Exp Brain Res (2008) 185:287–295
DOI 10.1007/s00221-007-1153-3

RESEARCH ARTICLE

Top-down control is not lost in the attentional blink: evidence from intact endogenous cuing

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Received: 14 March 2007 / Accepted: 19 September 2007 / Published online: 10 October 2007

Abstract The attentional blink (AB) refers to the Wnding that performance on the second of two targets (T1 and T2) is impaired when the targets are presented at a target onset asynchrony (TOA) of less than 500 ms. One account of the AB assumes that the processing load of T1 leads to a loss of top-down control over stimulus selection. The present study tested this account by examining whether an endogenous spatial cue that indicates the location of a following T2 can facilitate T2 report even when the cue and T2 occur within the time window of the AB. Results from three experiments showed that endogenous cuing had a signiWcant eVect on T2 report, both during and outside of the AB; this cuing eVect was modulated by both the cue-target onset asynchrony and by cue validity, while it was invariant to the AB. These results suggest that top-down control over target selection is not lost during the AB.

Introduction

When observers monitor a rapid serial visual presentation (RSVP) of stimuli, such as letters, digits, words or pictures, and search for two targets in the stream, they usually have no diYculty in reporting the Wrst target (T1) but they show a de

To examine how endogenous spatial cuing is aVected by the AB, we used the so-called “skeletal” two-target paradigm (Duncan et al. 1994; Ward et al. 1996) in which T1 and T2, presented in one of four locations, are immediately followed by pattern masks. A central arrow cue was inserted between the target presentations. If the function of top-down control is lost during the AB, the endogenous attentional orienting would not work and consequently the cuing eVect should be reduced or eliminated compared with the cuing eVect when the cue is presented outside of the AB period. If, on the other hand, the functioning of the prefrontal control system is intact during the AB, the cuing eVects should be present both inside and outside of the AB.

Given that cue validity plays a signiWcant role in modulating the size of endogenous cuing eVects in spatial orienting (e.g., Jonides 1980, 1983; Posner 1980; Eriksen and Yeh 1985; Madden 1992; Riggio and Kirsner 1997

for 38 ms. On cued trials, an arrow that pointed to either the left or the right location was presented for 40 ms at the location of the Wxation cross. Depending on the CTOA, this arrow could appear at diV

180 ms (mean = 78%). Pair-wise comparison of T2 performance in the four cue conditions showed that each of these diVerences was signiWcant at an alpha corrected for multiple comparisons using Bonferroni adjustment (all ’s < 0.0083). These results indicate that, compared to the uncued condition, T2 performance was enhanced in the cued condition when the CTOA was 180 or 270 ms, while it was relatively impaired for cued trials with a CTOA of 90 ms. Importantly, the interaction between TOA and cue condition was not signiWcant, (3, 57) = 1.92, > 0.1, indicating that the central cues inXuenced T2 performance to the same extent however short or long the TOA was. Thus, endogenous cuing did not appear to be aVected by the AB.

Experiment 2. The main eVect of TOA was signiWcant, (1, 19) = 171.63, < 0.001, with lower accuracy for T2 identiWcation at the short TOA (mean = 63%) than at the long TOA (mean = 83%). The main eVect of cue condition approached signiWcance, (3, 57) = 2.39,

due to the fact that the arrow captured attention at its own location and observers needed some time to reorient attention from the location of the cue towards the cued location. Critically, the cuing eVects observed with the two longer CTOAs in Experiments 1 and 3 were not observed when the cue was uninformative with regard to the T2 location (i.e., in Experiment 2 where 50% of the cues were valid), thereby excluding the possibility that the cuing eV