Incidental Effects of Attention on Face Processing

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Purpose

To describe a new task that can be used to measure incidental effects of attention.

To ask whether attention can affect the representation of objects in a cued location when those objects are irrelevant to the primary task.

Method

PHASE I

Observers performed a speeded digit matching task (respond "same" if both odd or even) in which attention was selectively biased towards the side of an initial probe digit.
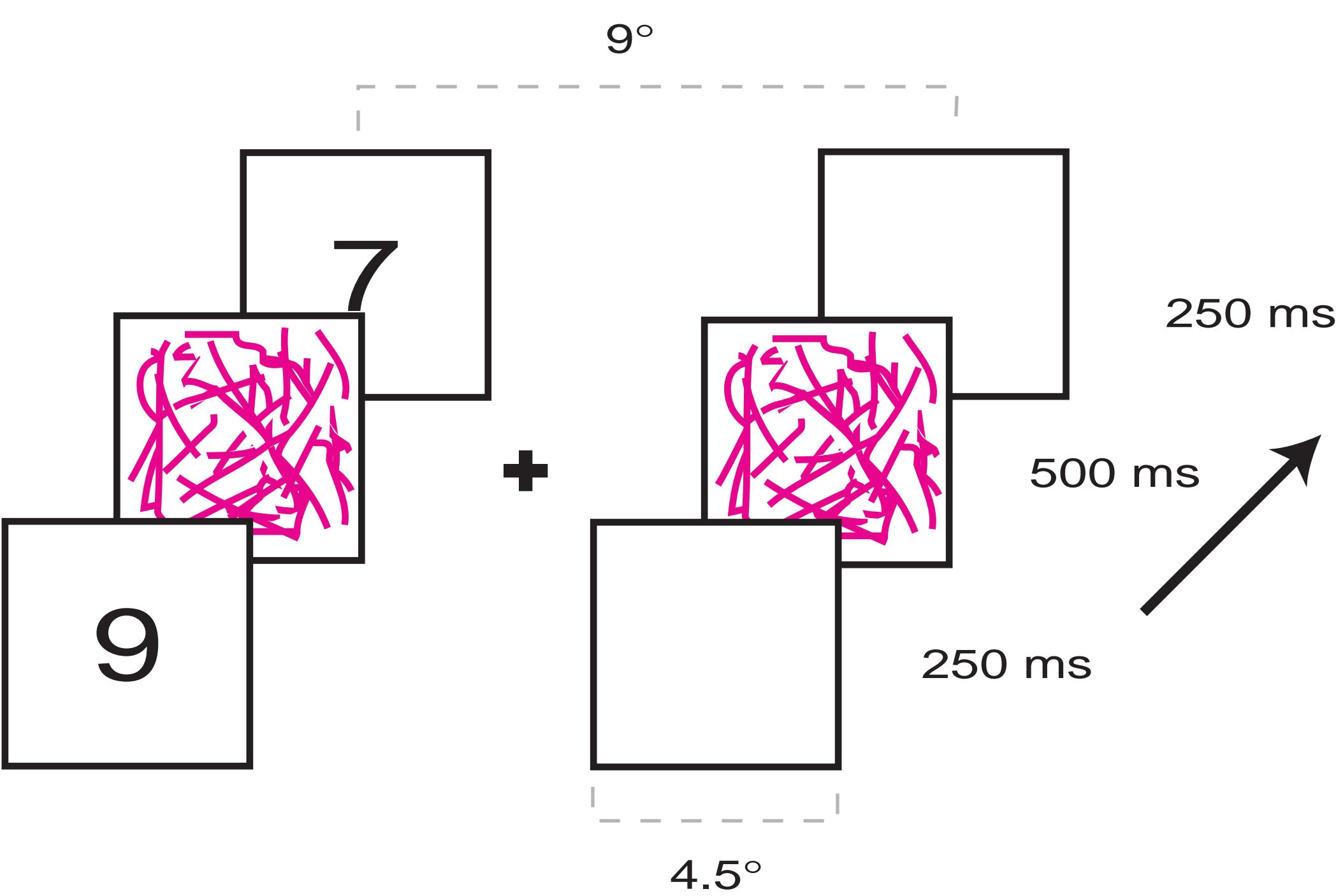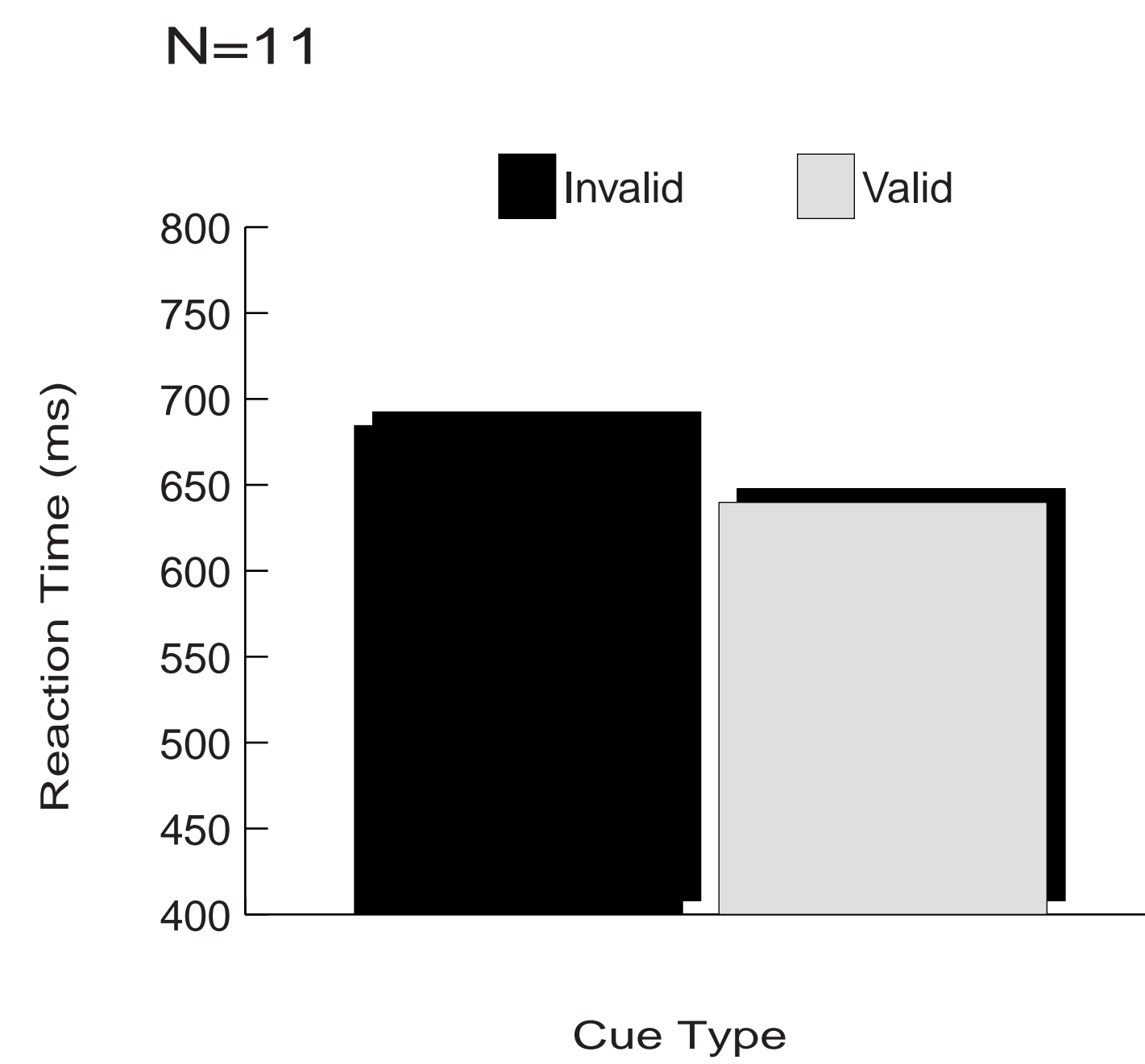

