Dissociating conscious and unconscious influences on visual detection effects

Supplementary Information

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Supplementary Discussion

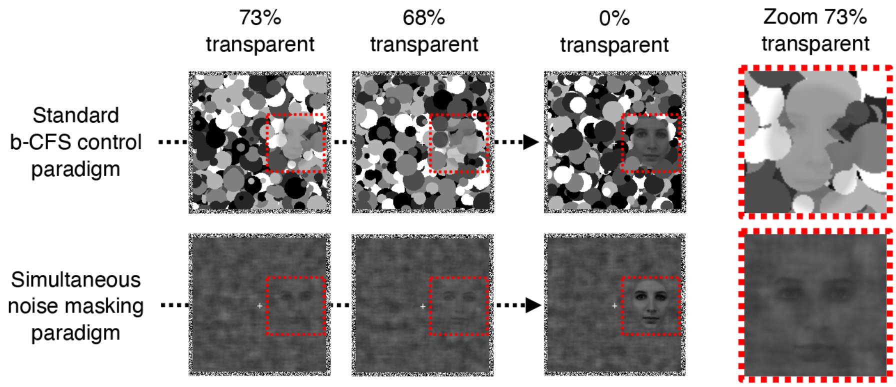
Simultaneous noise masking vs. standard b-CFS control paradigm

Instead of presenting faces transparently on top of CFS masks as is commonly done in standard b-CFS control paradigms (Supplementary Figure 1, top panel), in the simultaneous noise masking paradigm in Experiment 1 faces were faded-in on top of dynamically changing noise masks consisting of phase-scrambled face stimuli (Supplementary Figure 1, bottom panel). This was done to prevent detection based on face-contours alone. Supplementary Figure 1 illustrates how faces can be detected based on their contour alone when faded in on top of CFS masks. By contrast, presentation against dynamic phase-scrambled noise yields a smooth subjective emergence of the whole face stimulus (contour and inner parts simultaneously). As upright and inverted faces have similar contours, we reasoned that detection based on the contour alone should mitigate a possible face-inversion effect, and this may be one reason why standard b-CFS control paradigms typically failed to yield effects. In actual CFS subjective face appearance is less predictable and faces are faded in against a grey background (the mask is presented to the other eye), such that contour-based detection may be a less viable strategy. Accordingly, we designed the masks adopted in the simultaneous noise masking paradigm in a way that rendered a detection strategy based on the contour alone less likely.

Accuracy vs. response times for measuring detection effects

Many previous b-CFS studies measured detection effects as differences in response times (RTs) using speeded tasks, for example by instructing participants to press a key as soon as possible to indicate on which side of fixation any part of the test stimulus became visible. Such speeded tasks require participants to set an internal criterion for responding, such that the resulting RTs are influenced by unknown (uncontrolled) factors such as response tendencies, confidence, uncertainty, etc. Thus, had we found detection effects similar to b-CFS in control paradigms with RTs, these effects could have reflected such uncontrolled factors (e.g. lower response criterion for upright than inverted faces). Instead of using speeded RT-based tasks, we thus recorded thresholds (Experiment 1) and accuracy/sensitivity (Experiments 2–4) with non-speeded tasks. Accuracy-based, forced-choice tasks such as the 2- and 4-AFC localization tasks employed in the present experiments are criterion-free, meaning that the results reflect differences in perceptual sensitivity (e.g. a lower response criterion for upright than inverted faces would not affect thresholds or accuracy/sensitivity).

Supplementary Figures



Supplementary Figure 1. Illustration of face-stimulus appearance. Top panel: In the standard b-CFS control paradigm the face stimulus is faded-in on top of CFS masks. Bottom panel: In the simultaneous noise masking paradigm from Experiment 1 the face stimulus is faded in on top of phase-scrambled noise masks. The different screenshots represent different levels of face transparency. In standard control paradigms, the face contour can often be detected before the inner facial features can be discerned (see the inset from a level of 73% transparency). In the simultaneous noise masking paradigm the face contour and inner facial features emerge from the noise around the same time. The face icon in this figure was adapted from image AF13NES from the Karolinska face data set.

