Delay-period functional connectivity between IPS and occipital cortex relates to the precision of visual working memory

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Previous studies on visual working memory (VWM) revealed the involvement of both the parietal and occipital cortex in memory maintenance. However, how the parietal (e.g., intraparietal sulcus) and occipital cortex interact during memory delay and how this interaction relates to behavior remain to be further examined. In the current study, we manipulated participants' memory load by manipulating the number and category of the to-be-remembered items. On each trial, participants remembered the direction of one group of moving dots (1M), or three directions of serially-presented moving dots (3M), or one motion direction and two different color circles (1M2C). At the end of each trial, participants recalled either the motion direction or the color of one of the items as instructed on a motion or color wheel. We computed the Beta Series Correlation (BSC) between IPS and occipital cortex as the functional connectivity measure, and examined how this connectivity relates to behavioral mnemonic precision across loads. Our results demonstrated that, increased functional connectivity between IPS and occipital cortex was correlated with decreased behavioral precision across loads (1M-1M2C-3M) for individual participants. This effect was mainly driven by the relationship between the 1M and 3M conditions, and was more prominent in the anterior part of IPS. Furthermore, significant correlation was only observed for the delay-period, but not for the sample-period connectivity. These results provided evidence for the behavioral relevance of the modulation of IPS on the occipital cortex during VWM delay.