آنالیز ساختار تکالیف شناختی

در مطالعات نقشه برداری مغز

ستاره مختاری

دکترای روانشناسی شناختی

عضو هیات علمی پژوهشکده علوم شناختی و مغز – دانشگاه شهید بهشتی

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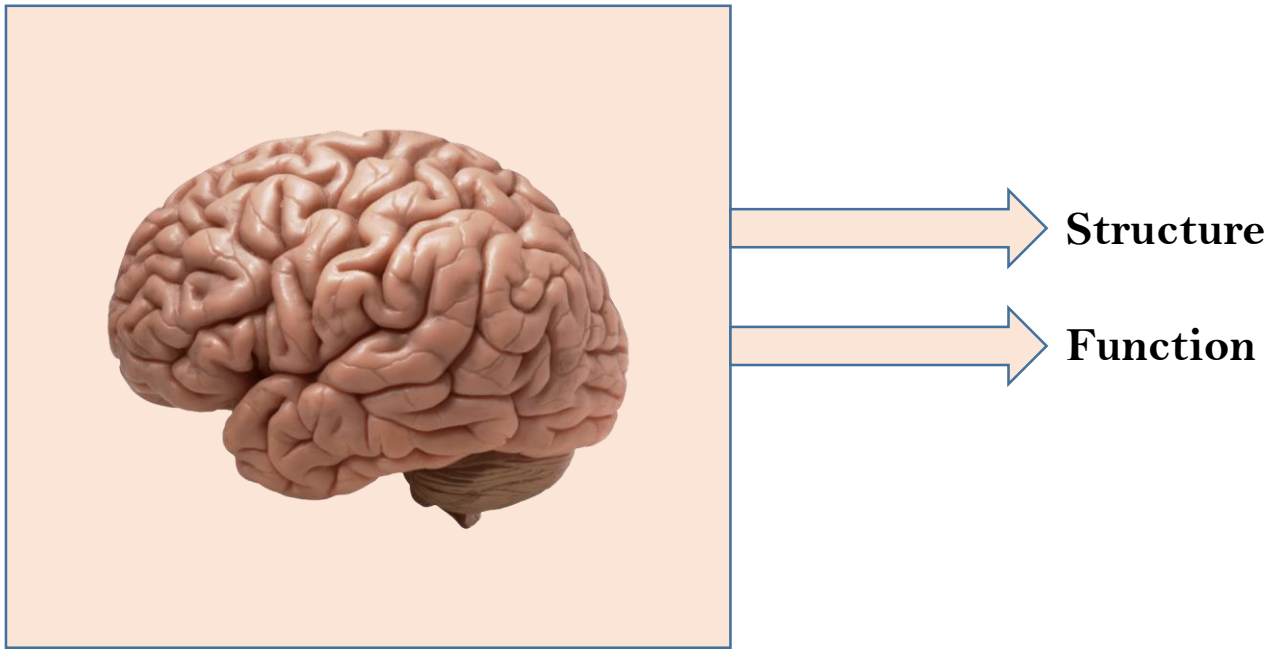
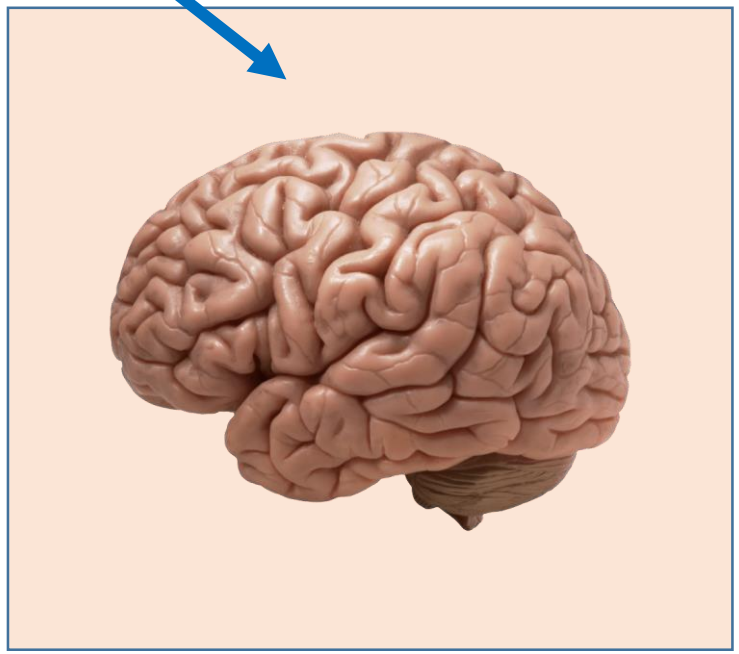

Structure
Function

ابزار

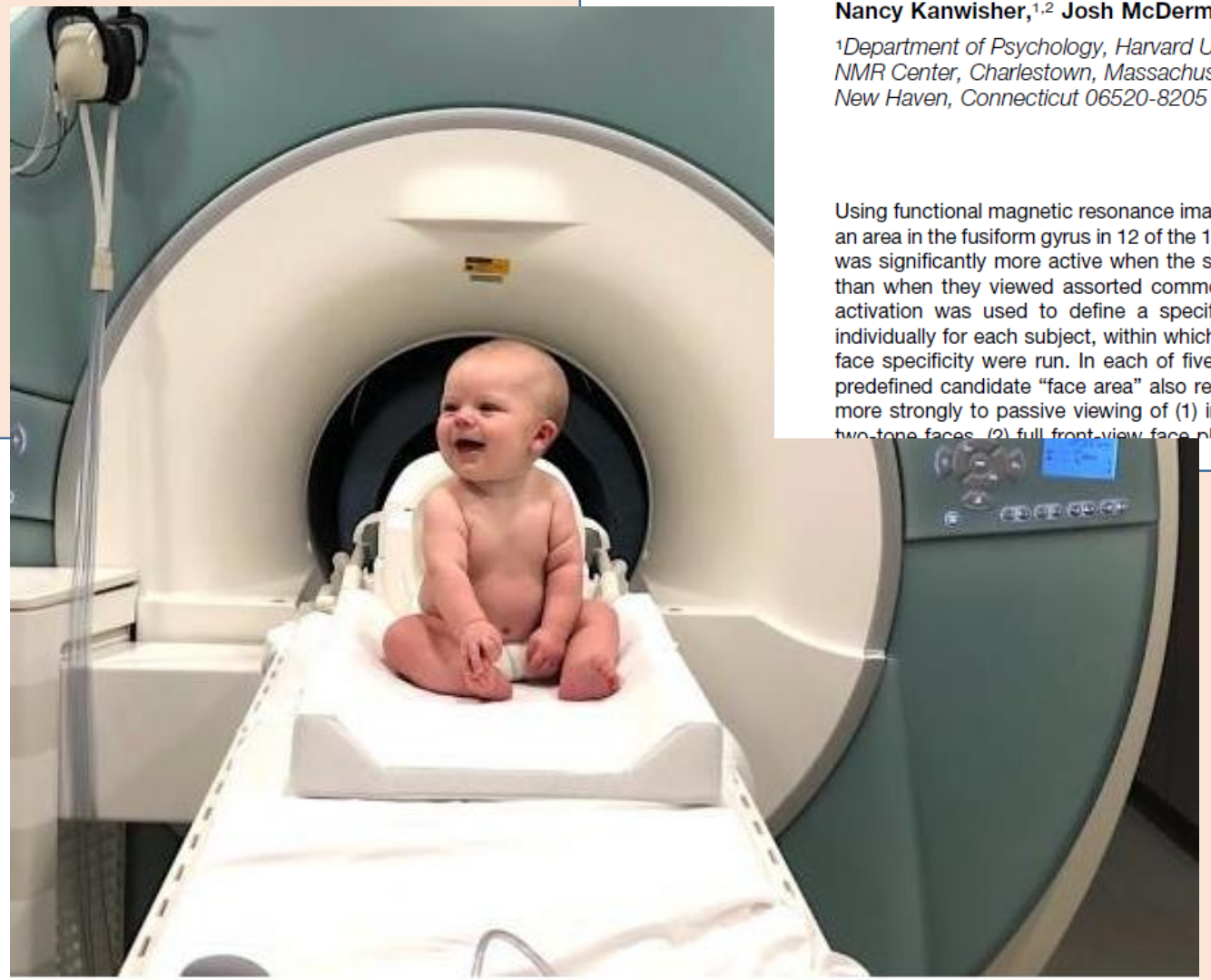
(technology)



