The Temporal Dynamics of Dividing Focal Attention

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The nature of focal attention: Unitary or divided?

**Single, unitary focus:**
- Ericksen & Yeh, 1985
- Barriopedro & Botella, 2002;
- Jonides, 1983
- Benso et al., 1992

**Divided, dual foci:**
- Müller et al., 2003
- Kawahara & Yamada, 2006
- Yamada & Kawahara, 2007
- Adamo, Pun, & Pratt, 2008
The nature of focal attention: Unitary or divided?

Can either mode be employed, depending on task demands?
Is it possible to morph from one mode to the other during a task?
How long does the morphing take?
Is there a default mode of attentional deployment?
The Attentional Blink (AB)

“K” and “N”

TIME

Inter-target Lag

Lag-1 sparing

% Correct T2/T1

Inter-target Lag

T1

T2

8 + 3
5 + H
3 + 9
R + 4
7 + 2

R + 4
7 + 2

T1

8 + 3
5 + H
3 + 9

% Correct T2/T1

Inter-target Lag

Lag-1 sparing

T2

T1

8 + 3
5 + H
3 + 9

R + 4
7 + 2
The Attentional Blink (AB)

Lag-1 sparing only occurs if T2 falls within the focus of attention.

Hence, we can use the incidence of Lag-1 sparing to probe whether a spatial location falls within the focus of attention or not.
The Attentional Blink (AB)

Our paradigm:
T1-pair always in-stream
Divided, dual-foci mode

Predictions:

Lag-1 deficit: T2 in unattended region

Lag-1 sparing: T2 in attended region
T1-pair unpredictable
Unitary, single-focus

Predictions:

- Lag-1 sparing: T2 in attended region

% Correct (T2|T1)

Inter-target Lag (ms)

Z + K

9 Z + K 3

6 + 2

V + H

4 V + H 9

8 + 5

Lag-1 sparing: T2 in attended region

% Correct (T2|T1)

Inter-target Lag (ms)
T1-pair always in-stream
Divided mode

\[
\begin{align*}
Z + K & \\
9 \ Z + K & \ 3
\end{align*}
\]

T1-pair unpredictable
Unitary mode

\[
\begin{align*}
Z + K & \\
9 \ Z + K & \ 3
\end{align*}
\]
T1-pair always in-stream
Divided mode

T1-pair unpredictable
Unitary mode

% Correct (T2|T1)

Inter-target Lag

T2-pair in-stream
T2-pair between streams

Unitary mode
Divided mode
What if the focus of attention is initially unitary, but divides over time?

At 100 ms SOA, SOA may already be divided.
T1-pair always in-stream
Divided mode

T1-pair unpredictable
Unitary mode

SOA = 70 ms

SOA = 100 ms

SOA = 70 ms

SOA = 100 ms

Different

Same
Whether a unitary or a divided focus is employed depends on task demands.

The focus of attention can morph from unitary to divided within 100 ms.

The “default” mode may be unitary.