

!"#\$%&'(#)'#\$%\$)+,%\$*,\$%)'#\$%\$)+. #\$/ :
O\$)'#\$%\$)+12&324*

R569S#O&E+ ,!5&H%69&61R5 *T&%E^{BD*}

(EAS#&O#60?935.93,8069J0K#)93,F##69E,U,E,456&,+A\$5.'?N1*\$806&!\$#6#,V8695*7./1&J0K#/=)68,V8695*EE,EC,456& ;BAI0#G#3H2/80/3.?4900#7#/) \$##61H8(069,F##697./1&J0K#)93,F##69 E,U<,456& ;DAI#8/669W4986H2/80/3,456&7./1&J0K#)93,F##69E,,B,456&)

O351 L %6906#M#05#05#?68069.?980# \$60' % \$609#0". 605#8066&)#068066&2%6 (XF),M#5%&1#806/#.06905#)#561(L+).?OM0/90M#60\$#) +, -<, 1) 80/05#?/0(LE)6&8/91)#8&K%)*&"/#68066(YI Z8)0#8 05)013#01%#105#"80#6.?969#?#0)6M#50M061).?\$.#1\$# I 805(%#A%05#)ᾂ&)#0./1%I 805(%#A%&1#8066&)#005#\$./.?05#**\$169L+A809%80).?05#013M##&G1 OI.60/LE&61L+%60%#YI Z8)0#81)M#05#\$#L+.6#0)395/ .6

!"#.0#1234567806&861#698.:#50(;<)"#\$%&'),7806&780/&!\$#6#>*61806.?456&(@807.)AB,-,+C ,BD,<C , CD,E)861F##69G#3H2/80/3.?H8(069&6149006,456&7./1&J0K#)93A
**L M5I \$/#).61#6#)5*12#811#)#1ANH & :DE D@'C #1* \$6

But this cuing effect at the long TOA is not as large as at the short TOA, because the attentional engagement to T2 is not delayed outside of the AB period and the cue could not increase the T2 performance much. Thus, the index of whether the cue counteracts the delay of attentional engagement to T2 is the larger beneficial cuing effect in the short than in the long TOA condition, i. e., the significant interaction between the cue condition (cued vs. uncued) and the TOA condition (short vs. long).

An important assumption of the delayed engagement account is that the cuing effect is contingent upon the match between the cue and the attentional control setting for the target^[17]. That is, during the AB period, the response to a stimulus event is under sustaining top-down control (but see Di Lollo et al.^[18]), which decides which stimulus deserves the processing resources. When the feature (e. g. color) of a cue does not match with the attentional set for the target, this cue cannot capture attention^[19], i. e. cannot open the attentional window before the T2 presentation. This contingent cuing account is based on the contingent capture hypothesis proposed by Folk et al.^[19] who suggested that the capturing of attention occurs only if the event shares the feature property (e. g. color) which is critical to the performance of the task at hand and which is programmed into the attentional control setting. However, this hypothesis was challenged by some empirical evidence, including studies by Theeuwes and his colleagues^[20–24] who demonstrated that a singleton or salient stimulus not matching the attentional set also captures attention. Nevertheless, the effect of attentional capture of the salient singleton is relatively brief, because this bottom-up capturing effect can be quickly overridden by the top-down control^[24]. In line with these attentional capture studies, we hypothesize that a cue with a color not matching the attentional set but salient enough to capture attention would open attentional window and produce cuing effect on T2 performance, but this cuing effect would be smaller than the cue with a color matching the attentional set for the target.

Results from studies on the cuing effect or attentional capture in the AB seem to be inconsistent. In Experiment 2 of Nieuwenstein et al.^[16] and Experiment 1 of Nieuwenstein^[17], the targets were colored digits and the distractors were uppercase letters in