Supplementary Results

Detailed statistical results

For readability and brevity, in the main manuscript we did not report all statistical test results. Here, these additional details are provided, along with 95% CIs for effect size estimates d_z for *t*-tests.

Experiment 1

The effect of contrast was significant for CFS ($t(23) = 5.48$, $p < .001$, $d_z = 1.12$, 95% CI for d_z [0.60, 1.62], $BF_{10} = 1.57 \times 10^3$), simultaneous noise masking ($t(23) = 26.04$, $p < .001$, $d_z = 5.32$, 95% CI for d_z [3.73, 6.89], $BF_{10} = 2.70 \times 10^{15}$), monoptic backward masking ($t(23) = 17.55$, $p < .001$, $d_z = 3.58$, 95% CI for d_z [2.47, 4.68], $BF_{10} = 7.16 \times 10^{11}$), and dichoptic backward masking ($t(23) = 20.60$, $p < .001$, d_z = 4.21, 95% CI for d_z [2.93, 5.47], $BF_{10} = 1.96 \times 10^{13}$). Similarly, the effect of face inversion was significant for CFS ($t(23) = 4.36$, $p < .001$, $d_z = 0.89$, 95% CI for d_z [0.41, 1.36], $BF_{10} = 128.13$), simultaneous noise masking ($t(23) = 10.82$, $p < .001$, $d_z = 2.21$, 95% CI for d_z [1.45, 2.95], $BF_{10} = 5.89 \times 10^7$), monoptic backward masking ($t(23) = 7.97$, $p < .001$, $d_z = 1.63$, 95% CI for d_z [1.01, 2.24], $BF_{10} = 3.13 \times 10^5$), and dichoptic backward masking ($t(23) = 5.63$, $p < .001$, $d_z = 1.15$, 95% CI for d_z [0.62, 1.66], BF_{10} = 2.17×10^3).

Experiment 2

Averaged across all three presentation conditions, inversion effects were significant for CFS ($t(39)$ = 7.70, $p < .001$, $d_z = 1.22$, 95% CI for d_z [0.80, 1.62], $BF_{10} = 4.96 \times 10^6$), backward masking ($t(39) = 9.93$, $p < .001$, $d_z = 1.57$, 95% CI for d_z [1.10, 2.03], $BF_{10} = 2.81 \times 10^9$), and RSVP ($t(39) = 8.81$, $p < .001$, d_z = 1.39, 95% CI for d_z [0.95, 1.83], $BF_{10} = 1.24 \times 10^8$). Inversion effects did not differ significantly between paradigms (mixed ANOVA, two-way interaction, $F(2, 117) = 1.82$, $p = .17$, $\eta_p^2 = .03$, $BF_{01} = 3.25$) or presentation conditions (CFS: $F(2, 78) = 1.18$, $p = .31$, $\eta_p^2 = .03$, $BF_{01} = 7.05$; backward masking: $F(2, 78) = 1.64$, $p = .20$, $\eta_p^2 = .04$, $BF_{01} = 4.39$; RSVP: $F(2, 78) = 1.75$, $p = .18$, $\eta_p^2 = .04$, $BF_{01} = 7.22$).

Experiment 3

Averaged across all presentation times, inversion effects were significant for both localization ($t(93)$ = 18.27, $p < .001$, $d_z = 1.88$, 95% CI for d_z [1.55, 2.22], $BF_{10} = 7.49 \times 10^{30}$) and detection ($t(93) = 19.23$, $p < .001$, $d_z = 1.98$, 95% CI for d_z [1.63, 2.33], $BF_{10} = 1.84 \times 10^{29}$). The interaction between presentation time and face orientation, reflecting larger inversion effects at intermediate presentation times, was significant for both localization ($F(4, 372) = 37.79$, $p < .001$, $\eta_p^2 = .29$; $BF_{10} = 9.72 \times 10^{15}$) and detection

