

Feature Binding in Working Memory

A thesis submitted by

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in partial fulfillment of the requirements for the award of the degree of

Doctor of Philosophy



॥ त्वं ज्ञानमयो विज्ञानमयोऽसि ॥

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Declaration

I hereby declare that the work presented in this thesis titled, "*Feature binding in working memory*" submitted to the Indian Institute of Technology Jodhpur in partial fulfillment of the requirements for the award of the degree of Doctor of Philosophy, is a bona fide record of the research work carried out under the supervision of Dr. Sandeep Kumar Yadav. The contents of this thesis in full or in parts, have not been submitted to, and will not be submitted by me to, any other institute or university in India or abroad for the award of any degree or diploma.



Anuj Kumar Bharti

Certificate

This is to certify that the thesis titled, "Feature binding in working memory", submitted by Anuj Kumar Bharti [PG201384003] to the Indian Institute of Technology Jodhpur for the award of the degree of Doctor of Philosophy, is a bona fide record of the research work done by him under my supervision. To the best of my knowledge, the content of this report, in full or in parts, have not been submitted to any other Institute or University for the award of any degree or diploma.



Sandeep Kumar Yadav

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List of Figures

Figure 3.1: The swap detection task	29
Figure 3.2: Stimuli made up of four colors and four shapes used in the study	32
Figure 3.3: Steps in pre-processing of the raw fMRI data	35
Figure 4.1: Two kinds of sequential presentation	37
Figure 4.2: Sequence of events in each trial in Experiment 1	39
Figure 4.3: Mean d prime scores in Experiment 1	40
Figure 4.4: Serial position effects in Experiment 1	41
Figure 4.5: Sequence of events in each trial in Experiment 2	43
Figure 4.6: Mean d prime scores in Experiment 2	44
Figure 4.7: Serial position effects in Experiment 2	45
Figure 5.1: Sequence of events in each trial in Experiment 3	50
Figure 5.2: Mean d prime scores in Experiment 3	51
Figure 5.3: Serial position effects in Experiment 3	52
Figure 5.4: Sequence of events in each trial in Experiment 4	54
Figure 5.5: Mean d prime scores in Experiment 4	55
Figure 5.6: Serial position effects in Experiment 4	56
Figure 5.7: Sequence of events in each trial in Experiment 5	58
Figure 5.8: Mean d prime scores in Experiment 5	59
Figure 5.9: Serial position effects in Experiment 5	60
Figure 6.1: Sequence of events in the fMRI experiment	71
Figure 6.2: Mean d prime scores of behavioral responses in the fMRI experiment	73
Figure 6.3: Serial position effects in behavioral responses in the fMRI experiment	74
Figure 6.4: Activation with simultaneous presentation	75
Figure 6.5: Activation with sequential presentation	77
Figure 6.6: Activation with unchanged locations	78
Figure 6.7: Activation with random locations	80
Figure 6.8: Activation common to all four conditions	81
Figure 6.9: Mean parameter estimates in ROIs showing significant effects	83

List of Tables

TABLES IN CHAPTER 6

Table 6.1: Brain regions of interest associated with feature binding	69
Table 6.2: Activation with simultaneous presentation $[[\text{SIMU-Base}] \cap [\text{SIMR-Base}]]$	75
Table 6.3: Activation with sequential presentation $[[\text{SEQU-Base}] \cap [\text{SEQR-Base}]]$	76
Table 6.4: Activation with unchanged locations $[[\text{SIMU-Base}] \cap [\text{SEQU-Base}]]$	78
Table 6.5: Activation with random locations $[[\text{SIMR-Base}] \cap [\text{SEQR-Base}]]$	79
Table 6.6: Activation in all four conditions $[[\text{SIMU-Base}] \cap [\text{SIMR-Base}] \cap [\text{SEQU-Base}] \cap [\text{SEQR-Base}]]$	81