The Fusiform Face Area: A Module in Human Extrastriate Cortex Specialized for Face Perception

Nancy Kanwisher,[1,2] Josh McDermott,[1,2] and Marvin M. Chun[2,3]

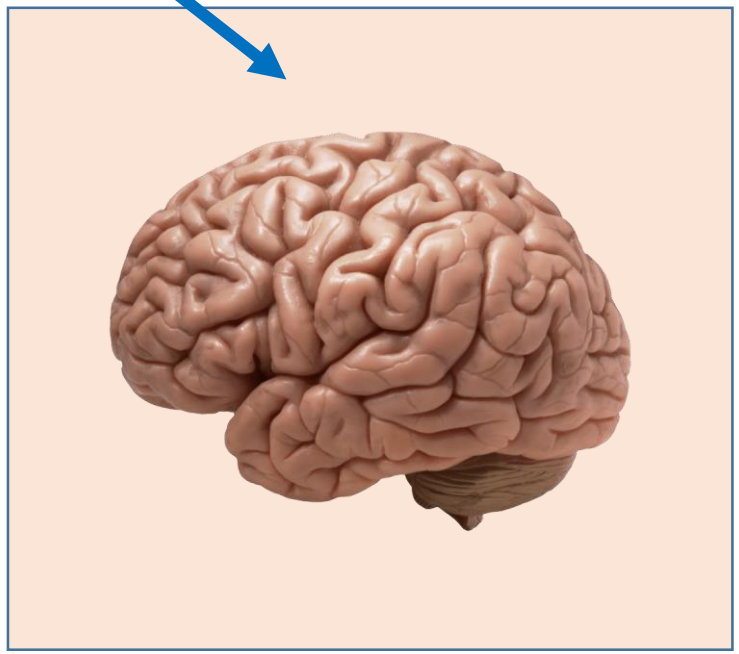
[1]Department of Psychology, Harvard University, Cambridge, Massachusetts 02138, [2]Massachusetts General Hospital NMR Center, Charlestown, Massachusetts 02129, and [3]Department of Psychology, Yale University, New Haven, Connecticut 06520-8205



Using functional magnetic resonance imaging (fMRI), we found an area in the fusiform gyrus in 12 of the 15 subjects tested that was significantly more active when the subjects viewed faces than when they viewed assorted common objects. This face activation was used to define a specific region of interest individually for each subject, within which several new tests of face specificity were run. In each of five subjects tested, the predefined candidate "face area" also responded significantly more strongly to passive viewing of (1) intact than scrambled two-tone faces, (2) full front-view face photos than front-view

faces versus hands. Our technique of running multiple tests applied to the same region defined functionally within individual subjects provides a solution to two common problems in functional imaging: (1) the requirement to correct for multiple statistical comparisons and (2) the inevitable ambiguity in the interpretation of any study in which only two or three conditions are compared. Our data allow us to reject alternative accounts of the function of the fusiform face area (area "FF") that appeal to visual attention, subordinate-level classification, or general processing of any animate or human forms, demonstrating that

ابزار



???

ابزار

tasks

Experimental design is at the heart of any cognitive neuroscience investigation.

Miyapuram, 2008

Participants

Stimulus

Paradigm (design)

Type of data (Outcome)

Brain Monitoring technique

Participants

Developmental studies

Clinical situation

Education & Intervention

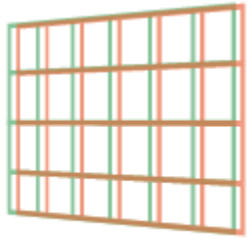
Stimulus

(1) Sensory channel

(2) Class of the stimulus

The stimulus

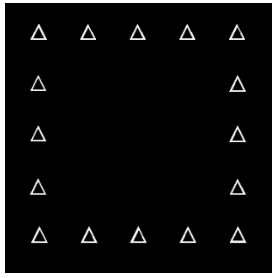
Luminance patch



Depth stimuli

Letters

Faces



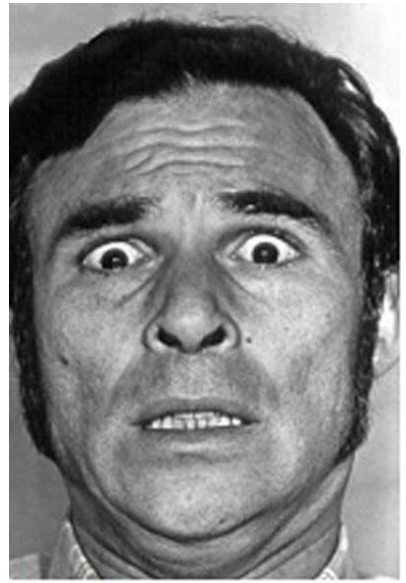
Geometric shapes

Real scene

Stimulus manipulation

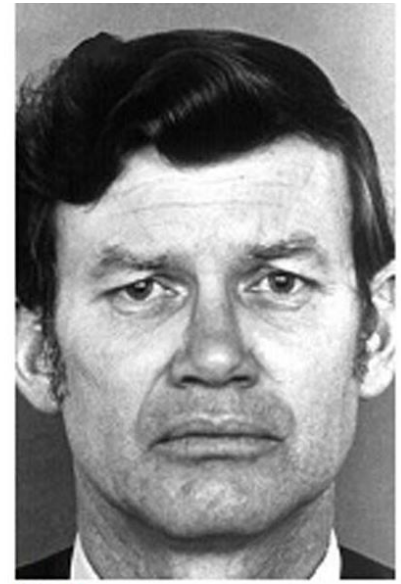
1. **Intensity**
2. **Quality**
3. **Duration**


