

Supplementary Material

This document contains lineup images, measures that were not reported in the manuscript, and additional details of analyses that were reported in the manuscript. Tables and Figures are located at the end of the document.

Experiment 1

Lineup Images

Figures SM1 and SM2 display the lineup member images.

Base Rate Effect Equivalency

A Base Rate Effect Equivalency (BREE) curve using suspect identifications for the face-off and showup procedures is presented in Figure SM3. Given the near-identical diagnosticity ratios for the face-off and simultaneous procedures, a comparable curve would be produced if the showup and simultaneous procedures were assessed. The curve in Figure SM3 indicates that a jurisdiction with a guilty base rate of 50% would need an increase of 37% for the showup procedure to produce suspect identifications that are as diagnostic as suspect identifications for the face-off procedure. If a jurisdiction had a base rate where the curve peaks (29%), the base rate would have to be increased by 44% for the showup procedure to attain equivalent diagnosticity to the face-off procedure.

Suspect Response Bias

Fitzgerald and Price (2015) introduced a measure of suspect response bias (c_s). Suspect response bias is calculated using the signal detection theory formula (MacMillan & Creelman, 1991): $c_s = -0.5(z_{\text{Hits}} + z_{\text{False Alarms}})$. However, c_s is conceptually distinct from response bias in applications of signal detection theory in recognition memory experiments. In old/new face recognition experiments, response bias refers the general inclination to respond that a face is “old” or “new”. However, in an eyewitness identification experiment, the hit rate and false alarm rates only refer to

identification of the target and innocent suspect, respectively, and filler identifications are treated like rejections. Thus, c_s provides an indication of whether a procedure tends to move choices away from (values above zero) or toward (values below zero) identification of the suspect.

The suspect response bias in the showup procedure was distinct from the suspect response bias in the two lineup procedures. The face-off and simultaneous procedures were both biased away from the suspect ($c_s = 0.97$ and $c_s = 0.96$, respectively), whereas the showup procedure was biased toward the suspect ($c_s = -0.17$). Statistical comparisons between suspect response bias scores, calculated using the method described by Fitzgerald and Price (2015), indicated that the face-off and simultaneous procedures were both significantly less biased toward the suspect relative to the showup procedure $G_s > 5.68, p_s < .001$

Age

For target-present lineups, a 3 (procedure: face-off vs. showup vs. simultaneous) \times 2 (age: 6-8 vs. 9-12 years) \times 2 (response: suspect identified vs. not identified) HILOG analysis produced a model that was not significant when all three factors were included, $\chi^2(2) = 1.48, p = .48$. Further, partial associations showed no significant interaction between age and correct identification of the target, $\chi^2(1) = 0.79, p = .38$.

For target-absent lineups, a 3 (procedure) \times 2 (age) \times 2 (response: lineup rejected vs. not rejected) HILOG analysis produced a model that was not significant when all three factors were included, $\chi^2(2) = 2.54, p = .28$, and partial associations showed no significant interaction between age and correct rejection of the lineup, $\chi^2(1) = 0.39, p = .53$.

Experiment 2

Base Rate Effect Equivalency

Figure SM4 displays suspect identification BREE curves comparing the face-off procedure with the simultaneous and elimination procedures. For low similarity lineups, the curve for the face-off and simultaneous comparison peaks when the base rate is 28% and the curve for the face-off and elimination comparison peaks when the base rate is 32%. At these base rates, which maximize the advantage for the face-off procedure, it would require base rate increases of 44% and 38% to increase the diagnostic value of suspect identifications obtained from the simultaneous and elimination procedures, respectively, to that of the face-off procedure. Conversely, for high similarity lineups, curves peak at base rates of 41% (face-off vs. simultaneous) and 46% (face-off vs. simultaneous), and it would only require base rate increases of 18% and 8%, respectively, for the simultaneous and elimination procedures to yield suspect identifications that have equivalent diagnosticity with those yielded from the face-off procedure. A range of BREE scores for comparisons between all of the procedures is provided in Table SM3.