TABLES IN THE ANNEXURE

Table 4.1: Mean and standard deviation of hits and false alarms in each experimental condition in Experiment 1 [N=18]	103
Table 4.2: Mean and standard deviation of d primes and betas in each experimental condition in Experiment 1 [N=18]	103
Table 4.3: Repeated measures ANOVA of d primes for modes of presentation and locations in Experiment 1 [N=18]	104
Table 4.4: Bayesian repeated measures ANOVA of d primes for modes of presentation and locations in Experiment 1 [N=18]	104
Table 4.5: Repeated measures ANOVA of betas for modes of presentation and locations in Experiment 1 [N=18]	104
Table 4.6: Repeated measures ANOVA of d primes for locations and selected swaps in sequential presentation in Experiment 1 [N=18]	105
Table 4.7: Bayesian repeated measures ANOVA of d primes for locations and selected swaps in sequential presentation in Experiment 1 [N=18]	105
Table 4.8: Mean and standard deviation of hits and false alarms in each experimental condition in Experiment 2 [N=18]	105
Table 4.9: Mean and standard deviation of d primes and betas in each experimental condition in Experiment 2 [N=18]	106
Table 4.10: Repeated measures ANOVA of d primes for modes of presentation and locations in Experiment 2 [N=18]	106
Table 4.11: Bayesian repeated measures ANOVA of d primes for modes of presentation and locations in Experiment 2 [N=18]	106
Table 4.12: Repeated measures ANOVA of betas for modes of presentation and locations in Experiment 2 [N=18]	107
Table 4.13: Repeated measures ANOVA of d primes for locations and selected swaps in sequential presentation in Experiment 2 [N=18]	107
Table 4.14: Bayesian repeated measures ANOVA of d primes for locations and selected swaps in sequential presentation in Experiment 2 [N=18]	107
Table 4.15: Mixed ANOVA for comparison of Experiment 1 [N=18] and Experiment 2 [N=18] with modes of presentation and locations as repeated measures	108
Table 4.16: Bayesian mixed ANOVA for comparison of Experiment 1 [N=18] and Experiment 2 [N=18] with modes of presentation and locations as repeated measures	109

Table 5.1:	Mean and standard deviation of hits and false alarms in each experimental condition in Experiment 3 [N=18]	110
Table 5.2:	Mean and standard deviation of d primes and betas in each experimental condition in Experiment 3 [N=18]	110
Table 5.3:	Repeated measures ANOVA of d primes for modes of presentation and locations in Experiment 3 [N=18]	110
Table 5.4:	Bayesian repeated measures ANOVA of d primes for modes of presentation and locations in Experiment 3 [N=18]	111
Table 5.5:	Repeated measures ANOVA of betas for modes of presentation and locations in Experiment 3 [N=18]	111
Table 5.6:	Repeated measures ANOVA of d primes for locations and selected swaps in sequential presentation in Experiment 3 [N=18]	111
Table 5.7:	Bayesian repeated measures ANOVA of d primes for locations and selected swaps in sequential presentation in Experiment 3 [N=18]	112
Table 5.8:	Mixed ANOVA for comparison of Experiment 2 [N=18] and Experiment 3 [N=18] with modes of presentation and locations as repeated measures	112
Table 5.9:	Bayesian Mixed ANOVA for comparison of Experiment 2 [N=18] and Experiment 3 [N=18] with modes of presentation and locations as repeated measures	113
Table 5.10:	Mean and standard deviation of hits and false alarms in each experimental condition in Experiment 4 [N=18]	113
Table 5.11:	Mean and standard deviation of d primes and betas in each experimental condition in Experiment 4 [N=18]	114
Table 5.12:	Repeated measures ANOVA of d primes for modes of presentation and locations in Experiment 4 [N=18]	114
Table 5.13:	Bayesian repeated measures ANOVA of d primes for modes of presentation and locations in Experiment 4 [N=18]	114
Table 5.14:	Repeated measures ANOVA of betas for modes of presentation and locations in Experiment 4 [N=18]	115
Table 5.15:	Repeated measures ANOVA of d primes for locations and selected swaps in sequential presentation in Experiment 4 [N=18]	115
Table 5.16:	Bayesian repeated measures ANOVA of d primes for locations and selected swaps in sequential presentation in Experiment 4 [N=18]	115
Table 5.17:	Mixed ANOVA for comparison of Experiment 2 [N=18] and Experiment 4 [N=18] with modes of presentation and locations as repeated measures	116
Table 5.18:	Bayesian mixed ANOVA for comparison of Experiment 2 [N=18] and Experiment 4 [N=18] with modes of presentation and locations as repeated measures	117
Table 5.19:	Mean and standard deviation of hits and false alarms in each experimental condition in Experiment 5 [N=18]	118
Table 5.20:	Mean and standard deviation of d primes and betas in each experimental condition in Experiment 5 [N=18]	118
Table 5.21:	Repeated measures ANOVA of d primes for modes of presentation and locations in Experiment 5 [N=18]	118
Table 5.22:	Bayesian repeated measures ANOVA of d primes for modes of presentation and locations in Experiment 5 [N=18]	119
Table 5.23:	Repeated measures ANOVA of betas for modes of presentation and locations in Experiment 5 [N=18]	119