0%
20%
40%
60%
80%
100%

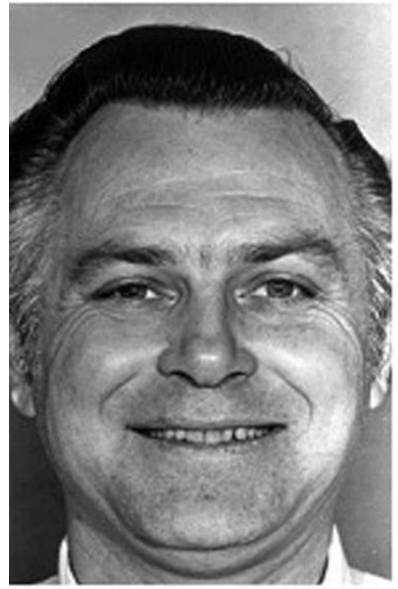


Fearful

Angry



Sad



Happy

Disgusted

Surprised

قالب

Paradigm (design)

قالب

Paradigm (design)

- **studying the mental processes:**

passive

active

سایکوفیزیک

Paradigm (design)

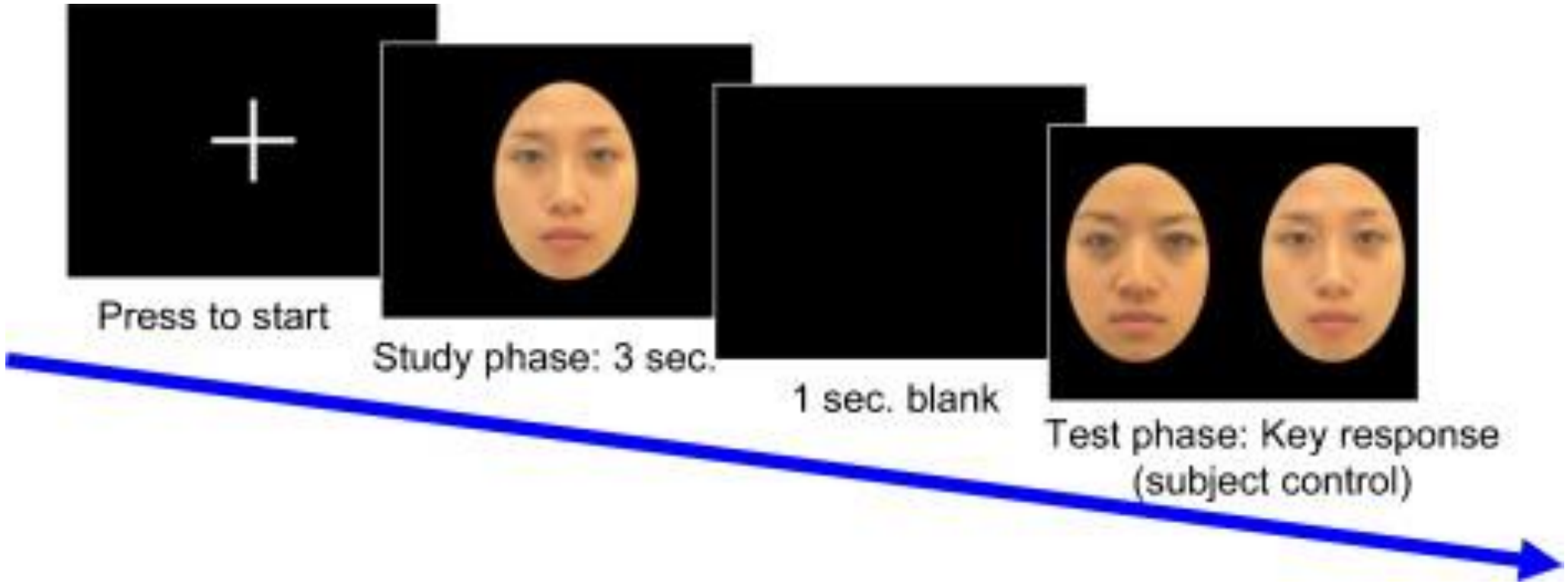