PHASE II

Observers performed the same task, but were told that difficulty would be increased by presenting "meaningful" masking items, specifically, pairs of unfamiliar human faces.
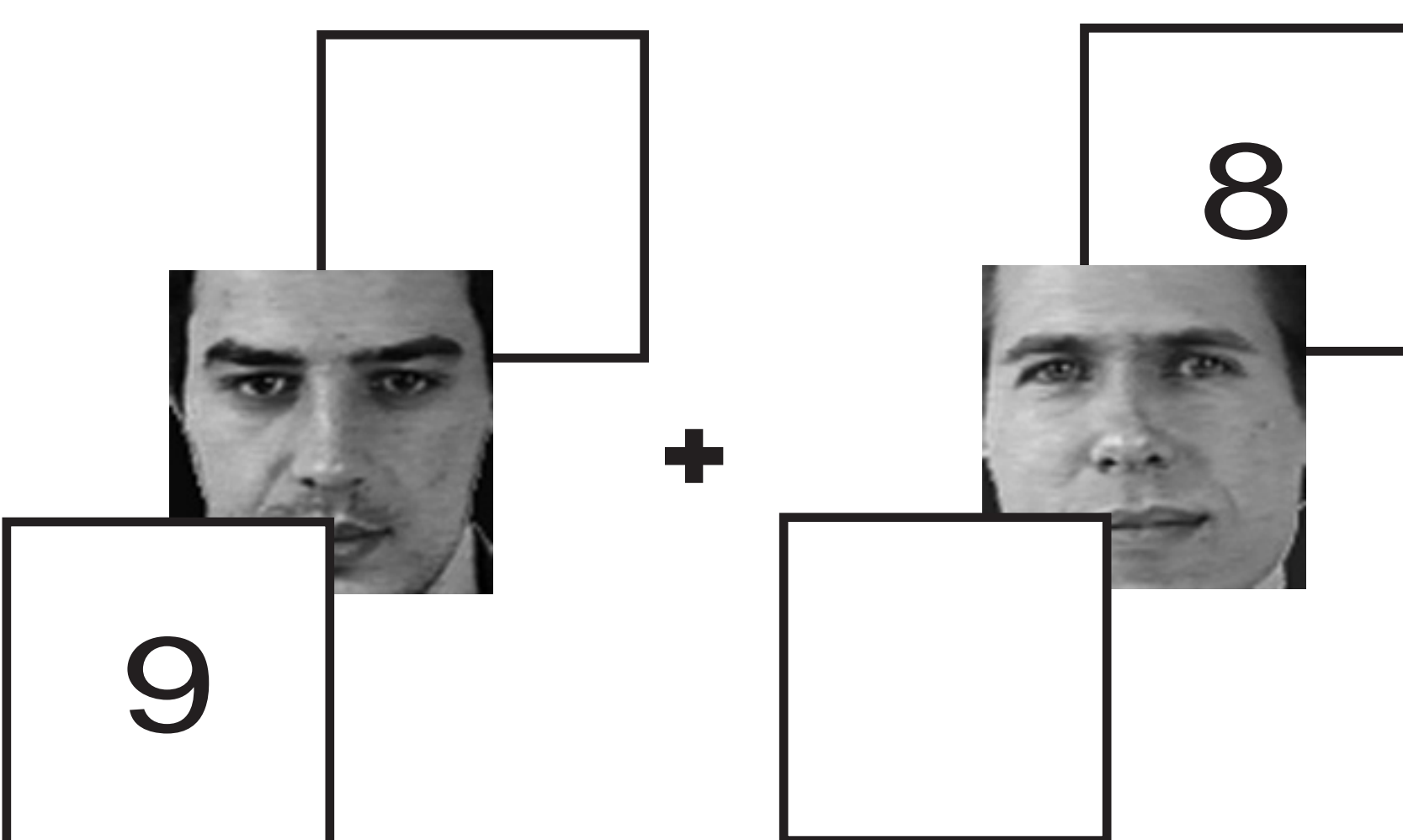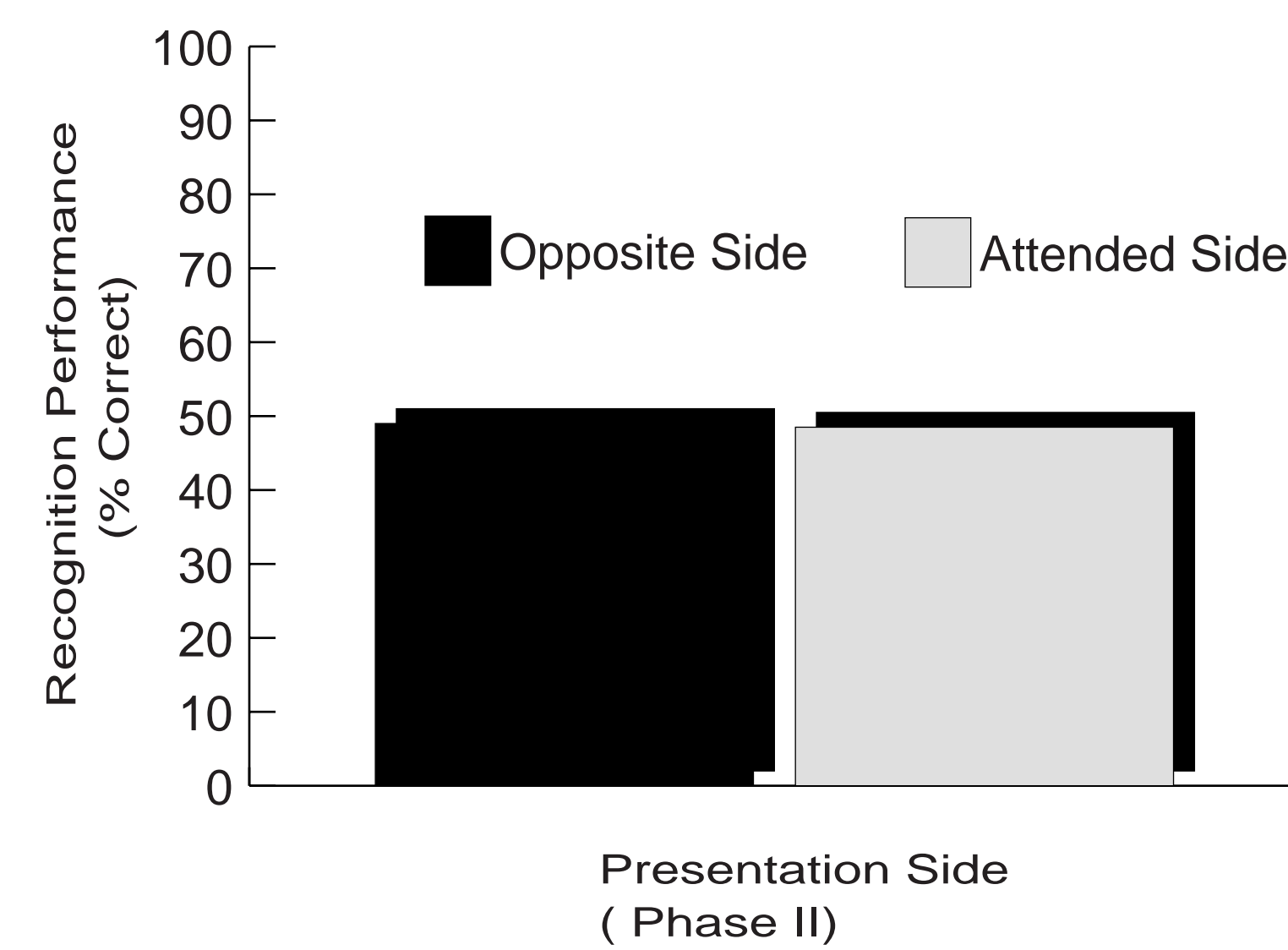