Suspect Response Bias

All values were positive on the suspect response bias (c_s) measure, indicating that all procedures tended to bias choices away from the suspect. Overall, the face-off procedure had the strongest bias away from the suspect ($c_s = 0.84$), followed by the elimination procedure ($c_s = 0.55$), and, finally, the simultaneous procedure ($c_s = 0.34$). Statistical comparisons indicated that the difference between the face-off and simultaneous procedures was significant, $G = 2.74$, $p = .006$, and that the elimination procedure did not significantly differ from either of the two procedures, $G_s < 1.55$, $p_s > .12$. The differences in suspect response bias for the low similarity lineups were the most pronounced (face-off: $c_s = 0.94$; elimination: $c_s = 0.50$; simultaneous: $c_s = 0.34$). Consistent with the analyses of the overall scores, a comparison between the simultaneous and face-off procedures for low similarity lineups revealed a significant difference, $G = 2.22$, $p = .03$, and no significant differences

were found for comparisons involving the elimination procedure, $G_s < 1.59$, $p_s > .11$. Compared with the low similarity lineups, the differences in suspect response bias for the high similarity lineups were smaller (face-off: $c_s = 0.76$; elimination: $c_s = 0.61$; simultaneous: $c_s = 0.34$). None of the comparisons between procedures for the high similarity lineups were significant, $G_s < 1.63$, $p_s > .10$.

Tables

Table SM1

Accuracy rates (condition n) in Experiment 1

| Age | Target-present | | | | Target-absent | | | |
|-------------|----------------|-----------------|-----------------|-----------------|---------------|-----------------|-----------------|-----------------|
| | n | Showup | Simultaneous | Face-off | n | Showup | Simultaneous | Face-off |
| 6 | 9 | .00 (3) | 1.00 (1) | .20 (5) | 9 | 1.00 (3) | .00 (1) | .80 (5) |
| 7 | 49 | .94 (16) | .28 (18) | .33 (15) | 49 | .56 (16) | .28 (18) | .60 (15) |
| 8 | 58 | .94 (17) | .63 (24) | .59 (17) | 59 | .78 (18) | .46 (24) | .77 (17) |
| 6-8 | 116 | .86 (36) | .49 (43) | .45 (37) | 117 | .70 (37) | .37 (43) | .70 (37) |
| 9 | 69 | .78 (23) | .52 (25) | .60 (20) | 70 | .74 (23) | .52 (25) | .59 (22) |
| 10 | 48 | .82 (17) | .64 (11) | .63 (19) | 48 | .82 (17) | .55 (11) | .65 (20) |
| 11 | 9 | 1.00 (4) | .00 (1) | .25 (4) | 9 | .75 (4) | .00 (1) | .50 (4) |
| 9-11 | 124 | .82 (44) | .54 (37) | .58 (43) | 127 | .77 (44) | .51 (37) | .61 (46) |

Note. Most children completed two identification tasks (one target-present and one target-absent), but two children abstained from the second identification task and two children were administered two target-absent lineup tasks.