دستورالعمل؟

چند بار؟

به چه صورت؟

با چه فاصله زمانی؟

.....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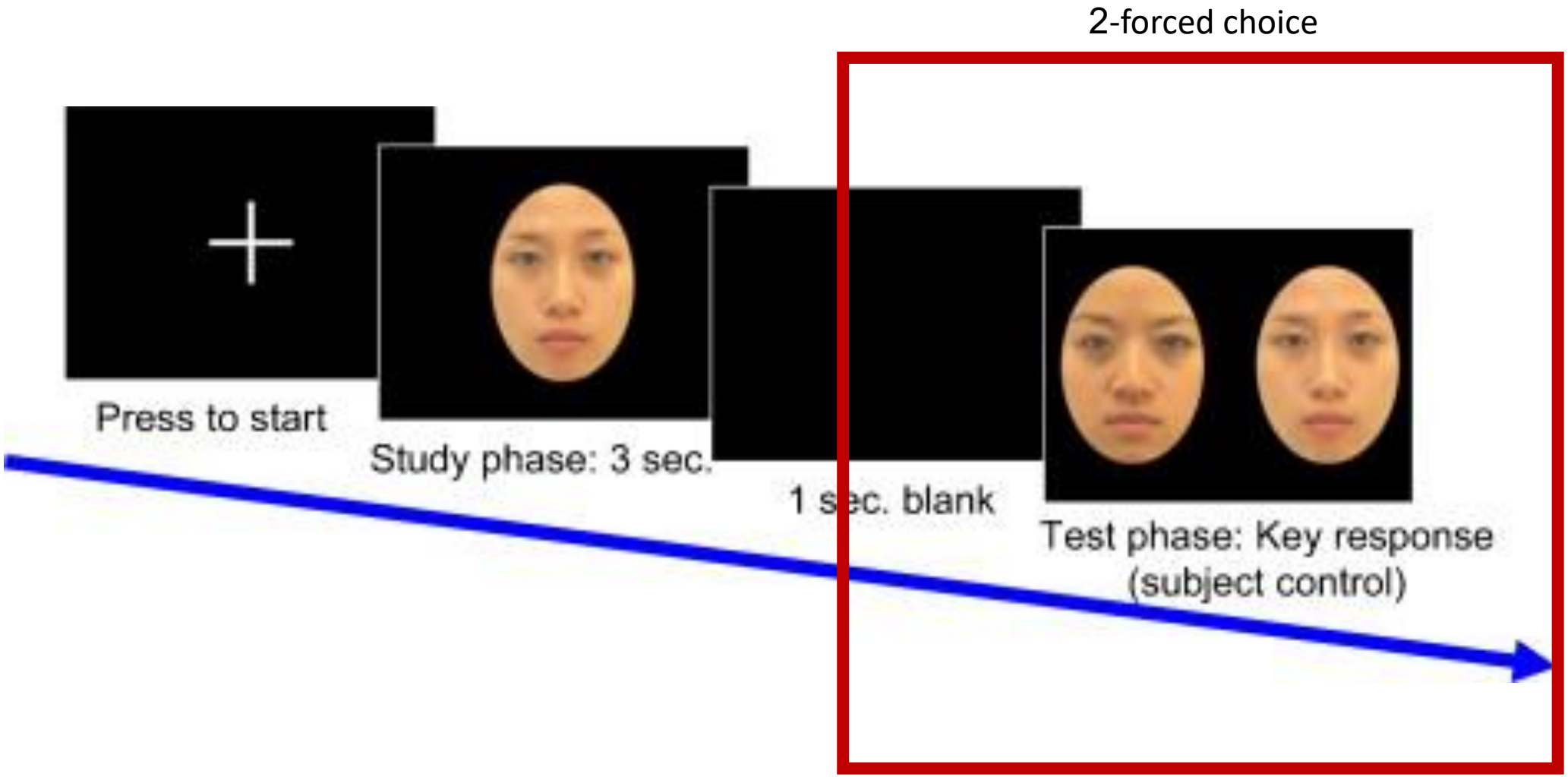
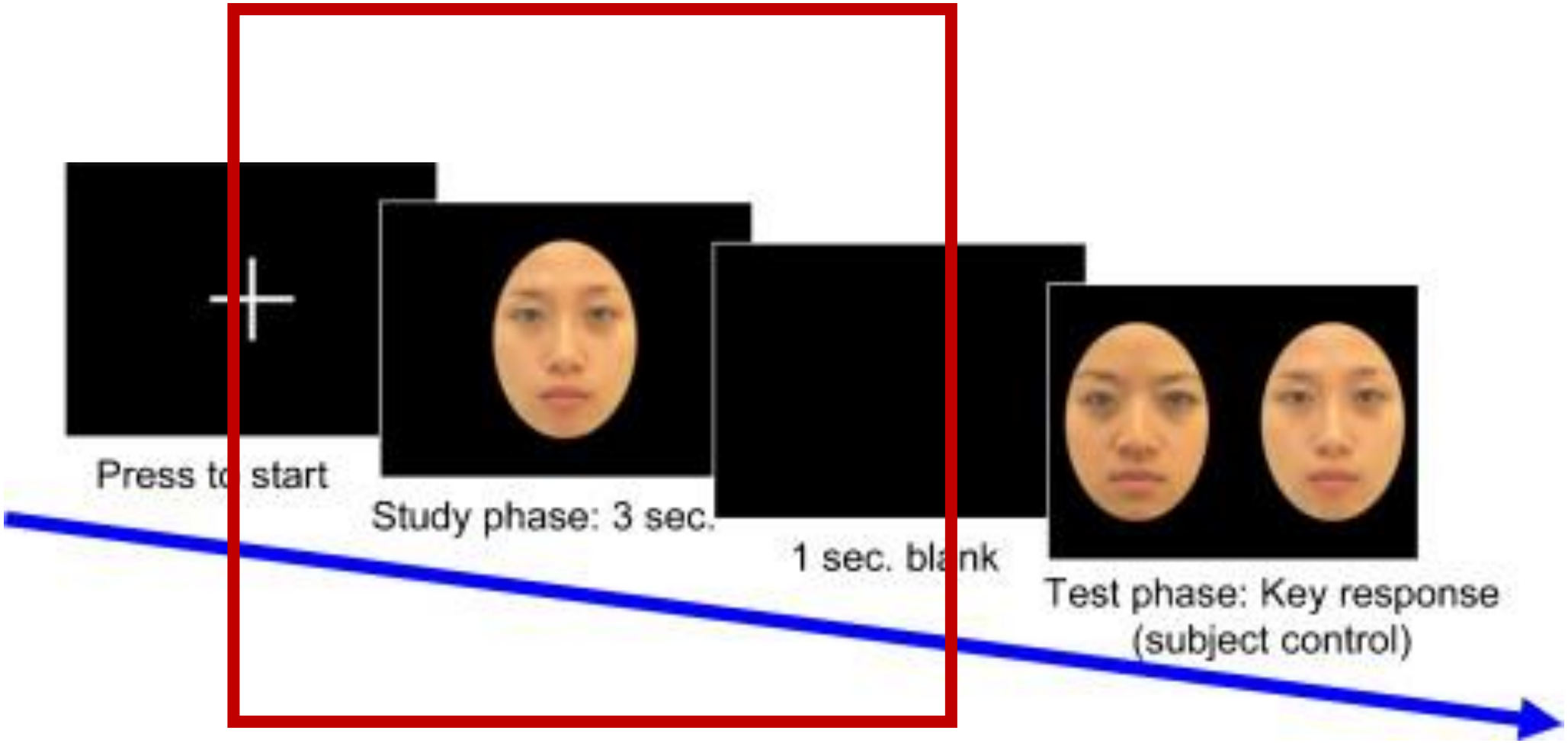
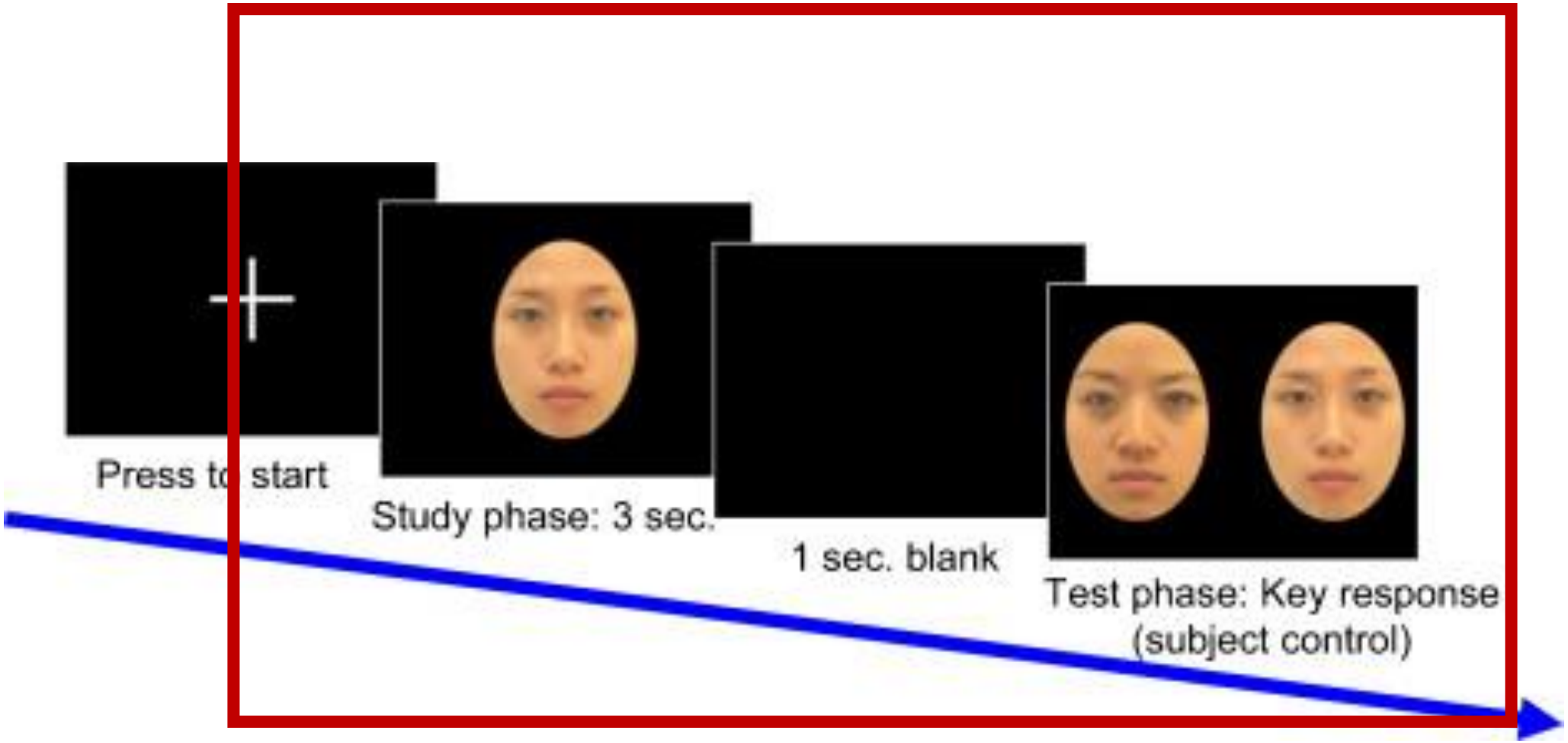
1 sec. blank
Test phase: Key response
(subject control)