($F(4, 372) = 80.88$, $p < .001$, $\eta_p^2 = .47$; $BF_{10} = 4.11\times10^{17}$). At the second shortest presentation time, orientation discrimination did not differ significantly from chance ($t(93) = 0.91$, $p = .18$ (one-tailed), $d_z = 0.09$, 95% CI for d_z [–0.08, ∞], $BF_{0+} = 3.59$), while localization was significantly above chance both for upright faces ($t(93) = 8.08$, $p < .001$, $d_z = 0.83$, 95% CI for d_z [0.60, 1.07], $BF_{10} = 3.47\times10^{9}$) and for inverted faces ($t(93) = 6.91$, $p < .001$, $d_z = 0.71$, 95% CI for d_z [0.49, 0.94], $BF_{10} = 1.70\times10^{7}$). Also detection was significantly above chance at the second shortest presentation time, both for upright faces ($t(93) = 6.93$, $p < .001$, $d_z = 0.72$, 95% CI for d_z [0.49, 0.94], $BF_{10} = 1.83\times10^{7}$) and for inverted faces ($t(93) = 4.64$, $p < .001$, $d_z = 0.48$, 95% CI for d_z [0.26, 0.69], $BF_{10} = 1.41\times10^{3}$). Localization sensitivity was significantly higher for upright than for inverted faces ($t(93) = 4.11$, $p < .001$, $d_z = 0.42$, 95% CI for d_z [0.21, 0.63], $BF_{10} = 220.59$). Also detection sensitivity was significantly higher for upright than for inverted faces ($t(93) = 4.69$, $p < .001$, $d_z = 0.48$, 95% CI for d_z [0.27, 0.70], $BF_{10} = 1.73\times10^{3}$). Inversion effects exceeded orientation discrimination, both for localization ($t(93) = 2.82$, $p = .006$, $d_z = 0.29$, 95% CI for d_z [0.08, 0.50], $BF_{10} = 4.67$) and for detection ($t(93) = 3.21$, $p = .002$, $d_z = 0.33$, 95% CI for d_z [0.12, 0.54], $BF_{10} = 13.16$). In those 64 participants who had enough trials with correct and incorrect discrimination responses for every condition, localization accuracy for upright faces was significantly better than for inverted faces for both trials with correct discrimination responses ($F(1, 63) = 54.38$, $p < .001$, $\eta_p^2 = .46$, $BF_{10} = 1.17\times10^{5}$) and trials with incorrect discrimination responses ($F(1, 63) = 58.24$, $p < .001$, $\eta_p^2 = .48$, $BF_{10} = 6.72\times10^{10}$). Similarly, detection accuracy for upright faces was significantly better than for inverted faces for both trials with correct discrimination responses ($F(1, 63) = 102.61$, $p < .001$, $\eta_p^2 = .62$, $BF_{10} = 1.24\times10^{12}$) and trials with incorrect discrimination responses ($F(1, 63) = 88.82$, $p < .001$, $\eta_p^2 = .59$, $BF_{10} = 3.35\times10^{20}$).

Experiment 4

In Experiment 4a, at the shortest presentation time (8 ms, followed by a blank of 8 ms) the cueing effect was significant ($t(44) = 2.95$, $p = .005$, $d_z = 0.44$, 95% CI for d_z [0.13, 0.74], $BF_{10} = 6.97$); however, also cue discriminability exceeded chance performance ($t(44) = 2.08$, $p = .022$, one-tailed, $d_z = 0.31$, 95% CI for d_z [0.06, ∞], $BF_{0+} = 0.45$). In Experiment 4b, at the shortest presentation time (8 ms, no blank) cue discriminability did not differ significantly from chance ($t(49) = –0.35$, $p = .36$, one-tailed, $d_z = –0.05$, 95% CI for d_z [–0.28, ∞], $BF_{0+} = 8.36$), while localization sensitivity was significantly above chance for validly cued objects ($t(49) = 6.91$, $p < .001$, $d_z = 0.98$; 95% CI for d_z [0.64, 1.31], $BF_{10} = 1.35\times10^{6}$) as well as for invalidly cued objects ($t(49) = 6.68$, $p < .001$, $d_z = 0.95$; 95% CI for d_z [0.61, 1.28], $BF_{10} = 6.30\times10^{5}$). However, there was no significant difference in localization sensitivity between validly and invalidly cued objects ($t(49) = 0.36$, $p = .72$, $d_z = 0.05$, 95% CI for d_z [–0.23, 0.33], $BF_{01} = 6.11$).

