In their commentary, Rubens and Zanto provide a succinct and accurate summary of the findings of Gilbert (2011), and go on to make several intriguing proposals concerning functional specialization within rostrolateral prefrontal cortex (RLPFC). The authors also briefly discuss the issue of RLPFC-hippocampal interactions, noting that Wendelken and Bunge (2010) observed increased functional connectivity between right RLPFC and hippocampus in a relational integration task. As Rubens and Zanto correctly point out, Gilbert (2011) reported that several content-representing posterior brain regions increased functional connectivity with RLPFC during maintenance of intentions, but the hippocampus was not amongst those regions. Here, I will briefly report some additional analyses of the dataset described in Gilbert (2011), prompted by Rubens and Zanto's suggestion that RLPFC-hippocampal interactions might be demonstrated if laterality effects are taken into account.

In order to assess interactions between RLPFC and hippocampus, peak co-ordinates within the hippocampus were obtained for the univariate contract of PM encode > Baseline encode (left: -21, -31, -2; right: 21, -34, 4). Regions of interest were then defined by 10-mm spheres centered on these co-ordinates. Functional connectivity was assessed by examining results of the PPI analysis (using RLPFC as a seed) within these regions of interest. This is the same small-volume correction technique that was used in the original analysis reported in Gilbert (2011). Using a bilateral RLPFC seed, as in the original study, this analysis revealed increased coupling between RLPFC and left hippocampus during intention maintenance ($p = .048$), but no significant effect involving right hippocampus. Additional analyses were conducted using left RLPFC and right

RLPFC seeds. Functional connectivity between left hippocampus and both left RLPFC ($p = .085$) and right RLPFC ($p = .023$) was increased during intention maintenance. However neither RLPFC region showed any significant modulation of functional connectivity with right hippocampus.

These results indicate that functional connectivity between RLPFC and hippocampus was indeed increased during intention maintenance, at least for the left hippocampus. Future studies should investigate whether this effect is affected by the nature of the material to be remembered (e.g. verbal versus spatial). Consistent with the results of Wendelken and Bunge (2010), this effect was most significant for right RLPFC (and only marginally significant for left RLPFC). Thus, the present results are compatible with models of prospective memory in which RLPFC plays a role in maintaining delayed intentions, the content of which is represented within posterior regions including the hippocampus.

I am grateful to Rubens and Zanto for their thoughtful commentary, and I entirely agree that investigation of functional subdivisions within RLPFC is an exciting topic for further research.

References

Gilbert, S.J. (2011). Decoding the content of delayed intentions. J Neurosci 31:2888-2894.

Wendelken, C., Bunge SA (2010). Transitive inference: distinct contributions of rostrolateral prefrontal cortex and the hippocampus. J Cogn Neurosci 22:837-847.