2-forced choice
Press to start
Study phase: 3 sec.
1 sec. blank
Test phase: Key response
(subject control)

Match- to- sample



Delayed Match- to- sample



دستورالعمل؟

Type of data (Outcome)

data

- Reaction Time
- Accuracy (error rate)
- Task-completion procedure
- Self- assessment

data

- Reaction Time
- Accuracy (error rate)
- Task-completion procedure
- Self- assessment

Behavioral data

data

- **Reaction Time**

Simple reaction time

Choice reaction time (complex RT)

- **Complexity of the situation**
- **Number of choices (alternatives)**
- **Familiarity**
- **Stimulus value**

data

- Reacti

Simple

Choice r

(a) Press *J* when light goes on.

(b) Press *J* for left light, *K* for right.

- **Reaction Time**

Simple reaction

Choice reaction

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Color Stroop and Negative Priming in Schizophrenia: An fMRI Study

Lida Ungar[a], **Paul G. Nestor**[b,c], **Margaret A. Niznikiewicz**[b], **Cynthia G. Wible**[b], and **Marek Kubicki**[a,b]

[a] Psychiatry Neuroimaging Laboratory, Department of Psychiatry, Brigham and Women's Hospital, Harvard Medical School

[b] Clinical Neuroscience Division, Laboratory of Neuroscience, Boston VA Healthcare System-Brockton Division, Department of Psychiatry, Harvard Medical School, Brockton, MA

[c] University of Massachusetts Boston

Abstract

Disturbances in selective attention represent a core characteristic of schizophrenia, whose neural underpinnings have yet to be fully elucidated. Consequently, we recorded brain activation using functional magnetic resonance imaging (fMRI) while 15 patients with schizophrenia and 15 age-matched controls performed a well-established measure of selective attention- color Stroop negative priming task. We focused on two aspects performance: overriding pre-potent responses (Stroop effect) and inhibition of prior negatively-primed trials (negative priming effect). Behaviorally, controls demonstrated both significant Stroop and negative priming effects, while schizophrenic

data

- Reaction Time
- Accuracy (error rate)

