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The effects of the binocular disparity differences between targets and maskers on visual search

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: 9 D 2016

Abstract A
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(,); (3) - (-
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1 C , B K L B M H , K L M (M E), , B , C 100080
2 B I B D , C M , B , C
3 D , , M , O , C

. I , - , -
.

Keywords · · I · E · B · C · · · A

Introduction

Stereopsis and binocular unmasking

/ (E & D L , 2000). H , . I , (, M , & , 2008). , (H & , 1995, 2002, 2012) (. ., H , 2009; H & H , 1973; , M , & J , 1989). , , (H & H , 1973; M & , 1990, 1992; O , B , & K , 2010; , M , & ,1995, 2001; . 2010). .

(M & , 1992; ., 1989).

Crossed disparity versus uncrossed disparity

Object formation and the perception of a depth plane

Object identification in a cluttered two-dimensional field

“A”

. I , “ ” (. ., & G , 1980).

I , ,

. (2016) E , (-), - , , , . H

. O .

The purposes of the present study

O (-) (,). - - . . ( ) - . , - - ( ). I , ; , . . ( ) ( ) (-).

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. I , . - (F . 1). ( ), ( ), ( ). I - , . ( ) - , - . F , , . F 1 (F . 1). A - , - . I ( ) - - , - - . H - , , . - (F . 1). (M) - , - ( ). M - , . (F . 1). - ( ) . I - - - , - . I , , - , .

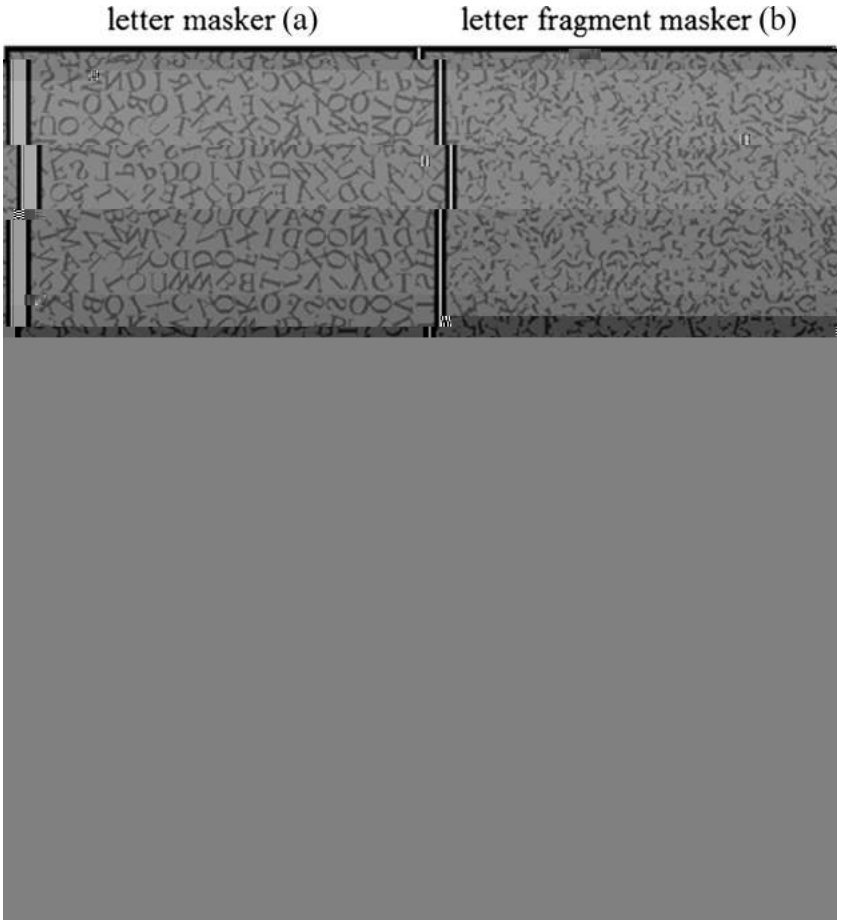

Fig. 1 E

I , , 45
- -
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(. ., -
) 13.3 13.3
(10.5 10.5).

Methods

Participants

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14) 17 26 (N , = 24 , F . 3),
, 22.5) .
, , ,
- - , .
(1 E). -
-
. 4.0 . F ,
(-)

Stimuli

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10 - .
. 1
M 788DF
1,024 768, . O - ,
80 H , .
, .
. O - ,

50% .

F :

, - , ,

(*see* F . 1). - -

18 18 ,

.

127

(33 / ^{2}).