Table SM2

Accuracy rates (condition *n*) in Experiment 2

| Age | Target-present | | | | Target-absent | | | |
|--------------|----------------|-----------------|-----------------|-----------------|---------------|-----------------|-----------------|-----------------|
| | <i>n</i> | Simultaneous | Elimination | Face-off | <i>n</i> | Simultaneous | Elimination | Face-off |
| 6 | 8 | .50 (2) | .25 (4) | .00 (2) | 4 | 1.00 (2) | - | 1.00 (2) |
| 7 | 32 | .50 (10) | .44 (9) | .39 (13) | 38 | .69 (13) | .69 (13) | .92 (12) |
| 8 | 25 | .75 (8) | .30 (10) | .57 (7) | 31 | .60 (10) | .60 (10) | .73 (11) |
| 6-8 | 65 | .60 (20) | .35 (23) | .41 (22) | 73 | .68 (25) | .65 (23) | .84 (25) |
| 9 | 45 | .63 (16) | .79 (14) | .53 (15) | 45 | .57 (16) | .80 (15) | .71 (14) |
| 10 | 40 | .54 (13) | .69 (13) | .43 (14) | 40 | .53 (13) | .69 (13) | .86 (14) |
| 11 | 34 | .82 (11) | .36 (11) | .58 (12) | 34 | .46 (11) | 1.00 (11) | 1.00 (12) |
| 12 | 33 | .70 (10) | .75 (12) | .82 (11) | 24 | .63 (8) | .89 (9) | .57 (7) |
| 13 | 25 | .44 (9) | .71 (7) | .44 (9) | 25 | .38 (8) | .50 (8) | .56 (9) |
| 9-13 | 177 | .63 (59) | .67 (57) | .56 (61) | 168 | .50 (56) | .79 (56) | .77 (56) |
| 14 | 10 | .67 (3) | .50 (2) | 1.00 (5) | 6 | 1.00 (2) | 1.00 (3) | 1.00 (1) |
| 15 | 2 | 1.00 (1) | 1.00 (1) | - | 1 | .00 (1) | - | - |
| 14-15 | 12 | .75 (4) | .67 (3) | 1.00 (5) | 7 | .67 (3) | 1.00 (3) | 1.00 (1) |

Note. Age information for one child was not recorded.

Table SM3

Base-rate effect-equivalency (BREE) scores for suspect identifications in Experiment 2

| Base Rate | Face-off vs. Simultaneous | | Face-off vs. Elimination | | Elimination vs. Simultaneous | |
|--------------|---------------------------|----------------------|--------------------------|----------------------|------------------------------|----------------------|
| | Lower Similarity | Higher Similarity | Lower Similarity | Higher Similarity | Lower Similarity | Higher Similarity |
| 0.10 | 0.33 | 0.09 | 0.25 | 0.03 | 0.03 | 0.05 |
| 0.25 | 0.44 | 0.16 | 0.37 | 0.06 | 0.07 | 0.09 |
| 0.50 | 0.37 | 0.18 | 0.33 | 0.08 | 0.08 | 0.10 |
| 0.75 | 0.20 | 0.11 | 0.19 | 0.05 | 0.06 | 0.07 |
| 0.90 | 0.08 | 0.05 | 0.08 | 0.02 | 0.03 | 0.03 |

Figures



Figure SM1. Images of the female target person (top left), the innocent suspect (top right), and the seven fillers in Experiment 1.