- **Reaction Time**
- **Accuracy (error rate)**

<u>Speed-accuracy tradeoff</u>

↓ RT	↓ Accuracy
↓ RT	↑ Accuracy
↑ RT	↓ Accuracy
↑ RT	↑ Accuracy

data

- Reaction Time
- Accuracy (error rate)
- Task-completion procedure

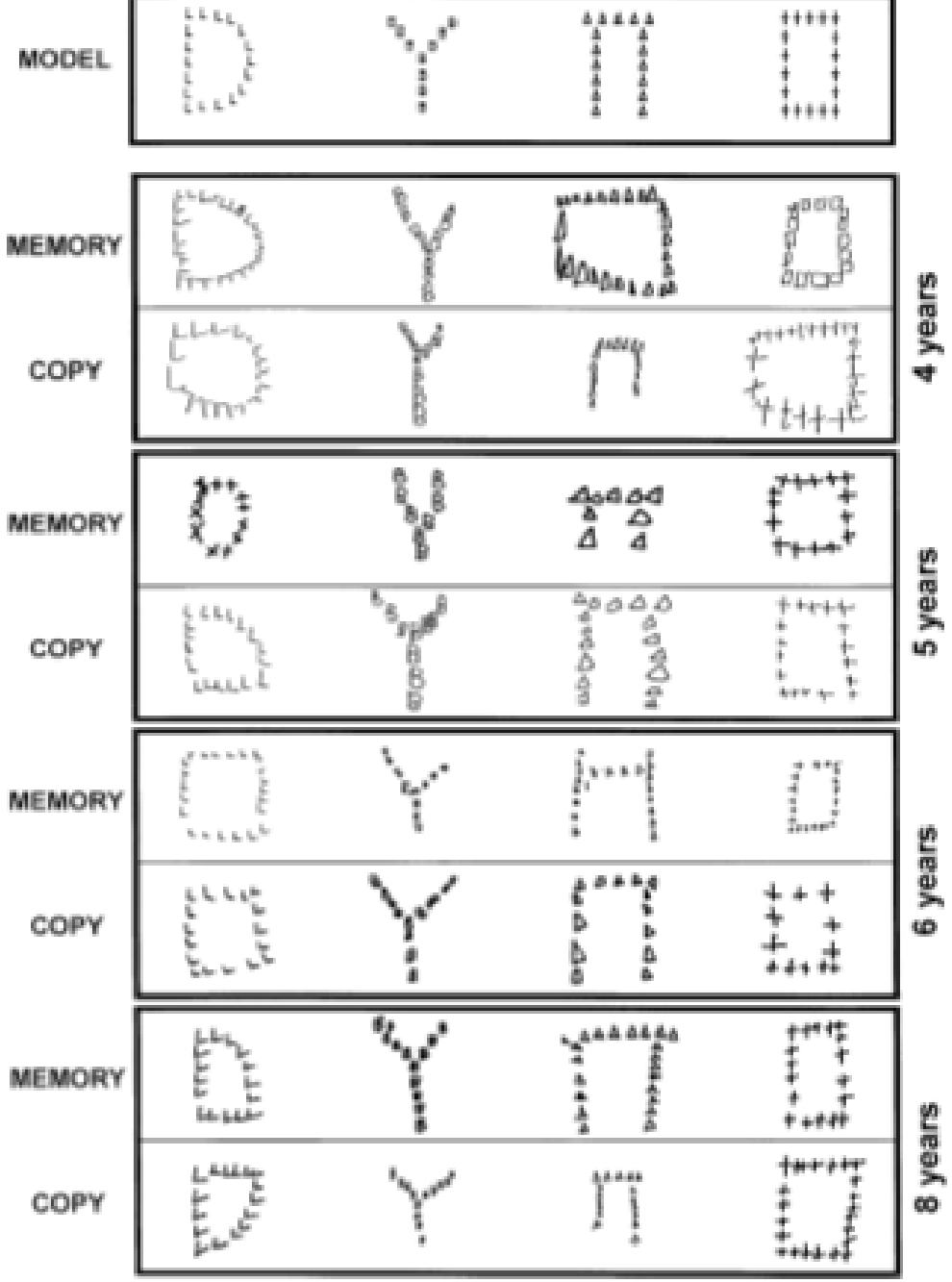

Figure 5 *Representative reproductions by children in*

- **Reaction T**
- **Accuracy (**
- **Task-comp**
- **Self- asse**

Contents lists available at SciVerse ScienceDirect

Behavioural Brain Research

journal homepage: www.elsevier.com/locate/bbr

Research report

fMRI-activation during drawing a naturalistic or sketchy portrait

K. Schaer[a], G. Jahn[b], M. Lotze[a,*]

[a] Functional Imaging Unit, Center for Diagnostic Radiology and Neuroradiology, University of Greifswald, Greifswald, Germany
[b] Department of Psychology, University of Greifswald, Greifswald, Germany

HIGHLIGHTS

- We used fMRI to measure 20 naive subjects during drawing a portrait.
- Participants were able to track their drawing online.
- We identified three important circuits specific for the process of portrait drawing.
- Circuits where: face perception, location encoding, and continuous feedback processes.
- Representations involved: fusiform gyrus, precuneus, parietal sulcus, and cerebellum.

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Available online 15 May 2012

Keywords:
Drawing a portrait
Face perception

ABSTRACT

Neural processes for naturalistic drawing might be discerned into object recognition and analysis, attention processes guiding eye hand interaction, encoding of visual features in an allocentric reference frame, a transfer into the motor command and precise motor guidance with tight sensorimotor feedback. Cerebral representations in a real life paradigm during naturalistic drawing have sparsely been investigated. Using a functional Magnetic Resonance Imaging (fMRI) paradigm we measured 20 naive subjects during drawing a portrait from a frontal face presented as a photograph. Participants were asked to draw the portrait in either a naturalistic or a sketchy characteristic way. Tracing the contours of the face with a pencil or passive viewing of the face served as control conditions. Compared to passive viewing, natural-

data

- Reaction Time
- Accuracy (error rate)
- Task-completion procedure
- Self- assessment

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Color Stroop and Negative Priming in Schizophrenia: An fMRI Study

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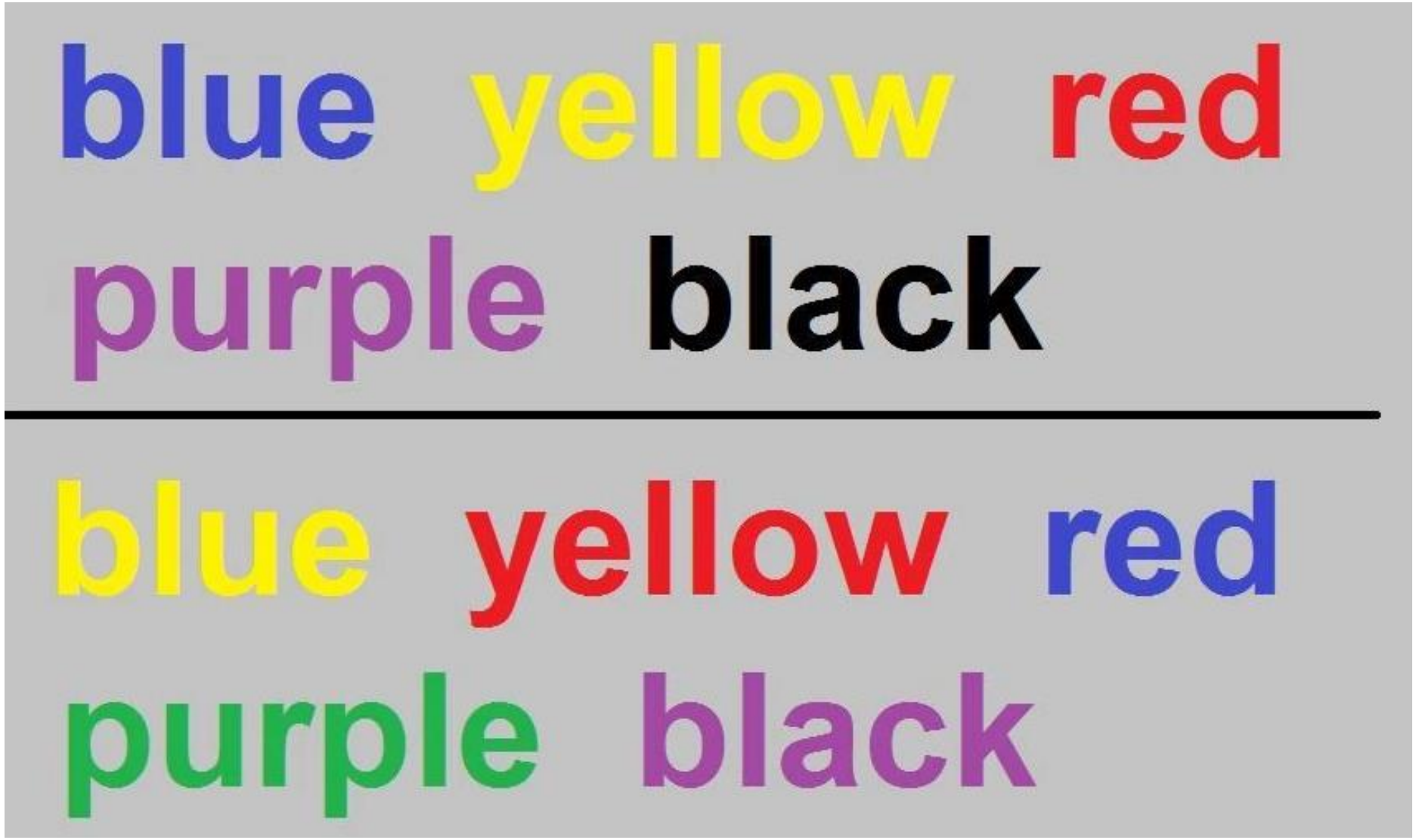
Abstract

Disturbances in selective attention represent a core characteristic of schizophrenia, whose neural underpinnings have yet to be fully elucidated. Consequently, we recorded brain activation using functional magnetic resonance imaging (fMRI) while 15 patients with schizophrenia and 15 age-matched controls performed a well-established measure of selective attention- color Stroop negative priming task. We focused on two aspects performance: overriding pre-potent responses (Stroop effect) and inhibition of prior negatively-primed trials (negative priming effect). Behaviorally, controls demonstrated both significant Stroop and negative priming effects, while schizophrenic


blue yellow red
purple black
blue yellow red
purple black

قرمز	آبی	سبز	بنفش	زرد
مشکی	زرد	قرمز	صورتی	آبی
زرد	قرمز	سفید	سبز	قهوه‌ای
آبی	بنفش	زرد	قرمز	سبز

combine fMRI and NP Stroop test to examine the dynamics of selective attention in patient and control groups. We hypothesize that each of the incongruent trials will be linked to differential brain activation within prefrontal regions. In particular, we predict that in relation to healthy controls, patients will show reduced ACC activation for the classic Stroop incongruent trials whereas negative priming trails will be related to aberrant DLPFC activation.