PHASE III

Observers were given an unexpected test of either explicit (Exp 1) or implicit (Exp 2) memory for the faces presented in Phase II.

Explicit Test

N=11

Analysis of RTs for the digit task revealed a significant validity effect for both Phase I and Phase II.

Such a pattern suggests that attention was being shifted and held on the cued side of the display.

As an explicit test of memory, observers were shown 80 pairs of faces and given a 2AFC old/new decision. Each pair contained one new face and one face from Phase II.

As can be seen above, observers were completely at chance on this task. There was no indication of attentional modulation.

Main Finding

Such poor recognition performance (which we also found with a simple old/new task and a 2AFC task in which faces was repeated 3 times) is somewhat surprising, given the presentation size & duration and the use of identical test images.

Subjective reports confirm that the digit task is very effective at capturing and holding conscious perception/awareness. We are also exploring the consequences of presenting two faces at once.

Implicit Test

N=12
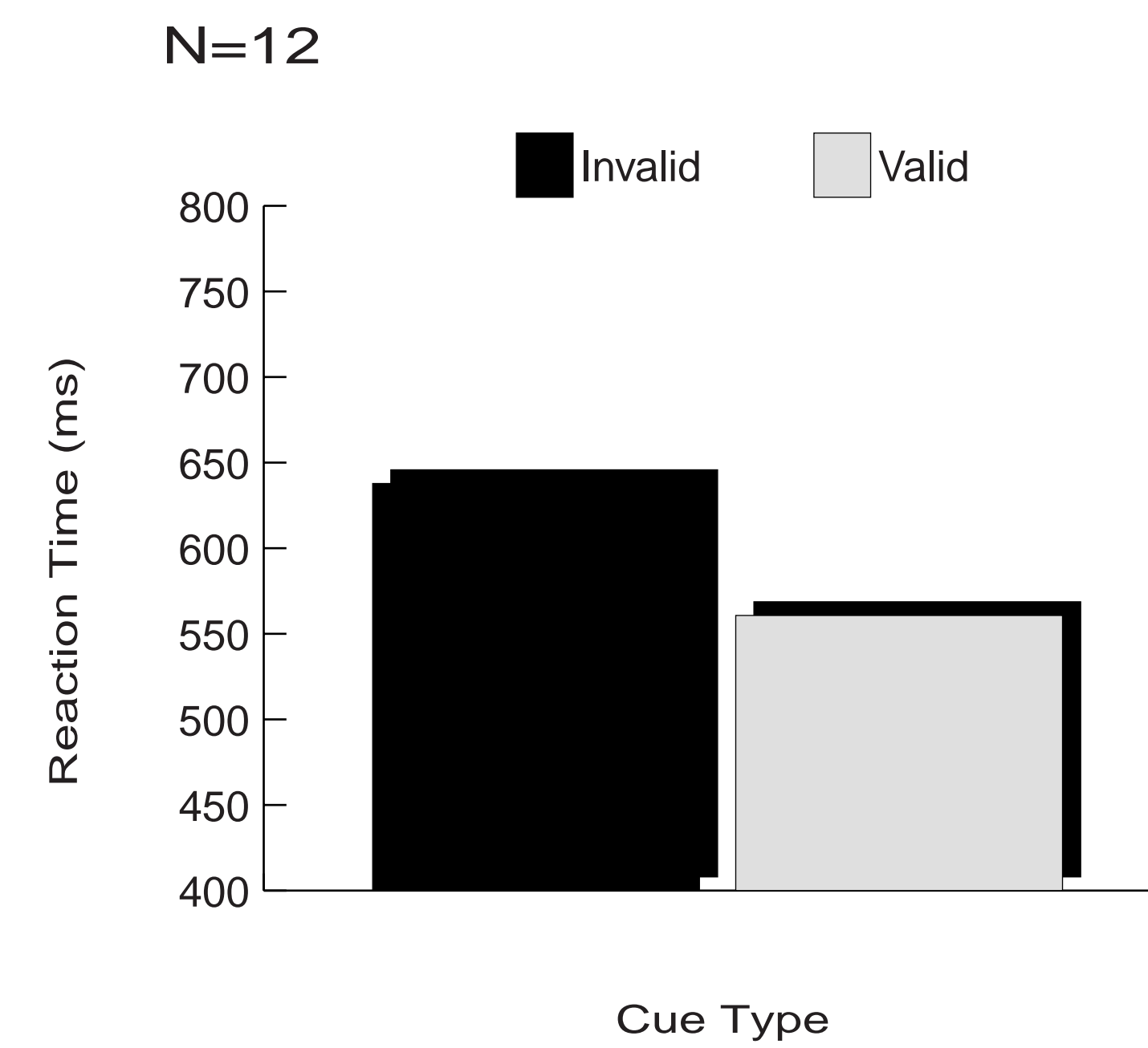
As in the previous experiment, there were consistent validity effects in both phases.
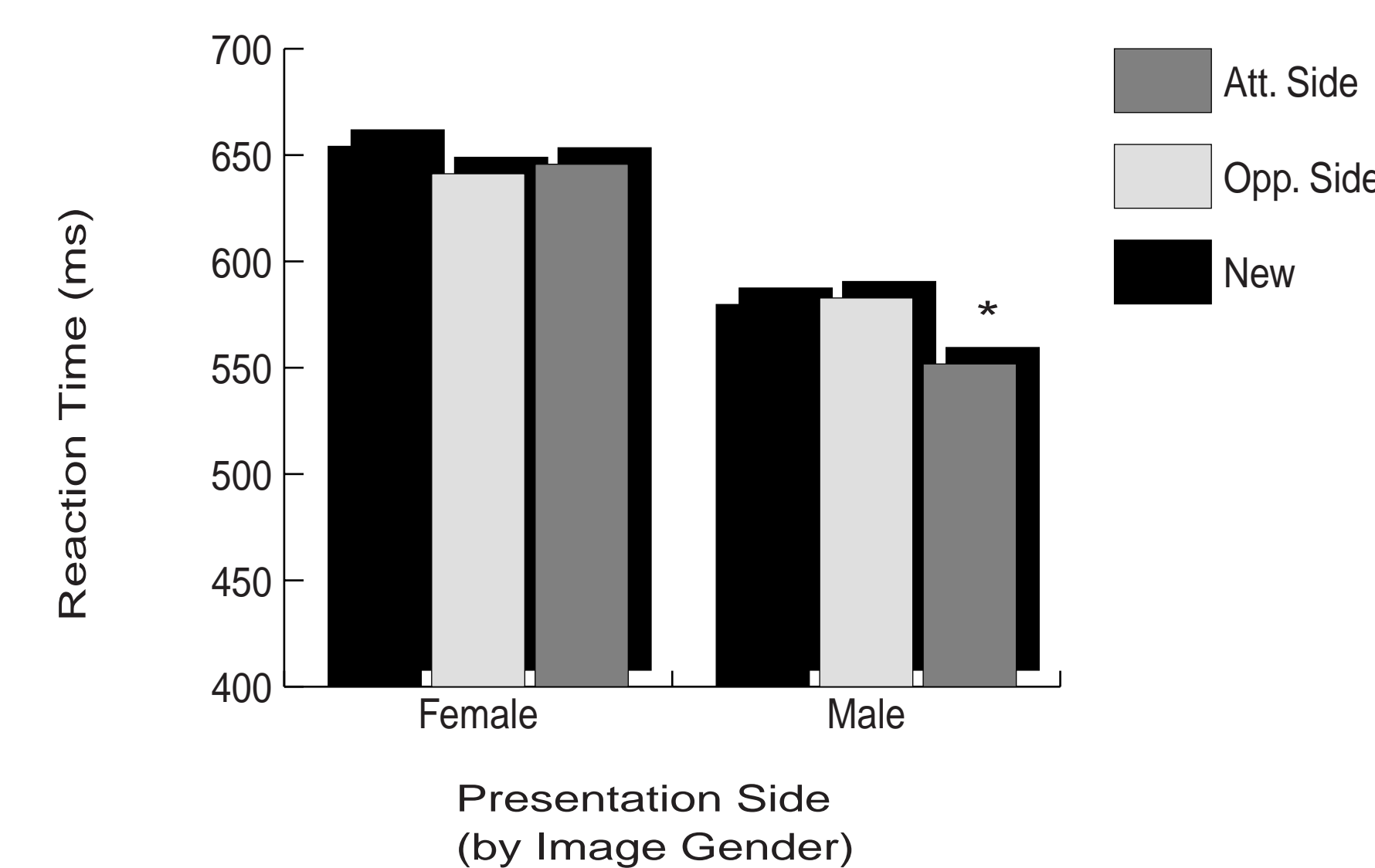
As an implicit test of memory, observers were shown an RSVP steam of faces (40 old and 40 new) and asked to categorize each image as either male or female.