Table 5.24: Repeated measures ANOVA of d primes for locations and selected swaps in sequential presentation in Experiment 5 [N=18]	119
Table 5.25: Bayesian repeated measures ANOVA of d primes for locations and selected swaps in sequential presentation in Experiment 5 [N=18]	120
Table 5.26: Mixed ANOVA for comparison of Experiment 2 [N=18] and Experiment 5 [N=18] with modes of presentation and locations as repeated measures	120
Table 5.27: Bayesian mixed ANOVA for comparison of Experiment 2 [N=18] and Experiment 5 [N=18] with modes of presentation and locations as repeated measures	121
Table 5.28: Mixed ANOVA for comparison of Experiments 2, 3, 4, and Experiment 5 [N=18 in each experiment] with modes of presentation and locations as repeated measures	122
Table 5.29: Bayesian mixed ANOVA for comparison of Experiments 2, 3, 4, and Experiment 5 [N=18 in each experiment] with modes of presentation and locations as repeated measures	123
Table 6.7: Mean and standard deviation of hits and false alarms in each experimental condition for behavioral responses in the fMRI experiment [N=18]	124
Table 6.8: Mean and standard deviation of d primes and betas in each experimental condition for behavioral responses in the fMRI experiment [N=18]	124
Table 6.9: Repeated measures ANOVA of d primes for modes of presentation and locations for behavioral responses in the fMRI experiment [N=18]	124
Table 6.10: Bayesian repeated measures ANOVA of d primes for modes of presentation and locations for behavioral responses in the fMRI experiment [N=18]	125
Table 6.11: Repeated measures ANOVA of betas for modes of presentation and locations for behavioral responses in the fMRI experiment [N=18]	125
Table 6.12: ANOVA of d primes for locations and selected swaps in sequential presentation for behavioral responses in the fMRI experiment [N=18]	125
Table 6.13: Bayesian repeated measures ANOVA of d primes for locations and selected swaps in sequential presentation for behavioral responses in the fMRI experiment [N=18]	126
Table 6.14: Mixed ANOVA for comparison of Experiment 3 [N=18] and the fMRI Experiment [N=18] with modes of presentation and locations as repeated measures	126
Table 6.15: Bayesian mixed ANOVA for comparison of Experiment 3 [N=18] and the fMRI Experiment [N=18] with modes of presentation and locations as repeated measures	127
Table 6.16: Mean and standard deviation of mean parameter estimates in each experimental condition for each region of interest in the fMRI experiment [N=18]	128
Table 6.17: Repeated measures ANOVA of mean parameter estimates in the Right Superior Parietal Cortex for modes of presentation and locations in the fMRI experiment [N=18]	128
Table 6.18: Bayesian repeated measures ANOVA of mean parameter estimates in the Right Superior Parietal Cortex for modes of presentation and locations in the fMRI experiment [N=18]	129
Table 6.19: Repeated measures ANOVA of mean parameter estimates in the Right Intra Parietal Cortex for modes of presentation and locations in the fMRI experiment [N=18]	129
Table 6.20: Bayesian repeated measures ANOVA of mean parameter estimates in the Right Intra Parietal Cortex for modes of presentation and locations in the fMRI experiment [N=18]	129
Table 6.21: Repeated measures ANOVA of mean parameter estimates in the Right Superior Parietal Lobule for modes of presentation and locations in the fMRI experiment [N=18]	130
Table 6.22: Bayesian repeated measures ANOVA of mean parameter estimates in the Right Superior Parietal Lobule for modes of presentation and locations in the fMRI experiment [N=18]	130
Table 6.23: Repeated measures ANOVA of mean parameter estimates in the Left Superior Parietal Lobule for modes of presentation and locations in the fMRI experiment [N=18]	130