Analyses of correct vs. incorrect discrimination responses

In the main manuscript, we report analyses of trials with correct and incorrect discrimination responses for Experiment 3 and 4 across all presentation times except the longest for those participants who had at least five trials per condition (stimulus × presentation time). To ensure that these results did not depend on these specific inclusion criteria, here we report localization accuracy for different inclusion criteria. We report results when including participants who had at least four, six, or eight trials per condition, and we report separate analyses for only those presentation times where discrimination was not significantly different from chance (discrimination ≈ 0) and for those presentation times where discrimination was significantly above chance (discrimination > 0). For Experiment 3, these additional analyses are reported in Supplementary Table 1; for Experiment 4 in Supplementary Table 2.

Experiment 3

As can be seen in Supplementary Table 1, for the analyses across all presentation times except the longest (as reported in the main manuscript) for all inclusion criteria inversion effects were significant for trials with both correct and incorrect discrimination responses. The specific participant inclusion criterion had little effect. For some inclusion criteria a significant interaction between correctness of the discrimination response and face orientation reflected somewhat larger effects for trials with incorrect discrimination responses. For the two longer presentation times (17 ms and 25 ms), where discrimination was significantly above chance (discrimination > 0), inversion effects were similarly strong for trials with correct and incorrect discrimination responses. For the two shortest presentation times (8 ms and 8[8] ms), where discrimination was not significantly above chance (discrimination ≈ 0), somewhat surprisingly, inversion effects were restricted to trials with incorrect discrimination responses and were not significant for trials with correct discrimination responses. However, this observation should be interpreted with caution, as the interactions between correctness of the discrimination response and face orientation were not always significant and Bayes factors provided only anecdotal evidence for the interaction effect. In summary, these results further support the conclusion that the face-inversion effect does not depend on awareness (discriminability) of face orientation.

Experiment 4

To increase power we collapsed the data from the identical presentation conditions of 17 and 25 ms (discrimination > 0) from Experiment 4a and 4b (thus dropping the 8[8]-ms condition from Experiment 4a, see the end of this section for this condition). For all inclusion criteria, there was strong evidence for a cueing effect in trials with correct discrimination responses. A significant interaction between correctness of the discrimination response and cue validity indicated that this cueing effect was absent in trials with incorrect discrimination responses: Here, the effect even tended to reverse, with significantly better localization accuracy in invalid than in valid trials. For the presentation time (8 ms) from Experiment 4b where cue discriminability was not significantly above chance (discrimination ≈ 0), there was no evidence for a cueing effect. These results further establish that some awareness of cue validity is required for the effect of category-based attention.

Finally, to directly test the effect of cue discriminability across experiments, we conducted an additional comparison of cueing effects for the shortest presentation times in Experiment 4a (8[8] ms, where discrimination was significantly above chance), and in Experiment 4b (8 ms, where discrimination was not significantly different from chance) as a function of the correctness of the discrimination response. Here, a significant three-way interaction in a mixed ANOVA with the between-subject factor experiment and the within-subject factors correctness of the discrimination response and cue validity indicates that cue discriminability influenced the cueing effect differently between experiments, i.e. that only in Experiment 4a, where overall cue discriminability was above chance (and thus discrimination responses were informative), cueing effects were modulated by conscious access to cue validity. With the inclusion criterion of at least five trials per condition (Experiment 4a: 42 participants, Experiment 4b: 48 participants) this three-way interaction was significant ($F(1, 88) = 8.24$, $p = .005$, $\eta_p^2 = .09$, $BF_{10} = 4.07$). The four-trials inclusion criteria resulted in the same group of participants; for the six-trials inclusion criterion (Experiment 4a: 42 participants, Experiment 4b: 47 participants) and for the eight-trials inclusion criterion (Experiment 4a: 39 participants, Experiment 4b: 46 participants) the results were nearly identical ($F(1, 87) = 8.22$, $p = .005$, $\eta_p^2 = .09$, $BF_{10} = 4.50$, and $F(1, 83) = 9.63$, $p = .003$, $\eta_p^2 = .10$, $BF_{10} = 8.58$, respectively). To unpack this three-way interaction: At the shortest presentation time in Experiment 4b (8 ms), there was no evidence that cueing effects were modulated by the correctness of the discrimination response (see Table S2), while at the shortest presentation time in Experiment 4a (8[8] ms), this interaction was significant, for the identical four-, five-, and six-trials inclusion criteria ($F(1, 41) = 12.07$, $p = .001$, $\eta_p^2 = .23$, $BF_{10} = 91.64$), and for the eight-trials inclusion criterion ($F(1, 38) = 14.27$, $p < .001$, $\eta_p^2 = .27$, $BF_{10} = 237.61$): Cueing effects were larger in trials with correct than with incorrect discrimination responses.