Regardless of observer gender, male faces were categorized more quickly and more accurately (n.s. trend) than female faces.

Main Finding

Male faces that appeared on the attended side of the Phase II display showed facilitated processing relative to images on the opposite side or new images.

Why would incidental effects of attention show a bias for male faces?

Gender Marking

Khurana & Prince (2000) recently suggested that male human faces might be perceptually "marked" in some way. Such marking of secondary sexual characteristics is common in many species, including the peafowl.

Using a flanker task consisting of MFM or FMF triplets of either prototype or individual unfamiliar faces, they found consistently faster & more accurate responses to male target images, regardless of observer gender. Such an asymmetry was absent when targets were inverted or consisted of prepubescent male & female faces.

Here we found a similar gender asymmetry, and also a suggestion that visual marking might make male faces "sticky", as they alone appear to benefit from the incidental effects of attention.

Conclusions

The current task may prove a useful tool for exploring incidental effects of attention.

Our results suggest that objects appearing at a cued location can be affected by attention, even when they are completely irrelevant to the ongoing task.

However, the current incidental effects were only apparent when implicit testing was used and even then, susceptible to modulation by other perceptual factors, in this case some form of gender marking.

Future Goals

We are currently exploring other implicit measures of face processing (e.g., familiarity and attractiveness ratings) and are attempting to generalize the current findings to other sets of faces.

We are also using sets of common objects to explore incidental effects of attention on between category decisions.