A (2017) 79:459–472
DOI 10.3758/ 13414-016-1252-

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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Keywords · · I · E · B · C · · · A

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2 B I B D , C M B , C

3 D M , O , C

Introduction

Stereopsis and binocular unmasking

/ (E & D L , 2000). H ,

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(, M , & , 2008).
(H & , 1995, 2002, 2012)
(. ., H , 2009; H & H , 1973; , M , & J , 1989).
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(H & H , 1973; M & , 1990, 1992; O , B , & K , 2010; , M , & ,1995, 2001; . 2010).

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(M & , 1992; ., 1989).
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Crossed disparity versus uncrossed disparity

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, 1986; O’ & , 1997; M ,
F –, N , & F , 1987; ., 1995).

Object formation and the perception of a depth plane

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Object identification in a cluttered two-dimensional field

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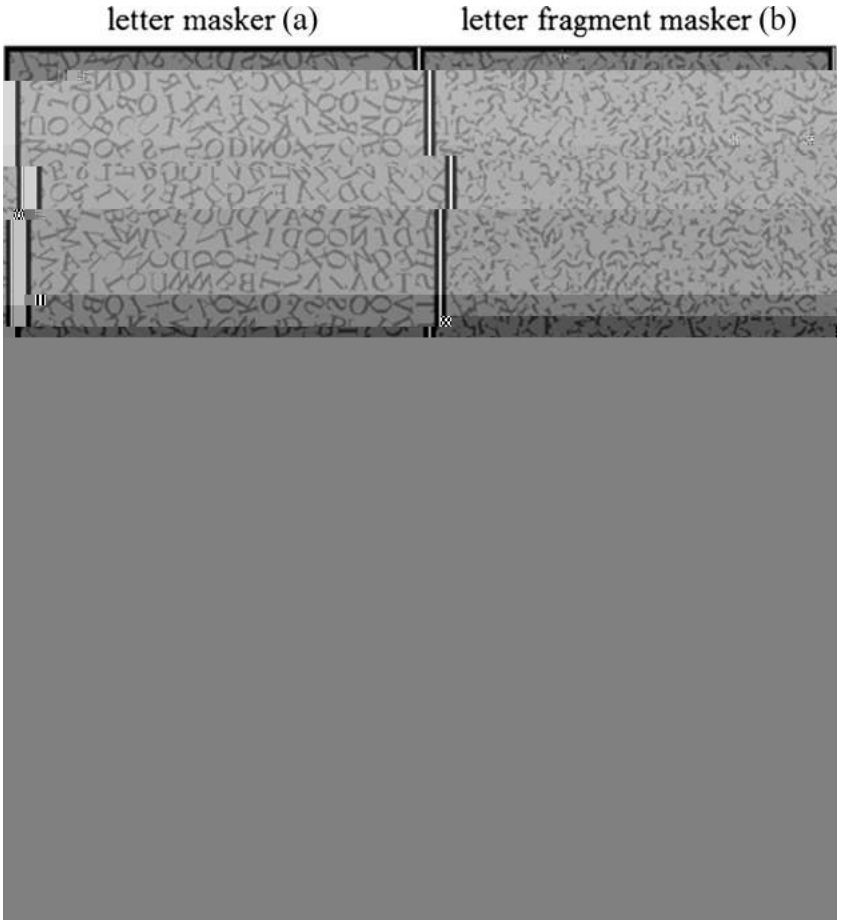

Fig. 1 E

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

Methods

Participants

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-, – (10 1 E (= 24 , F . 3),
14) 17 26 1 (N , = , 22.5)
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4.0 . F ,
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Stimuli

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M 788DF . 1
1,024 768, . O - ,
80 H , ,
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50% .

F : , , , (*see* F . 1). 18 18 , . 127 (33 / 2). 77 ( ). E 4- 255 (<0.1 / 2).

F , (F . 1 2).

A , (F . 1 2).

( )-3 ( ),

F 2 -

(**a**),

(**b**), (**c**), (**d**)

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Results

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- , ,). A 4 M 1 (
, - , ,)
3 D 1 (, ,) 4 D
(100, 400, 700, 1,000) - - 1
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 1 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 ($F_{6,138} = 3.719$, $p = 0.002$), 1 . -
M , M D , D
1 ($F_{18,414} = 2.824$, $p < 0.001$).
- ,
.

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

$y_{i,j,k,m}$
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,
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. 1 1 *solid lines* F . 5
( ), *lines with the larger dashes*
( ),
dashed lines with the smaller dashes -
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[1] -8(.) -4, -3(633(0(D 9(5(1 J0.0291)1) 20(D)1)15(2 1 -(2)5( )-2775(-

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

(*see* F . 5)

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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 ,

I

. 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

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

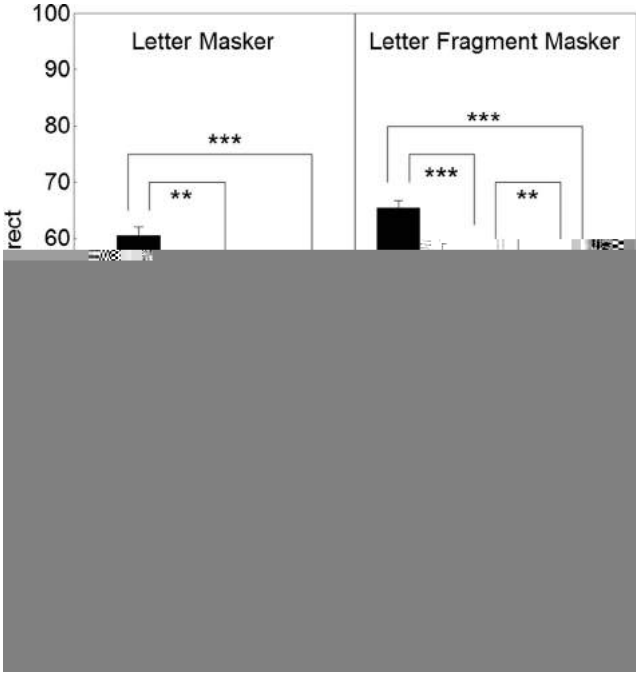

Fig. 6 A . C 50% .
Standard error bars

Limitations

I ( ) ( ), G . I (.) . A –, (G .). , . I , 1 . , , , , , , .

H – , ( ) . H .

Summary

1. 1 , 1 . (. ., G) ( ) .
2. I , , , , , . L
3. 1 . 1 ( ).
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Acknowledgements "973" N B C (2015CB351800), B M & C C 161100002616017), 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).

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

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

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

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

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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, $p = 0.039$).

$H0: MD_{4,1} =$

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