**Supplementary Online Material**



**Supplementary Figure 1.** Experimental procedure. A target letter was presented in one of the three RSVPs. In the oddball trials, an oddball movie was presented at the center of the screen, simultaneously with the RSVPs.



**Supplementary Figure 2.** (A) Activation time courses of the TPJ activity during the oddball movie presentation. (B) LPFC activation time courses. A horizontal line on the plots indicates 16-sec oddball presentation. Error bars represent standard errors of the mean.

We found that the peak latency of the TPJ activation occurred later than those of other ROIs (ACC, AI, FEF, IPS and LPFC) for the slow trials (see page). To rule out the possibility that the observed result is simply because the TPJ activation peaked later by its hemodynamic nature, not a late neural response reflecting stimulus evaluation, we carried out a control analysis using a published dataset 1. This dataset was obtained from an experiment, in which twenty adults were required to detect and identify Korean letters (‘가’, ‘나’, ‘다’, or ‘라’) in the three RSVPs of digits (Supplementary Figure 1). Importantly, in some trials, an unexpected and task-irrelevant movie was played at the center for 16 sec (Oddball trials). The oddball movies consisted of non-meaningful animations (e.g. continuously transforming fractals, dynamically transforming objects and so on) and real-world situations (e.g. fast-moving roller coasters, a remote-controlled vacuum cleaner and so on). The results did not differ across the oddball types (Han and Marois, 2014). In the remaining trials, there were no oddball movies (Search trials). There were a total of 96 trials, which were divided into 24 oddball trials and 72 search trials (see Han et al., 2018).

The event-related time courses for each participants and trial types were extracted from the ROIs defined in the present study. Specifically, we focused on the activation patterns of the TPJ and LPFC. Then, to assess the TPJ and LPFC’s response evoked by the oddball onset, we estimated onset latency of the BOLD responses in each ROI. The onset latency was determined as the volume with the greatest signal amplitude between the 1st and 8 th volumes immediately following the oddball onset from individual participant data, using paired t-tests.

As shown in Supplementary Figure 2, the TPJ and LPFC showed robust activations. Specifically, the LPFC activation was significantly greater than the TPJ activity for the oddball trials, *t*(20) = 2.43, *p* < .02. Importantly, the onset latencies of the TPJ and LPFC did not differ, *t*(20) = 0.17, *p* = 0.86. These findings suggest that the response delay of the TPJ during the probe presentation is because the latency of the TPJ increased as sensory evidence for the matching process increases, not because the TPJ activation simply reached its peak late by its intrinsic, hemodynamic nature.

**Supplementary Online Material – References**

1 Han, S. W. *et al.* Neural substrates of purely endogenous, self-regulatory control of attention. *Scientific reports* **8**, 925 (2018).