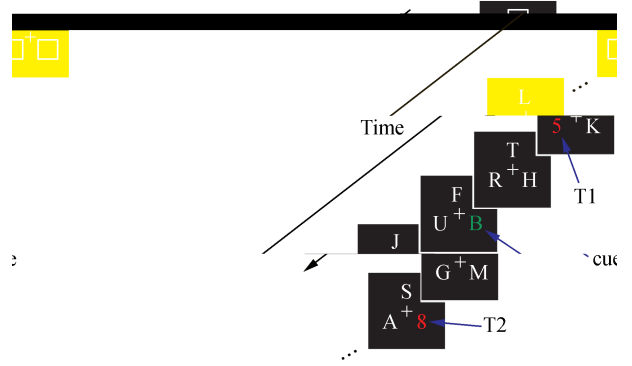
grey. The cues used in both experiments were two successive distractors preceding T2. These cues had a color which was different from (or the same as) the targets but which was always different from other distractors in the RSVP stream. In the Experiment 2 of Nieuwenstein et al.^[16], the cuing effect of cues sharing the same color with the targets (i. e., the same-color cuing) was larger than the effect of cues possessing a different color from the targets (i. e., the different-color cuing). The interaction between the cue condition (cued vs. uncued) and the TOA condition (short vs. long) was significant for the same-color cue, but not for the different-color cue. In Experiment 1A of Nieuwenstein^[17], the cue with a color different from the color of the targets also resulted in

!"" #, \$& (&#)%!, (-&. "- /012(345#)678
 #'-%&!)-%9&/!, ("*)%- ": 0<3=1? #@*(A
 B#)*) (+, (-&%- /-. !, 5!.%9": +!&5/-&
 !, (+-(-(\$!, 5-&**. DE, (-&%- ("&\$!,
 ('&: //-(A,)!FC(A#/)A8, &9& \$!,
 .%9& !/\$-:!"#&, (&/-9%9:!"#<&GAS,
 .%&/5!((-. &, 5,) \$!,)++!5(,*&!(
 .!/\$-:!"#&, A+ /C&(,%)%9"H", "I", "J",
 "E"/-."K"), /-. \$!, +, (-&. %&!,, (#)*&F
 -,"(*)&! 7BLE(&/#(+/5. % /-)+, M%&!/A
 &%-9*! A!/-9#, -&/-9/-%#/9!AD&B, \$&
 /OAN%#,& (5AE,&(" - /-. 0*/[-G], (, P&A
 O)A8, %#/9!D.%#,& \$((#/*, "-)9 ("&/&
 +!&5/-&5)*. %, -&D%#(% /-D": &, &!,,
 *5%-(\$&")&!, ("!&69&, D #Q#, -&AR/5
 (&/#5-9&. ": <O&#(, \$&& &, !, (&5%-&/&
 -" *&!(".%9& \$!, !, +&. \$&% / (&/# "I
 /++A,. % #!, &/- "-, (&/# .)!%9&, (/#
 :!/#, A8, +, (-&%- !/& ": 7BLE \$(OAO
 %&#(+! (5-. A8 /&%, &, "- (&/D5!"-DCF
 &\$, - ,/5 %&# \$(G # (, \$&")&C/-S%&!Q*
 C&\$, -%#(AP! O+!&5/-& &, &9& \$!,
 %!,. (\$& &, 7TUQ), ": [O4 ; ;]AP! &,
 "&! O +!&5/-& &, &9& \$!, % 9,, - ([; ,
 O ; ;]A8)/-. &<"5)!!,. % /-D(&/# \$&, F
 M)* +!(9&A8, .%&/5! *&!(\$!, % 9, D
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 5*!) ' / . &\$* Q*(, /O%9&, (/#, 5*! / (&
 &9& "I ' /O%9 / .%!, -&5*! :!"#&, &9&A

8,!, \$!, <1 5,. &%(:!" ,/5 5#C%/&%-
 ": 5, 5*! , 68JW /-. 8JW\$, - &, 80/- . &<
 "5)!!,. \$&% / (&/# /-. V3&%(\$, - &, 80
 /-. &< \$!, % .%!, -&(&/#(A8) (&!, \$!,
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 &!, \$!, O<&%(:!" ,/5 8JW\$, - &, 80/- .
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 :!" ,/5 8JW\$, - &, 80/- . &<"5)!!,. % .%!, F
 , -&(&/#(AU5) (&!, \$!, /&&*": O33&%(
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 , -&(&9C"5) /-. &!, \$(/- %&!Q*": O<
 #%)&(C&\$, - &, C"5)AE!&5/-&!, 5%Q. 3
 +!&5 &%(C:!" , &, D\$!, &(&. :!" &, , @, !%#
 #, -&A