77 (

). E

4- - -

255 (<0.1 / ^{2}).

-

F ,

-

(F . 1 2).

A -

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-

(F . 1 2).

( ),

F 2 - (**a**), (**b**), (**c**), (**d**) . N . , , , - - , .

A , ,
, .
12 ,
, ,
. I 12
. A
12
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12
, . A
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24
100
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Results

F 5 -
(,
- , ,). A 4 M (
, - , ,)
3 D (, ,) 4 D
(100, 400, 700, 1,000) - -
ANO A M
($F_{2.333,53.650} = 173.811$, $p < 0.001$, G -G -
), M D ($F_{2,46} = 49.203$, $p < 0.001$),
D ($F_{3,69} = 58.348$, $p < 0.001$). I , -
M D ($F_{9,207} =$
7.544, $p < 0.001$), M D D
($F_{4.116,94.658} = 4.488$, $p = 0.002$, G -G -
), M M D ($F_{6,138} = 3.719$,
$p = 0.002$), . -
M , M D , D
($F_{18,414} = 2.824$, $p < 0.001$).
-
.

$$y_{i,j,k,m} = MD_{i,j} + b1_{i,j}x_k + b2_{i,j}x_k^2 + e_{i,j,k,m} \quad (1)$$

$y_{i,j,k,m}$
m $(1 \le m \le 24)$
i $(1 \le i \le 4)$ j $(1 \le j \le$
3) x_k $(1 \le k \le 4)$. $MD_{i,j}$
j
i; x_k $(1 \le k \le 4)$
; $b1_{i,j}$ $b2_{i,j}$
j
i; $e_{i,j,k,m}$
.
I “A ” -
48 - ANO A,
10 , -
.[1] *solid lines* F . 5
( ), *lines with the larger dashes*
( ),
dashed lines with the smaller dashes -
( ). , ’ -
. F , ,
( ) (-
).[2] , ,
-
( )
( ).[3] , -
, -
( ) -
(-
).[4] F , , -
,
( )

[1]

Discussion

Are target comparisons easier when the target plane appears in front of the masker plane?

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. B
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. F 5
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, . O
. H -
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? -
G
. F , ,
(F , 2003). H
( ),
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[5] . *See* "A ".

[6] F- , -
, -
, . *See* "A ".

Does the object nature of the masking plane affect the ease with which targets can be compared?

. A
(*see* F . 5)
-
( )
. I
-
-
. H
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.[7]
-
[8]
-
( )
)
(; *see*
C & C , 2013).
,
,

. A 3 D 4
D ANO A
(M – L M) M
E D (F 3,138 = 12.112, $p < 0.001$)
D D D .
D
(F 1,23 = 34.507, $p < 0.001$)
-
. H ,
,

[7] I ,
.
A
(D .,
2003, F , H , M C , & C , 1999; , L , &
D , 2007). I ,
. I
(. ., ,
) . O

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,
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I
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-
. A 3 D 4 D
-
ANO A (L -
F M – L M)
M E D (F 3,138 = 7.174, $p < 0.001$)
D D D -
. A , D
(F 1,23 = 16.749, $p < 0.001$),
-
-
. G ( )
-
,
-
-
-
. A
.
I
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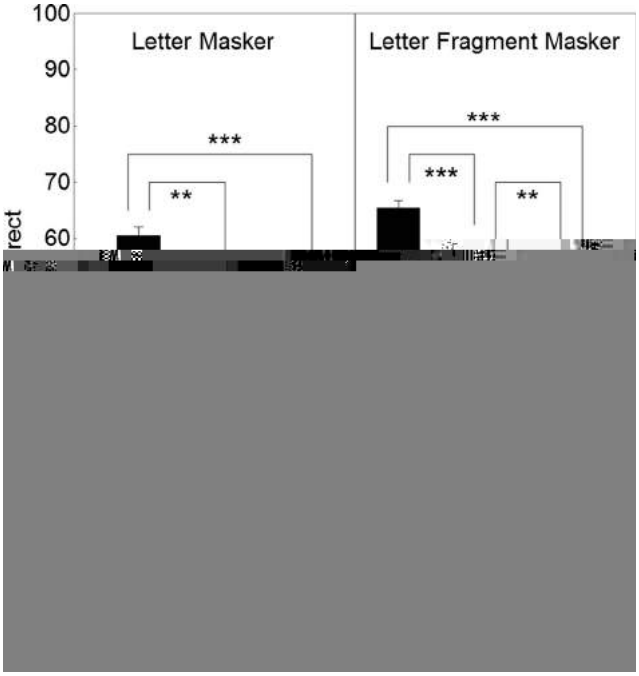

Fig. 6 A . C 50% .
Standard error bars

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Limitations

I - ( ) ( ), - G . I (.) - . A , - (G .). , , . I , . - , , .