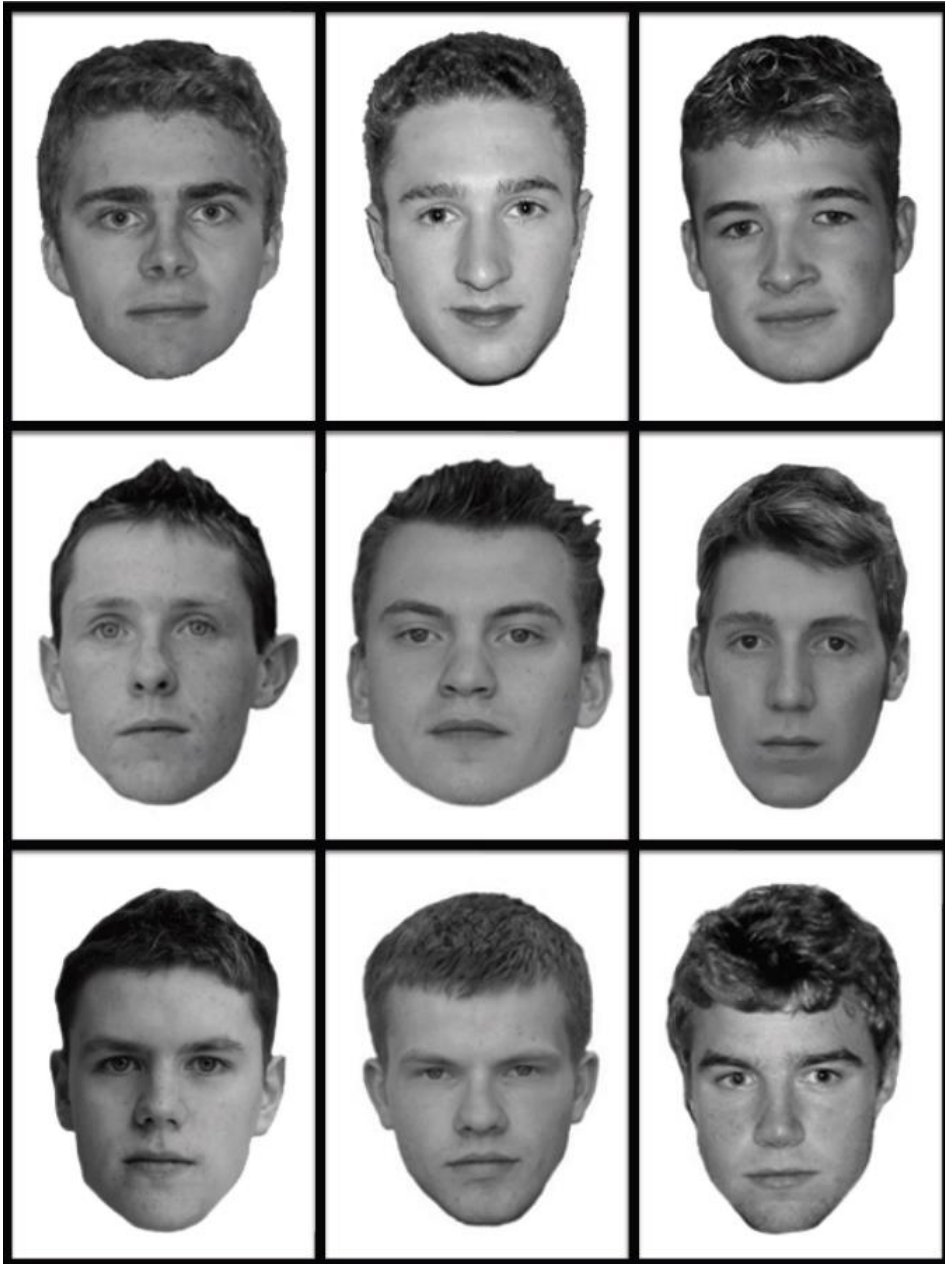


Figure SM2. Images of the male target person (top left), the innocent suspect (top right), and the seven fillers in Experiment 1.