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 & 9, ((%&, D\$!,)-0!, \$ /&&, &9& \$!, A



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O4 H(% /-. +!"5.!),

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2 Results

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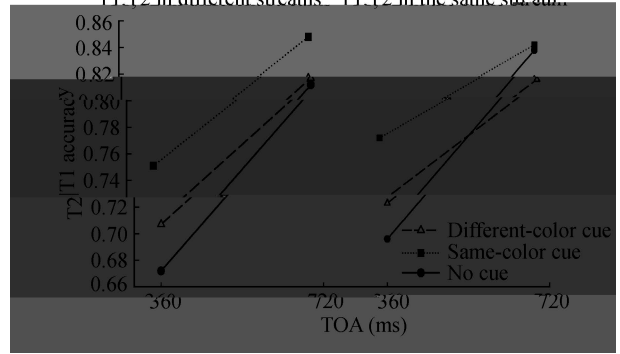
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(. CD:+G \$(OH< &) F 8(; 523# 32(-15:
2# ; \$& ; 2\$& A 9(077#(2; 2\$&) DI CJD 9
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/K#H;! <<9</ ; 2=3: '#. 85#7#&\$!' 7#
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(&\$) K89,), &\$17; 2(62 261 \$DM 7!29
. = &\$('7!2-7!" !-(02(: \$; 16(17\$2,
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25# 32(-15: \$; 16(17\$2," (/ &)) L#G,
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2# ; 523# 32(-15: \$ (-22# !\$;' -7077#
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T1,T2 in different streams. T1,T2 in the same stream.



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		*<	//9P89**	/9P89	**
	T17#(2-3#!"	/K<	U<9P89	U89P/9	
T17#(2 2\$&		8k	U/9P89	89P/9*	
		*<	/+9P89**	N9P/9*	**
	C&\$ >-3#!"	/K<	L9P/9*	/9P/8	
		8k	G9P/9**	L9P/9*	
		*<	/+9P89**	89P89	**
	T17#(2-3#!"	/K<	89P/9	U/9P+9	
. = ; \$& ; 2\$&		8k	UK9P+9*	UH9P89*	
		*<	H9P/9**	N9P/9*	**
	C&\$ >-3#!"	/K<	G9P/9*	<9P89	***
		8k	U<9P89	UN9P89*	

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&\$('7!2-7. CD: \$; 16(17\$2," (/ &))

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)"-+ 45#(+ +& (" & \$3 %4 O6) 53/2' &+ *+ . ' +
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\$#5-\$%& , " %& 53/ %&? , (+&#(+ D09. , " ,
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53#7Q(\$ 48/\$3 \$ %& \$ #&# , \$ (#(+ -%&/\$%&
3&#-. \$3 (?)#(+ \$ %4 /4"? +&3-2+&# 2%4 ,
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-%&5 #(+-. + # 4# #(+ "##&#&#&#& ' # 45#(+ # 5
3#7: !# 53# 53? , %& 23# " 53# + (# , % 2## 5
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*+ " 2&/+ / 7B' (%! / 8# / , (% +85 , !#(% 3 "
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5+ #(+-. \$3+4# \$ #4# +5 \$ " 2\$ 2' # (*# , +&
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+4# / \$ &# 85 " " 4 & #8% %4 #(+ ')" # 5";
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4- \$ \$ # 15 , (+& O1 "&/ #(+-. + (" &/ O6) , 5- \$&
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)5%+' 2? (" & & 3 # 3 \$ 2) #.)%&#(+ O6) 53/2'
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/ \$45&#-%5" 2 #(+ %)+& 83 %4 #(+ "##&#&#&#& , \$&
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) 53/2' &+ 79 \$ 8! ? # \$ \$ (\$ \$ 15 - . \$ 3+4# #
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#(+ " 2+ PORS ' 5" 2 %5 \$ \$ / \$45&#-%5" 2 , #(+
)5+ &# ' # / ? %& 53/ - . \$3+4# 45#(+ O6) +5
452' &+ , -%2" 5 / , \$ (#(+ . &. + / -%&/\$%& 7