Table 6.24: Bayesian repeated measures ANOVA of mean parameter estimates in the Left Superior Parietal Lobule for modes of presentation and locations in the fMRI experiment [N=18]	131
Table 6.25: Repeated measures ANOVA of mean parameter estimates in the Left Intra Parietal Sulcus for modes of presentation and locations in the fMRI experiment [N=18]	131
Table 6.26: Bayesian repeated measures ANOVA of mean parameter estimates in the Left Intra Parietal Sulcus for modes of presentation and locations in the fMRI experiment [N=18]	131
Table 6.27: Repeated measures ANOVA of mean parameter estimates in the Right Intra Parietal Sulcus for modes of presentation and locations in the fMRI experiment [N=18]	132
Table 6.28: Bayesian repeated measures ANOVA of mean parameter estimates in the Right Intra Parietal Sulcus for modes of presentation and locations in the fMRI experiment [N=18]	132
Table 6.29: Repeated measures ANOVA of mean parameter estimates in the Left Precentral Gyrus for modes of presentation and locations in the fMRI experiment [N=18]	132
Table 6.30: Bayesian repeated measures ANOVA of mean parameter estimates in the Left Precentral Gyrus for modes of presentation and locations in the fMRI experiment [N=18]	133
Table 6.31: Repeated measures ANOVA of mean parameter estimates in the Right Fusiform Area for modes of presentation and locations in the fMRI experiment [N=18]	133
Table 6.32: Bayesian repeated measures ANOVA of mean parameter estimates in the Right Fusiform Area for modes of presentation and locations in the fMRI experiment [N=18]	133
Table 6.33: Repeated measures ANOVA of mean parameter estimates in the Left Anterior Hippocampus for modes of presentation and locations in the fMRI experiment [N=18]	134
Table 6.34: Bayesian repeated measures ANOVA of mean parameter estimates in the Left Anterior Hippocampus for modes of presentation and locations in the fMRI experiment [N=18]	134
Table 6.35: Repeated measures ANOVA of mean parameter estimates in the Right Supramarginal Gyrus for modes of presentation and locations in the fMRI experiment [N=18]	134
Table 6.36: Bayesian repeated measures ANOVA of mean parameter estimates in the Right Supramarginal Gyrus for modes of presentation and locations in the fMRI experiment [N=18]	135

List of Abbreviations

ABBREVIATION	FULL FORM
<i>ANOVA</i>	Analysis of Variance
BOLD	Blood Oxygen Level Dependent
CDA	Contralateral Delayed Activity
EEG	Electroencephalogram
fMRI	Functional Magnetic Resonance Imaging
FOV	Field of View
INR	Indian Rupee
IPL	Intra Parietal Lobule
IPS	Intra Parietal Sulcus
ISI	Inter Stimulus Interval
IT	Inferior Temporal
JASP	Jeffrey's Amazing Statistics Program
L-FFG	Left Fusiform Gyrus
LGN	Lateral Geniculate Nucleus
L-IFG	Left Inferior Frontal Gyrus
L-IOG	Left Inferior Occipital Gyrus
L-MFG	Left Middle Frontal Gyrus
L-MOG	Left Middle Occipital Gyrus
L-SPL	Left Superior Parietal Lobule
LTM	Long Term Memory
LTP	Long Term Potentiation
MEG	Magneto Encephalography
MFG	Middle Frontal Gyrus
MOG	Middle Occipital Gyrus
MPRAGE	Magnetization-prepared rapid gradient echo sequence
ms	milliseconds
MT	Middle Temporal Visual Area
MTL	Medial Temporal Lobe
PCG	Precentral Gyrus
PET	Positron Emission Tomography
PPC	Posterior Parietal Cortex

R-Ant. Insula	Right Anterior Insula
R-FFG	Right Fusiform Gyrus
R-IPL	Right Inferior Parietal Lobule
R-ITG	Right Inferior Temporal Gyrus
ROI	Region[s] of Interest
R-SFG	Right Superior Frontal Gyrus
R-SPL	Right Superior Parietal Lobule
RSVP	Rapid Serial Visual Processing
RT	Response Time
sec(s)	second(s)
SEQR	Sequential presentation with Random locations
SEQU	Sequential presentation with Unchanged locations
SIMR	Simultaneous presentation with Random locations
SIMU	Simultaneous presentation with Unchanged locations
SMA	Supplementary Motor Area
SPM	Statistical Parametric Mapping
STM	Short Term Memory
T1	Timing of radio frequency pulse sequence, which highlights fat issues
T2	Timing of radio frequency pulse sequence, which highlights fat and water
TE	Echo time
TEO	Posterior part of the Infero-temporal Cortex
TMS	Trans cranial Magnetic Stimulation
TR	Repetition time
V1	Visual Area 1
V2	Visual Area 2
V3	Visual Area 3
V4	Visual Area 4
VSTM	Visual Short Term Memory; a limited capacity store, receiving input from basic perceptual processes for further transfer to other higher order processes such as long term memory. In this work, it is considered as one aspect of VWM
VWM	Visual Working Memory; implies continuous storage [maybe in multiple stores] as well as processing of visual material, to enable the eventual response as an output.
WM	Working Memory; implies continuous storage [maybe in multiple stores] as well as processing to enable the eventual response as an output.