Supplementary Table 1. Additional results from Experiment 3

	Minimum no. of trials (No. of participants)	Correct discrimination	Incorrect discrimination	Interaction (correctness × orientation)
All presentation times (excluding the longest)	4 (66)	Upr 68.3%, inv 64.0% $F(1, 65) = 51.19$, $p < .001$, $\eta_p^2 = .44$, $BF_{10} = 1.00\times10^5$	Upr 68.2%, inv 61.1% $F(1, 65) = 63.35$, $p < .001$, $\eta_p^2 = .49$, $BF_{10} = 3.44\times10^{11}$	$F(1, 65) = 5.54$, $p = .022$, $\eta_p^2 = .08$, $BF_{10} = 1.67$
	5 (64)	Upr 68.2%, inv 63.8% $F(1, 63) = 54.38$, $p < .001$, $\eta_p^2 = .46$, $BF_{10} = 1.17\times10^5$	Upr 68.1%, inv 61.0% $F(1, 63) = 58.24$, $p < .001$, $\eta_p^2 = .48$, $BF_{10} = 6.72\times10^{10}$	$F(1, 63) = 4.57$, $p = .036$, $\eta_p^2 = .07$, $BF_{10} = 0.94$
	6 (62)	Upr 68.1%, inv 63.7% $F(1, 61) = 53.67$, $p < .001$, $\eta_p^2 = .47$, $BF_{10} = 7.90\times10^4$	Upr 67.8%, inv 60.9% $F(1, 61) = 53.60$, $p < .001$, $\eta_p^2 = .47$, $BF_{10} = 1.52\times10^{10}$	$F(1, 61) = 20.90$, $p < .001$, $\eta_p^2 = .26$, $BF_{10} = 1.04\times10^4$
	8 (55)	Upr 67.6%, inv 63.3% $F(1, 54) = 41.03$, $p < .001$, $\eta_p^2 = .43$, $BF_{10} = 8.37\times10^3$	Upr 67.5%, inv 60.7% $F(1, 54) = 48.63$, $p < .001$, $\eta_p^2 = .47$, $BF_{10} = 4.42\times10^8$	$F(1, 54) = 3.63$, $p = .062$, $\eta_p^2 = .06$, $BF_{10} = 0.73$
Discrimination > 0	4 (80)	Upr 84.0%, inv 76.5% $F(1, 79) = 62.19$, $p < .001$, $\eta_p^2 = .44$, $BF_{10} = 5.86\times10^9$	Upr 81.5%, inv 71.0% $F(1, 79) = 77.59$, $p < .001$, $\eta_p^2 = .50$, $BF_{10} = 4.68\times10^{14}$	$F(1, 79) = 3.74$, $p = .057$, $\eta_p^2 = .05$, $BF_{10} = 1.00$
	5 (77)	Upr 83.7%, inv 76.3% $F(1, 76) = 58.52$, $p < .001$, $\eta_p^2 = .44$, $BF_{10} = 1.29\times10^9$	Upr 81.5%, inv 71.0% $F(1, 76) = 72.27$, $p < .001$, $\eta_p^2 = .49$, $BF_{10} = 1.16\times10^{14}$	$F(1, 76) = 3.52$, $p = .065$, $\eta_p^2 = .04$, $BF_{10} = 1.22$