!"#\$%&'(\$)\$ \$ +-. *\$ /O'(\$-))\$ \$ 1*2&
*.\$ #3453283- 21\$)"&34"&8&68"- '(3
'(\$)\$ \$ +-. *\$ /O'(\$351"2&*. \$78'8%8&,
'(\$*. +99)\$ \$ +4\$ (\$3\$ \$ +, 3/2: 688- #34
+ 9\$ 8249) +3' 202898' (3' (\$)\$ \$ ". '4\$
)' (\$; < #(\$ ' (\$=>; /\$ #\$\$ ' (\$*. \$3- >@
#34("& 7>(\$)\$ +, +944994' (3' (\$*. \$*. 2
*3. 83\$ \$ +, 3- "6' (\$3\$ \$ +, 32#+- "#)"&
>@, " 53\$ 8+ 53*(\$4' (\$3\$ \$ +, 324\$ - \$ + \$
'& (\$' 38\$ 4"&, " 7! "#98&' (\$' 6-" #, *, 1
'&2.#(^(+4, " 24 -. & 9' (\$; <, *, 2 A ^: 20
"%88-\$' (\$)\$ \$ ") 3\$ \$ +, 3*3. 8/O' (\$*. \$
#(\$ ' (\$*. \$3- >@35, " 53*(+9+ '\$54") 31
'\$ \$ +, 324\$,4994+9' (3 /" (' (\$' 6-" #, 31
'\$ \$ +, 32", '&24\$ +93-' (\$' /" " 51.63\$ \$ +, 3
*3. 8\$), * \$ +, -. & 9' (\$3\$ \$ +, 3/2: 7

!"#\$%&'

B <3/\$' CD3- <3/\$' 8! E7F&5-\$ \$ \$ +, " +\$)#3
' +, 886, 4" 5265 38\$ 4+ 86- 483%4268\$ 3
' +, 7E8\$ 6+, GE0("60#4,BHJ,K@):BM-BN
@ 005', -FD,Q3& RS3-; &\$2R87>\$56804684",
)%4268\$4+ 9+ 3 00E' 34 -3 3\$ \$ +, 3/2: 7P.&32
) D685\$ 3E0("290!. 53 E88\$6+, 3- E88\$853*\$,
BH@,B(N):KH-HV

N =(., 883- E" #8=7; ' #'143\$ 5'-\$)"&5265 386
-\$ \$ \$ +, 86- 483%4268\$ 3+, 7P.&32) D685\$ 3
E0("290!. 53 E88\$6+, 3- E88\$853*\$,BHM,@(B):
BH-H@

K W848(' <3- G5'2 T740, -' (\$3\$ \$ +, 3/2: :T42
534+90' /\$ 4/4+.' +, 7P.&32) D685\$ 3E0("21
01. 53 E88\$6+, 3- E88\$853*\$,BH ,@(M):BMK-
BKW

M P2"\$&E3- C52'; *A307>(\$-\$5',488\$, ") 4"&185
*,42-3#, 7="9+9\$E0("290,BH ,N(@):BN -@@

V Q3& RS,005', -FD3-; &\$2R87." \$ \$ +, " %42631
'8&+)853+, 68-.\$4' (\$3\$ \$ +, 3/2: + 86- 483%42
68\$ 3+, 7P.&32) D685\$ 3E0("290!. 53 E88\$6
' +, 3- E88\$853*\$,BHK,@(R):NM-NB

J T'92DR,S*: CP3-Q3& RS7D8'&60#29'28%*\$ \$
)"&36468\$6. 32*.4") 46684", -. & 9' (\$3\$ \$ +, 3
/2: 7P.&32) D685\$ 3E0("290!. 53 E88\$6+, 3-
E88\$853*\$,BH ,@(V):BM-BJK

I 0884; 3- 082 9W7;" \$ \$ +, 98+9+ 4"&185 %42
55\$807E0("29*208\$#, BHV,HN@):BL-@V

H Q(Q70\$32)' #' %42 38\$455\$-\$ + 00E48\$54)
-48\$ 84-\$6-\$4', ' (\$8' \$56823- 43-328\$ 4+67E8
\$6\$, GE0("60#4,@LL,VLJ):BNK-BNM