2. METHODS

2.1. Subjects

Fifteen male patients diagnosed with chronic schizophrenia, using DSM-IV criteria based on SCID-P interviews and a review of the medical records (mean age 43 (±7), mean age of onset 21.7 (±3.3), mean neuroleptic dose (mg/day in chlorpromazine equivalents 632 (±307)) and 15 male control subjects (mean age 43 (±6)) were matched on gender (all male), handedness, PSES, and age. All subjects gave written informed consent prior to participation in the study, and all were compensated for their time. Criteria for subjects' inclusion were as follows: right-handedness, ages between 18 and 55 years, no neurological illness, no alcohol or drug dependence in the last 5 years and no abuse in the past year.

2.2. Negative-Priming Color Stroop Paradigm

The Color Stroop/Negative Priming paradigm is a modified, computerized version of single trial/event related classic Color Stroop paradigm, where color names compete and interfere with incongruent ink colors they are written in. In our experiment, stimuli consisted of four color names (red, green, blue, or yellow) presented in one of these four colors (size 44 font) on a black background. Subjects were asked to report the color in which the word was written, by pressing the corresponding response button, ignoring the name of the color itself. Each word

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2. METHODS

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Runs were different from each other, and their orders were counterbalanced between subjects.

3. RESULTS

3.1. Behavioral Data

There was no significant difference in overall response time between the two groups ($t = -1.162$; $df = 28$; $p = 0.260$) with a mean response time of 1099.52 ms (±131.29 ms) for normal control subjects and 1210.58 ms (±346.03 ms) for the schizophrenic subjects. The mean difference in response times between congruent and incongruent trials for normal control subjects was 111.39 ms (±47.06ms) and for schizophrenic patients was 122.74 ms (±71.22 ms). The mean difference in response times between the incongruent trials with the negative priming manipulation and those without for the normal control subjects was 30.62 ms (±50.62 ms) and for schizophrenic subjects was 17.87 ms (±49.03 ms).

Statistical tests revealed a strong main effect of Stroop interference ($F(1, 34) = 27.35$, $p < 0.0001$), and no group by condition interaction ($F(1, 34) = 0.54$, $p < 0.47$). For negative priming, there was a main effect of negative priming ($F(1,34)=5.16$, $p < 0.03$), and a significant group by NP interaction ($F(1,34)=5.65$), $p < 0.023$). The significant interaction effect indicated that whereas the control group showed increased slowing for the negative priming trials, the patients did not. To follow-up on the interaction effect, we have conducted paired within-sample t-tests for each group for the NP effect. While normal controls showed a strong NP effect ($p < t = -4.709$, $p < 0.0001$), the patient group did not show this effect ($t=0.06$, $p < 0.95$).

3.2. Imaging Data

Schizophrenic patients showed less activation associated with Stroop effect for incongruent trials that were not negative primed than normal controls in the medial frontal gyrus/ACC as well as in middle frontal gyrus around the inferior frontal sulcus (Broadman area 9) (Table 2, Figure 1), but showed greater activation in the medial parietal regions, that include posterior cingulate and precuneus (Table 2, Figure 1). For negative priming, schizophrenic patients showed significant activation in both the right and the left DLPFC (Broadman area 6- Table 2, Figure 2) while the healthy subjects only showed significant activation in the right DLPFC (Table 2, Figure 3).

Stroop interference effect in schizophrenic patients: An electrophysiological approach

Jaana Markela-Lerenc [a,b,*], Christian Schmidt-Kraepelin [b], Daniela Roesch-Ely [b], Christoph Mundt [b], Matthias Weisbrod [b,c], Stefan Kaiser [b]

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[b] Department of Psychiatry, University of Heidelberg, Germany
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ARTICLE INFO

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Prefrontal cortex
Anterior cingulate cortex
Attention

ABSTRACT

Schizophrenic patients present deficits in executive control functions. The Stroop test requires executive control functions, in particular response inhibition. So far only one study has employed the high temporal resolution of electrophysiological methods to investigate the neural correlates of the Stroop effect in schizophrenia. This study investigated medicated patients with schizophrenia or schizoaffective disorder (n= 15) and healthy controls (n= 15) using event-related potentials. The analyses of the P1 and N1 components revealed no differences between the groups indicating intact sensory processing in schizophrenia during the Stroop test. We found greater negativity in the incongruent as compared to the congruent and neutral conditions between 350 and 450 ms over prefrontal scalp areas in healthy subjects but not in schizophrenic patients. Later on, a sustained positivity was observed over parietal scalp regions in healthy subjects. This later sustained potential was attenuated in patients but only in the first block. This suggests that following practice patients show similar parietal effects as healthy subjects. The total errors in the incongruent condition in patients correlated negatively with the difference in mean activity between incongruent and congruent conditions over the left parietal area (time window 600–1000 ms). In other words the more errors were made by patients, the more attenuated was the Stroop related electrophysiological effect. This suggests that the parietal activity is related to successful resolution of the Stroop conflict in schizophrenic patients. Furthermore, the absence of the frontal deflection in patients reflects dysfunctional neural processes associated with

Participants

Stimulus

Paradigm (design)

Type of data (Outcome)

