | fail | 20% 黄1、緑3 | 100% |
| TN | 23 | 1盲 | fail | 100% | 0% 緑5 |
| AU | 25 | 1盲 | fail | 100% | 40% 赤3 |
| HY | 28 | 1盲 | fail | 40% 橙3 | 100% |
| TI | 29 | 1盲 | fail | 40% 橙3 | 40% 橙1、緑2 |
| AY | 38 | 1盲 | fail | 100% | 40% 赤3 |
| SS(F) | 39 | 1盲 | fail | 100% | 100% |
| HK | 17 | 2弱 | pass | 100% | 20% 緑4 |
| KT | 23 | 2弱 | pass | 60% 黄2 | 40% 緑3 |
| TE | 23 | 2弱 | pass | 100% | 100% |
| MT | 23 | 2弱 | pass | 80% 橙1 | 100% |
| YA | 24 | 2弱 | pass | 100% | 60% 白2 |
| YN | 24 | 2弱 | pass | 100% | 100% |
| TO | 33 | 2弱 | pass | 100% | 40% 橙2、緑1 |
| NM(F) | 34 | 2弱 | pass | 60% 黄2 | 100% |
| KM | 35 | 2弱 | pass | 100% | 100% |
| MO | 36 | 2弱 | pass | 100% | 0% 緑5 |
| TN | 40 | 2弱 | pass | 100% | 0% 緑5 |
| YM | 58 | 2弱 | pass | 100% | 100% |
| TW | 15 | 2弱 | fail | 100% | 100% |
| TF | 18 | 2盲 | fail | 20% 黄1、緑3 | 60% 緑2 |
| TT | 18 | 2盲 | fail | 0% 橙2、黄緑: | 0% 橙3、黄緑: |
| MK | 21 | 2弱 | fail | 80% 黄1 | 100% |
| KH | 23 | 2弱 | fail | 100% | 100% |
| KK | 24 | 2弱 | fail | 80% 黄1 | 80% 赤1 |
| AH | 24 | 2弱 | fail | 100% | 20% 赤3、橙1 |
| KI | 24 | 2盲 | fail | 0% 橙5 | 0% 橙5 |
| TN | 26 | 2盲 | fail | 80% 黄1 | 80% 赤1 |
| MS | 28 | 2盲 | fail | 0% 黄1、緑4 | 100% |
| NK | 28 | 2盲 | fail | 100% | 80% 赤1 |
| YO | 28 | 2盲 | fail | 0% 緑5 | 0% 緑5 |
| YY | 29 | 2弱 | fail | 100% | 100% |
| TT | 30 | 2盲 | fail | 20% 緑2、黄2 | 40% 緑2、赤1 |
| TF | 31 | 2盲 | fail | 0% 緑5 | 0% 緑5 |
| YT | 31 | 2盲 | fail | 0% 緑5 | 0% 黄5 |
| SM(F) | 36 | 2弱 | fail | 100% | 100% |
| TI | 39 | 2弱 | fail | 100% | 0% 赤5 |
| TM | 40 | 2弱 | fail | 0% 橙5 | 40% 緑1、橙2 |
| MT | 46 | 2弱 | fail | 100% | 20% 緑3、黄1 |
| HN | 50 | 2盲 | fail | 0% 緑5 | 0% 緑5 |