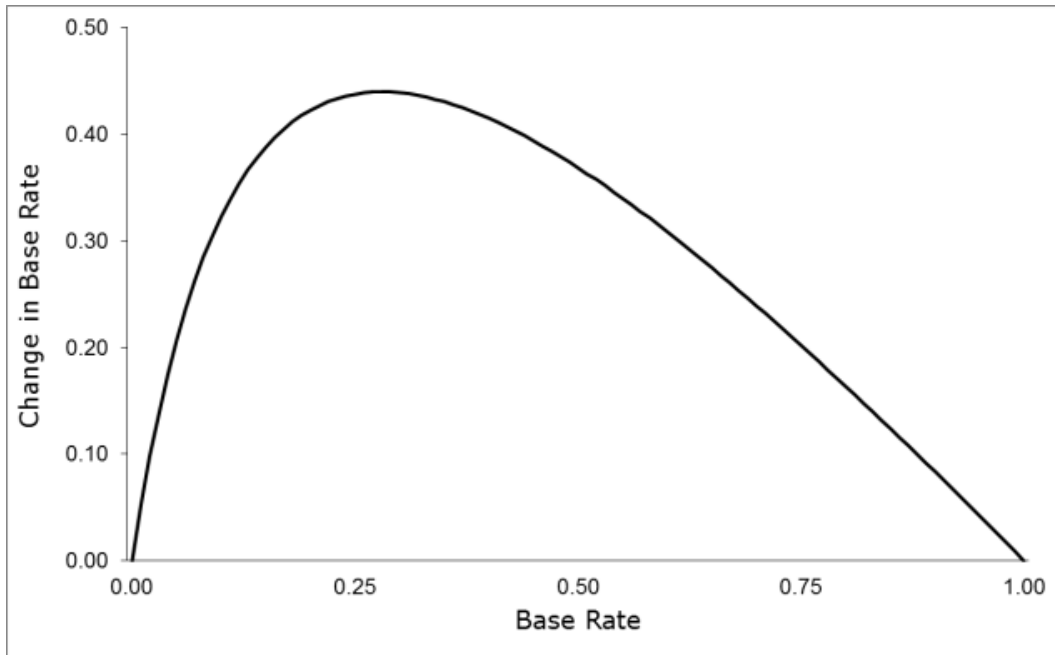


Figure SM3. Base-rate effect-equivalency (BREE) curve in Experiment 1 for suspect identifications from face-off and showup procedures.

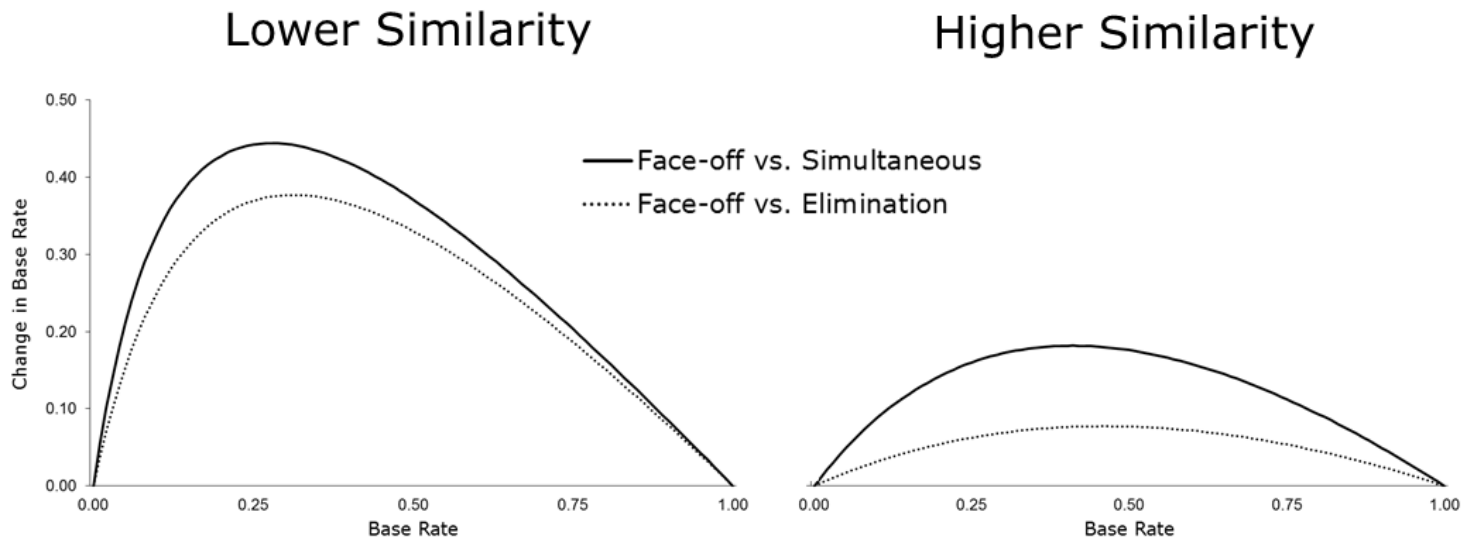


Figure SM4. Base-rate effect-equivalency (BREE) curves for suspect identifications in Experiment 2.