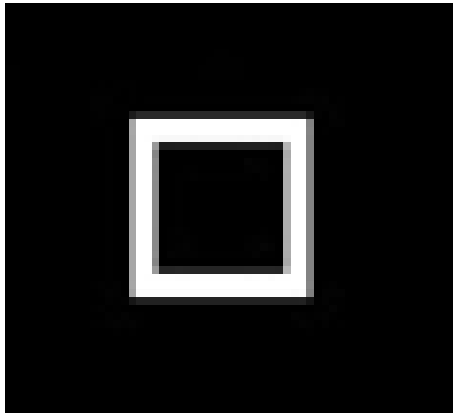
Brain Monitoring technique

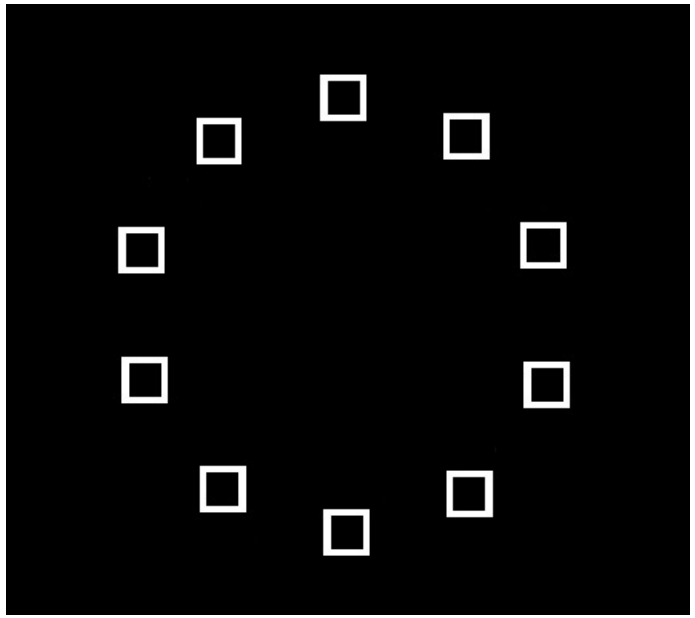
نکته مهم

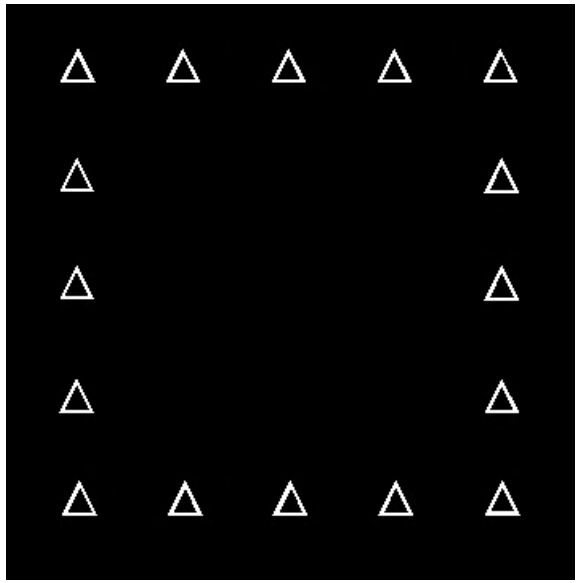
سوال پژوهش تعیین کننده انتخاب ابزار است.

سوالات

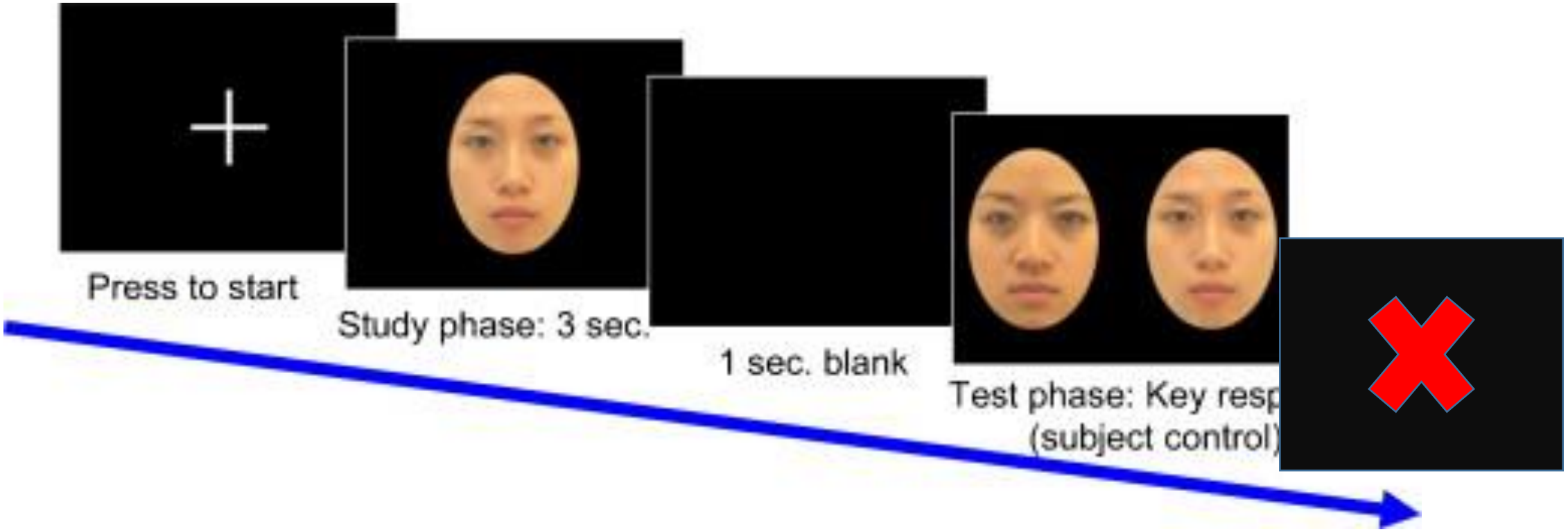
سوال 1







سوال 2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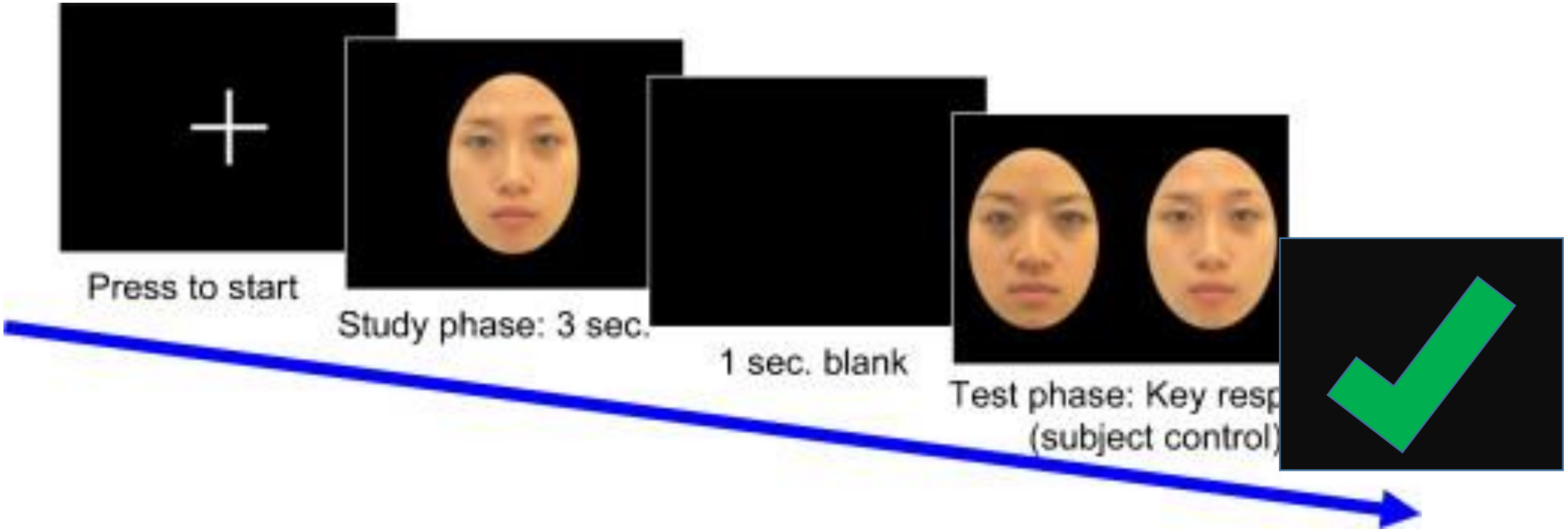
Test phase: Key resp
(subject control)

سوال 2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1 sec. blank
Test phase: Key resp
(subject control)

اثرات فیدبک