B Q(Q3- 082 9W78\$34&93- 5'-\$ 9' (\$88"80")
%4243-323\$ \$ +, 7E0("29*208\$#, @L@,BH(@):
@L-NM

BB 082 9W,0884; ,<28D,\$ 327>#* *56' 3', 35'-\$2
) 3\$ \$ +, 7Y: T42;" \$ \$ +, 3- ="=8+47=351
&9\$:>(\$8Y>E84,@LB,BJ-@K

B@ 082 9W3- Z\$(428, 8D7D64-#'\$ (\$80)' (\$-035#4
) 43-323\$ \$ +, 7E0("29*208\$#, BHM,BL@N):MLN-
M@

BN Z\$(428, 8D3- 082 9W70035#4") 3'" 53# 3- *, 1
'&2\$ %423\$ \$ +, 70\$ \$ \$,BHJ ,@N(K@):JL-JL
BK C3\$ 6&P5 3- E" #8=7>(\$2*.4") 453' # 685+9+
00E' 38\$ 488(788\$80G="9+#, @LM,N@):@B-
@

BM E" #8=,03/; 3- ? "!, " & Q 7>(\$+\$5\$*. 86\$) *51
6+), "&3\$ \$ +, ;;" \$ \$ +, 4+ +322\$ 7P.&32) D685
+5\$ 3E0("290!. 53 E88\$6+, 3- E88\$853*\$,@L@,@
(M):BK-HB@

BV [\$ # \$ 4\$, 80,=(., 88 %8 -\$8 /\$Q.P,\$ 327058\$
3\$ \$ +, 32\$ 98\$5\$ + ' (\$3\$ \$ +, 3/2: 7P.&32) D685
5\$ 3E0("290!. 53 E88\$6+, 3- E88\$853*\$,@LM,NB
(V):BNK-BJM

B [\$ # \$ 4\$, 807>'6-" #, *, '&2\$,-\$8\$ 48\$ \$ +, ' (\$
3\$ \$ +, 3/2: 7P.&32) D685\$ 3E0("290!. 53 E88
\$6+, 3- E88\$853\$,@LV,N@K):HJN-HIM

B G5'2 T, R3#333P,W"84+080,\$ 327>(\$3\$ \$ +, 32
/2: :04. 8\$-\$6\$ \$ +, "&\$5682024") *, '&2'E0("29
*3048(1E0("294(\$F'8(., 9,@LM,V@N):BB-@L

BH P'2 =S,05+9", OZ 3-P(,4", P=7Y,%2, 30**%8'84
\$ +94*,' +9\$ ", 3\$ \$ +, 32", '&24\$ +947P.&32) D1
685\$ 3E0("290!. 53 E88\$6+, 3- E88\$853*\$,BH@,
B(K):BNL-BKK

@ >(\$ #4P7>'6-" #, 488(4889\$4*3, " "%88-\$3\$ \$ +, 1
3*3. 87E0(" , 5# <2\$ + G08\$ #, @LK, BB(B):W-
JL

@ >(\$ #4P3- W-X 078888\$ 4 98", 4*3. 83\$ \$ +, :
D%*\$)&5+ (+4+, ") 8& 7E88\$6+, GE0("60#4,
@L@,N(K):JK-JLL

@ >(\$ #4P 3- <888 07;" \$ \$ +, 32*, '&2-. & 9 %42
488(:>(\$)\$ \$ ") 888\$ 4 98", 47P.&32) D685\$ 3
E0("290!. 53 E88\$6+, 3- E88\$853*\$,BH ,@(M):
BNK-BMN

@ >(\$ #4P70+52488\$ *3. 853- 3\$ \$ +, 324-088\$ 86
488(")*"2&3- %423&6", 4647P.&32) D685\$ 3
E0("290!. 53 E88\$6+, 3- E88\$853*\$,BHK,@(K):
JH-HLV

@ >(\$ #4P; '* (30E3- R888; F7?, ' (\$+\$5\$*. 86\$)
' 6-" #, 3- /" " 51.6\$, '&2') %423\$ \$ +, 7Y, :=" , '&2')
="9+9\$ E8\$484; ;" \$ \$ +, 3- E88\$853*\$ \\WY7=351
&9\$:8Y>E84,@LL ,BM-BK

@ Z\$Q3- =(, 3FR7=36. & 93\$ \$ +, #(\$ 3\$ \$ +, "/2: 4"7
P.&32) D685\$ 3E0("290!. 168800ED('S'OTD(JA.) 74