	6 (72)	Upr 83.2%, inv 75.2% $F(1, 71) = 65.33$, $p < .001$, $\eta_p^2 = .48$, $BF_{10} = 1.27\times10^{10}$	Upr 80.5%, inv 70.2% $F(1, 71) = 62.16$, $p < .001$, $\eta_p^2 = .47$, $BF_{10} = 1.30\times10^{12}$	$F(1, 71) = 1.79$, $p = .185$, $\eta_p^2 = .03$, $BF_{10} = 0.39$
	8 (62)	Upr 82.5%, inv 74.5% $F(1, 61) = 54.24$, $p < .001$, $\eta_p^2 = .47$, $BF_{10} = 1.41\times10^8$	Upr 80.4%, inv 69.9% $F(1, 61) = 53.52$, $p < .001$, $\eta_p^2 = .47$, $BF_{10} = 3.02\times10^{10}$	$F(1, 61) = 1.78$, $p = .188$, $\eta_p^2 = .03$, $BF_{10} = 0.43$
Discrimination ≈ 0	4 (84)	Upr 56.7%, inv 56.1% $F(1, 83) = 0.42$, $p = .520$, $\eta_p^2 < .01$, $BF_{10} = 0.16$	Upr 58.3%, inv 54.1% $F(1, 83) = 15.53$, $p < .001$, $\eta_p^2 = .16$, $BF_{10} = 73.28$	$F(1, 83) = 5.91$, $p = .017$, $\eta_p^2 = .07$, $BF_{10} = 1.39$
	5 (80)	Upr 56.8%, inv 56.2% $F(1, 79) = 0.36$, $p = .552$, $\eta_p^2 < .01$, $BF_{10} = 0.15$	Upr 58.3%, inv 54.2% $F(1, 79) = 13.63$, $p < .001$, $\eta_p^2 = .15$, $BF_{10} = 50.87$	$F(1, 79) = 4.95$, $p = .029$, $\eta_p^2 = .06$, $BF_{10} = 1.45$
	6 (79)	Upr 56.6%, inv 55.7% $F(1, 78) = 0.93$, $p = .337$, $\eta_p^2 = .01$, $BF_{10} = 0.20$	Upr 57.9%, inv 54.1% $F(1, 78) = 12.38$, $p < .001$, $\eta_p^2 = .14$, $BF_{10} = 28.13$	$F(1, 78) = 3.90$, $p = .052$, $\eta_p^2 = .05$, $BF_{10} = 0.72$
	8 (75)	Upr 56.8%, inv 56.1% $F(1, 74) = 0.51$, $p = .476$, $\eta_p^2 < .01$, $BF_{10} = 0.16$	Upr 57.9%, inv 54.2% $F(1, 74) = 10.85$, $p = .002$, $\eta_p^2 = .13$, $BF_{10} = 19.75$	$F(1, 74) = 3.94$, $p = .053$, $\eta_p^2 = .05$, $BF_{10} = 0.97$

Face-inversion effects for trials with correct and incorrect discrimination responses. Shown are marginal means (percentage correct localization accuracy) for upright and inverted faces, separately for trials with correct and incorrect discrimination responses, and the associated main effect of face orientation, as well as the interaction between correctness of the discrimination response and face orientation. Different rows show different participant inclusion criteria.