H ,

( ) . H - .

Summary

1. , , , , , . (. ., G) ( ) .

2. I , - , , , , . L -

.

3. . ( ). .

4. .

5. ( ), - , - , , .

Acknowledgements “973” N B C (2015CB351800), B M & C (L161100002616017), N H D C (863 : 2015AA016306), “985” , N E C C (G IN-9952-13). L

Appendix

4 M 3 D 4 D “ ” 144,518 1,104 . E . 1 147,996 1,116 . H (ANO A L) . L M 10 . , 10-36 E . 1 , . I L M , , *i*, M *i* = 1 , *i* = 2 , *i* = 3 , *i* = 4 . , *j*, *j* = 1 ( ) , *j* = 2 ( ) , *j* = 3 (. , *k*, *k* = 1 100- , *k* = 2 400- , *k* = 3 700- , *k* = 4 1,000- . ,

$$
\begin{aligned}
H0{:}\; & MD_{1,1} = MD_{1,2} = MD_{1,3} \\
& MD_{2,1} = MD_{2,2} = MD_{2,3} = MD_{3,1} = MD_{3,2} = MD_{3,3} \\
& MD_{4,1} = MD_{4,3} \\
& b1_{1,1} = b1_{2,2} \\
& b1_{1,2} = b1_{1,3} = b2_{1,1} = b2_{1,2} = b2_{1,3} = b2_{2,1} = b2_{2,2} = b2_{2,3} = 0 \\
& b1_{2,1} = b1_{3,2} = b1_{3,3} \\
& b1_{3,1} = b1_{4,1} = b1_{4,2} = b1_{4,3} \\
& b2_{3,1} = b2_{4,1} = b2_{4,2} = b2_{4,3} \\
& b2_{3,2} = b2_{3,3}
\end{aligned}
$$

(F 26,1116 = 0.99, $p = 0.478$). H 10- 36 . *lines* F . 5 10- . - - :

$$
\begin{aligned}
& MD_{1,1} = MD_{1,2} = MD_{1,3} = 52.74 \\
& MD_{2,1} = MD_{2,2} = MD_{2,3} = MD_{3,1} = MD_{3,2} = MD_{3,3} = 46.65 \\
& MD_{4,1} = MD_{4,3} = 59.34,\ MD_{4,2} = 55.70 \\
& b1_{1,1} = b1_{2,2} = .0132719,\ b1_{2,3} = 0.0181527 \\
& b1_{2,1} = b1_{3,2} = b1_{3,3} = 0.0344126 \\
& b1_{3,1} = b1_{4,1} = b1_{4,2} = b1_{4,3} = 0.0655073 \\
& b2_{3,1} = b2_{4,1} = b2_{4,2} = b2_{4,3} = -0.000037793 \\
& b2_{3,2} = b2_{3,3} = -0.0000114286
\end{aligned}
$$

2, · ,

$$
\begin{aligned}
H0{:}\; & MD_{1,2} = MD_{1,3} \\
& b1_{1,2} = b1_{1,3} = b2_{1,2} = b2_{2,2} = 0
\end{aligned}
$$

(F 5,1116 = 1.350, $p =$ 0.241). 3, · ,

$$
\begin{aligned}
H0:\; & MD_{3,2} = MD_{3,3} \\
& b1_{3,2} = b1_{3,3} \\
& b2_{3,2}2 = b2_{3,3}
\end{aligned}
$$

(F 3,1116 = 1.145, $p =$ 0.459). 4, - . - , .

$$
\begin{aligned}
H0:\; & MD_{2,2} = MD_{2,3} \\
& b1_{2,2} = b1_{2,3}
\end{aligned}
$$

(F 3,1116 = 3.521, $p =$ 0.015). - · ,

$$
H0:\; MD_{2,2} = MD_{2,3}
$$

(F 1,1116 = 0.000, $p =$ 0.997). H - .

5,

,

$H0: MD_{4,1} = MD_{4,2} = MD_{4,3}$
$b\ 1_{4,1} = b\ 1_{4,2} = b\ 1_{4,3}$
$b\ 2_{4,1} = b\ 2_{4,2} = b\ 2_{4,3}$

(F 2,1116 = 2.217, $p = 0.039$).

,

$H0: MD_{4,1} =$ 2

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