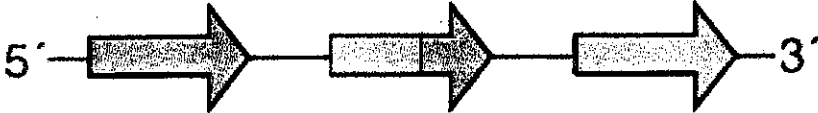















先天色覚異常者における工事用1灯式LED信号灯色光の誤答率

| 仁シヤル | 年齢 | 類型 | PD-15 | 工事赤 | 工事緑 |
|-------|----|----|-------|-----------|-----------|
| YU | 19 | 1弱 | pass | 100% | 0% 黄5 |
| YK | 21 | 1弱 | pass | 100% | 100% |
| TI | 25 | 1弱 | pass | 100% | 40% 黄3 |
| KS | 27 | 1弱 | pass | 100% | 0% 黄5 |
| HW | 30 | 1弱 | pass | 100% | 20% 黄4 |
| AK | 30 | 1弱 | pass | 100% | 100% |
| KI | 31 | 1弱 | pass | 100% | 0% 黄5 |
| HI | 34 | 1弱 | pass | 100% | 0% 黄5 |
| ST | 21 | 1弱 | fail | 100% | 0% 黄5 |
| SI | 21 | 1盲 | fail | 100% | 0% 黄5 |
| SO | 22 | 1弱 | fail | 100% | 0% 黄5 |
| ST | 23 | 1盲 | fail | 20% 黄4 | 0% 黄5 |
| TN | 23 | 1盲 | fail | 60% 緑2 | 40% 黄3 |
| AU | 25 | 1盲 | fail | 100% | 0% 黄5 |
| HY | 28 | 1盲 | fail | 0% 黄5 | 0% 黄5 |
| TI | 29 | 1盲 | fail | 0% 黄1、緑4 | 0% 黄5 |
| AY | 38 | 1盲 | fail | 100% | 0% 赤3、黄2 |
| SS(F) | 39 | 1盲 | fail | 60% 黄2 | 0% 黄4、赤1 |
| HK | 17 | 2弱 | pass | 100% | 100% |
| KT | 23 | 2弱 | pass | 100% | 100% |
| TE | 23 | 2弱 | pass | 100% | 100% |
| MT | 23 | 2弱 | pass | 100% | 0% 黄5 |
| YA | 24 | 2弱 | pass | 100% | 100% |
| YN | 24 | 2弱 | pass | 100% | 100% |
| TO | 33 | 2弱 | pass | 100% | 100% |
| NM(F) | 34 | 2弱 | pass | 20% 黄4 | 0% 黄3、赤2 |
| KM | 35 | 2弱 | pass | 100% | 0% 黄5 |
| MO | 36 | 2弱 | pass | 100% | 100% |
| TN | 40 | 2弱 | pass | 100% | 100% |
| YM | 58 | 2弱 | pass | 100% | 0% 黄5 |
| TW | 15 | 2弱 | fail | 100% | 0% 黄5 |
| TF | 18 | 2盲 | fail | 20% 黄3、緑1 | 20% 黄4 |
| TT | 18 | 2盲 | fail | 0% 橙5 | 0% 橙5 |
| MK | 21 | 2弱 | fail | 100% | 60% 黄2 |
| KH | 23 | 2弱 | fail | 20% 黄4 | 20% 黄2、赤2 |
| KK | 24 | 2弱 | fail | 0% 黄3、橙2 | 20% 黄2、橙2 |
| AH | 24 | 2弱 | fail | 20% 橙4 | 0% 橙5 |
| KI | 24 | 2盲 | fail | 0% 橙5 | 0% 橙5 |
| TN | 26 | 2盲 | fail | 100% | 0% 赤1、黄4 |
| MS | 28 | 2盲 | fail | 0% 黄5 | 0% 黄5 |
| NK | 28 | 2盲 | fail | 0% 黄4、橙1 | 0% 黄2、橙3 |
| YO | 28 | 2盲 | fail | 100% | 40% 赤3 |
| YY | 29 | 2弱 | fail | 80% 黄1 | 100% |
| TT | 30 | 2盲 | fail | 0% 黄5 | 0% 黄5 |
| TF | 31 | 2盲 | fail | 100% | 0% 赤5 |
| YT | 31 | 2盲 | fail | 100% | 0% 黄5 |
| SM(F) | 36 | 2弱 | fail | 80% 黄1 | 0% 黄5 |
| TI | 39 | 2弱 | fail | 20% 黄4 | 0% 黄5 |
| TM | 40 | 2弱 | fail | 100% | 100% |
| MT | 46 | 2弱 | fail | 100% | 100% |
| HN | 50 | 2盲 | fail | 0% 黄5 | 0% 黄5 |

正例番号

遺伝子型

表現型

| | | |
|------|--|------|
| 6 |  | 第2異常 |
| 1616 |  | 第2異常 |
| 1645 |  | 第2異常 |
| 1647 |  | 第2異常 |
| 1928 |  | 第2異常 |
| 2057 |  | 第2異常 |
| 3135 |  | 第2異常 |
| 3136 |  | 第2異常 |
| 3682 |  | 第2異常 |
| 3703 |  | 第2異常 |
| 4848 |  | 第2異常 |
| 5149 |  | 第2異常 |
| 2382 |  | 正常色覚 |
| 3444 |  | 正常色覚 |
| 4914 |  | 正常色覚 |
| 4915 |  | 正常色覚 |
| 5148 | | 正常色覚 |

研究成果の刊行に関する一覧表

書籍 特に無し。

雑誌

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先天色覚異常者における黄および赤色の夜間点滅信号灯に 対する弁別能

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「研究成果の刊行に関する一覧表」をご参照ください。