Supplementary Table 2. Additional results from Experiment 4

	Minimum no. of trials (No. of participants)	Correct discrimination	Incorrect discrimination	Interaction (correctness × cue validity)
Discrimination > 0 (Experiment 4a and 4b)	4 (91)	Valid 85.9%, invalid 78.6% $F(1, 90) = 89.40$, $p < .001$, $\eta_p^2 = .50$, $BF_{10} = 4.69\times10^{20}$	Valid 75.9%, invalid 78.4% $F(1, 90) = 8.92$, $p = .004$, $\eta_p^2 = .09$, $BF_{10} = 9.68$	$F(1, 90) = 61.84$, $p < .001$, $\eta_p^2 = .41$, $BF_{10} = 1.30\times10^{16}$
	5 (90)	Valid 85.8%, invalid 78.4% $F(1, 89) = 87.82$, $p < .001$, $\eta_p^2 = .50$, $BF_{10} = 3.29\times10^{20}$	Valid 75.7%, invalid 78.2% $F(1, 89) = 8.49$, $p = .005$, $\eta_p^2 = .09$, $BF_{10} = 7.41$	$F(1, 89) = 60.24$, $p < .001$, $\eta_p^2 = .40$, $BF_{10} = 7.81\times10^{15}$
	6 (89)	Valid 85.7%, invalid 78.3% $F(1, 88) = 88.31$, $p < .001$, $\eta_p^2 = .50$, $BF_{10} = 3.77\times10^{20}$	Valid 75.5%, invalid 78.1% $F(1, 88) = 9.06$, $p = .003$, $\eta_p^2 = .09$, $BF_{10} = 9.82$	$F(1, 88) = 61.99$, $p < .001$, $\eta_p^2 = .41$, $BF_{10} = 1.64\times10^{16}$
	8 (84)	Valid 85.4%, invalid 78.4% $F(1, 83) = 76.32$, $p < .001$, $\eta_p^2 = .48$, $BF_{10} = 3.72\times10^{17}$	Valid 75.6%, invalid 77.8% $F(1, 83) = 6.36$, $p = .014$, $\eta_p^2 = .07$, $BF_{10} = 2.67$	$F(1, 83) = 52.60$, $p < .001$, $\eta_p^2 = .39$, $BF_{10} = 7.02\times10^{12}$
Discrimination ≈ 0 (Experiment 4b)	4 (48)	Valid 56.1%, invalid 56.8% $F(1, 47) = 0.17$, $p = .686$, $\eta_p^2 < .01$, $BF_{10} = 0.23$	Valid 55.8%, invalid 56.4% $F(1, 47) = 0.14$, $p = .715$, $\eta_p^2 < .01$, $BF_{10} = 0.23$	$F(1, 47) < 0.01$, $p = .956$, $\eta_p^2 < .01$, $BF_{10} = 0.21$
	5 (48)	Valid 56.1%, invalid 56.8% $F(1, 47) = 0.17$, $p = .686$, $\eta_p^2 < .01$, $BF_{10} = 0.23$	Valid 55.8%, invalid 56.4% $F(1, 47) = 0.14$, $p = .715$, $\eta_p^2 < .01$, $BF_{10} = 0.23$	$F(1, 47) < 0.01$, $p = .956$, $\eta_p^2 < .01$, $BF_{10} = 0.21$
	6 (47)	Valid 56.4%, invalid 56.8% $F(1, 46) = 0.06$, $p = .814$, $\eta_p^2 < .01$, $BF_{10} = 0.22$	Valid 55.9%, invalid 56.2% $F(1, 46) = 0.02$, $p = .893$, $\eta_p^2 < .01$, $BF_{10} = 0.22$	$F(1, 46) < 0.01$, $p = .923$, $\eta_p^2 < .01$, $BF_{10} = 0.21$
	8 (46)	Valid 57.0%, invalid 57.0% $F(1, 45) < 0.01$, $p = .993$, $\eta_p^2 < .01$, $BF_{10} = 0.22$	Valid 56.0%, invalid 55.8% $F(1, 45) = 0.01$, $p = .910$, $\eta_p^2 < .01$, $BF_{10} = 0.21$	$F(1, 45) < 0.01$, $p = .923$, $\eta_p^2 < .01$, $BF_{10} = 0.22$

Cueing effects for trials with correct and incorrect discrimination responses. Shown are marginal means (percentage correct localization accuracy) for validly and invalidly cued objects, separately for trials with correct and incorrect discrimination responses, and the associated main effect of cue, as well as the interaction between correctness of the discrimination response and cue validity. Different rows show different participant inclusion criteria (note that the same participants were included for the inclusion criteria of at least four and five trials per condition).