

I Remember Me The Best, Always?

Evidence For Self-prioritization In Working Memory Binding Using A Visuo-spatial Working Memory Task

Neelabja Roy, Irfan Ahmad, Ark Verma
neelabja.iitk@gmail.com, airfan@iitk.ac.in,
arkverma@iitk.ac.in

Indian Institute of Technology, Kanpur

Background

- Information relevant to self, even geometric shapes (paired with SELF label) enjoys preferential processing vs that of ‘others’
- This social salience is investigated for attention & memory, but its affect on working memory (WM) is still understudied
- WM has limited capacity for storing temporary representations & active manipulation of information, for eg. feature combinations
- Self-bias in WM location probe task, affected self weighted decisions while making judgements in constrained scenarios (Yin et. al, 2019)
- Our study tested the extents of prioritization in WM binding across location, identity and combinational tasks

Results

- No main effect of associated label (self, friend, stranger) on accuracy
- Significant main effect of association on RTs in all conditions

Condition	F(2,70)	p-value
Identity	3.373	0.040*
Location	4.722	0.012*
Combination	6.043	0.004*

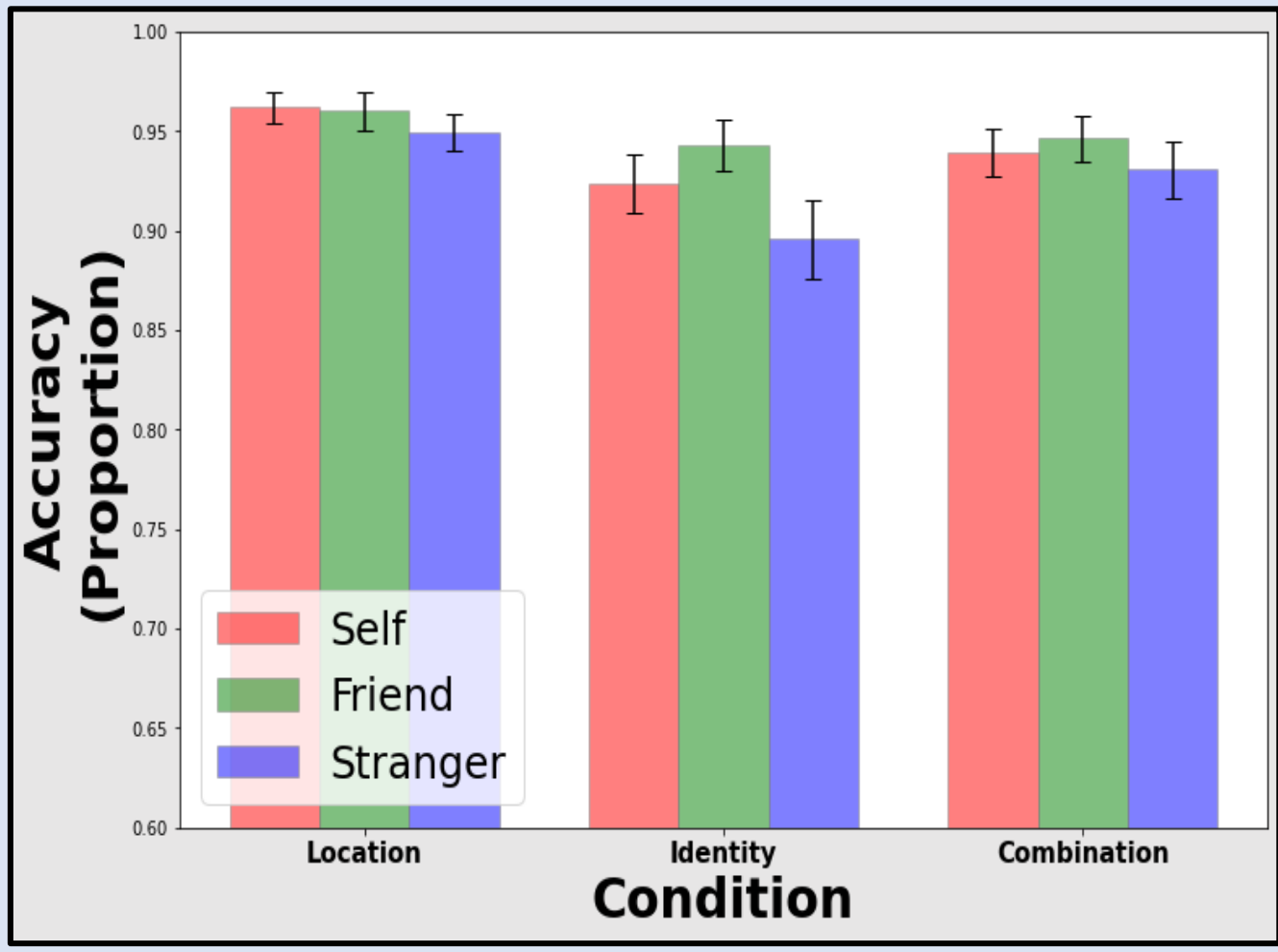
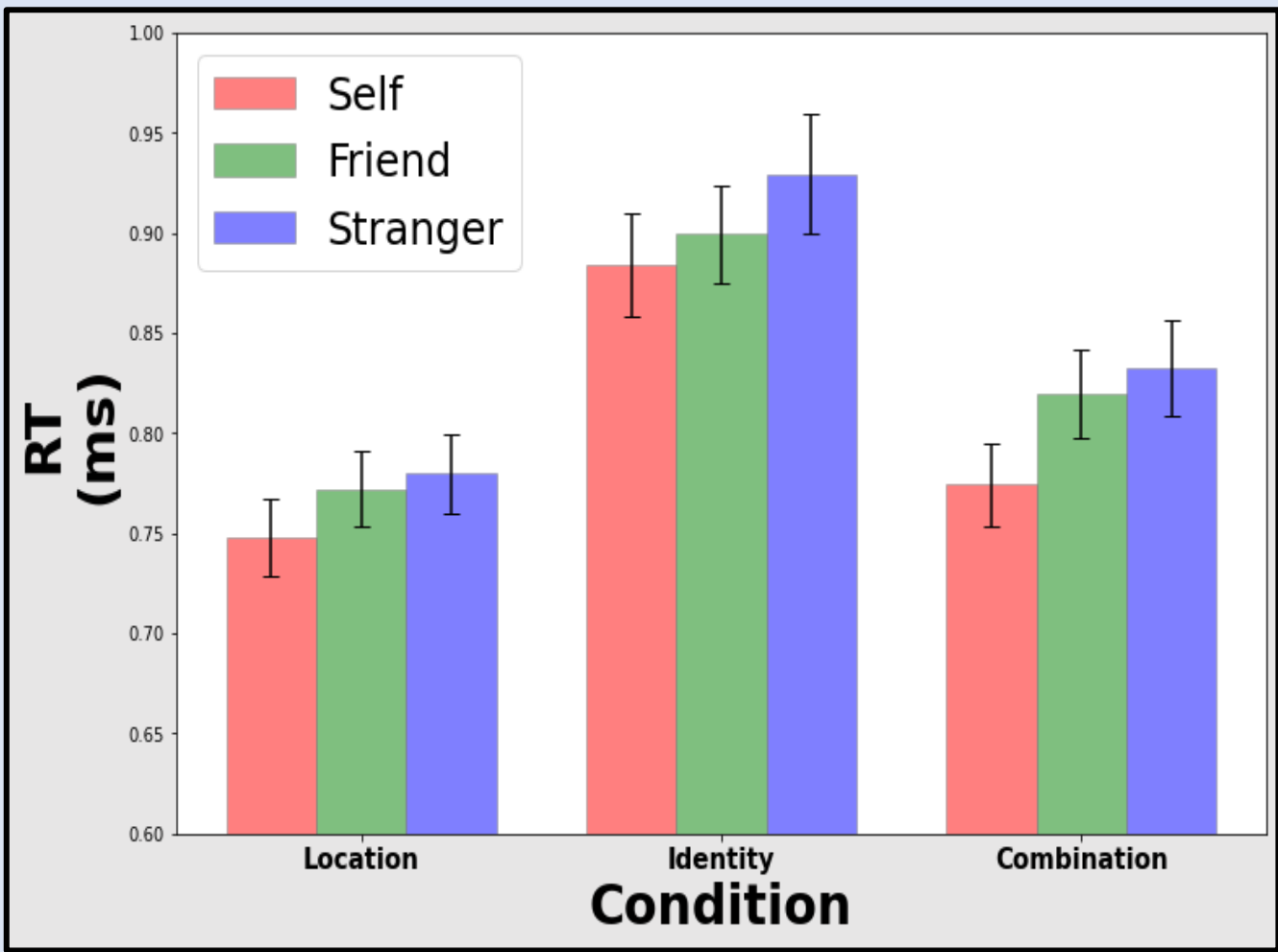
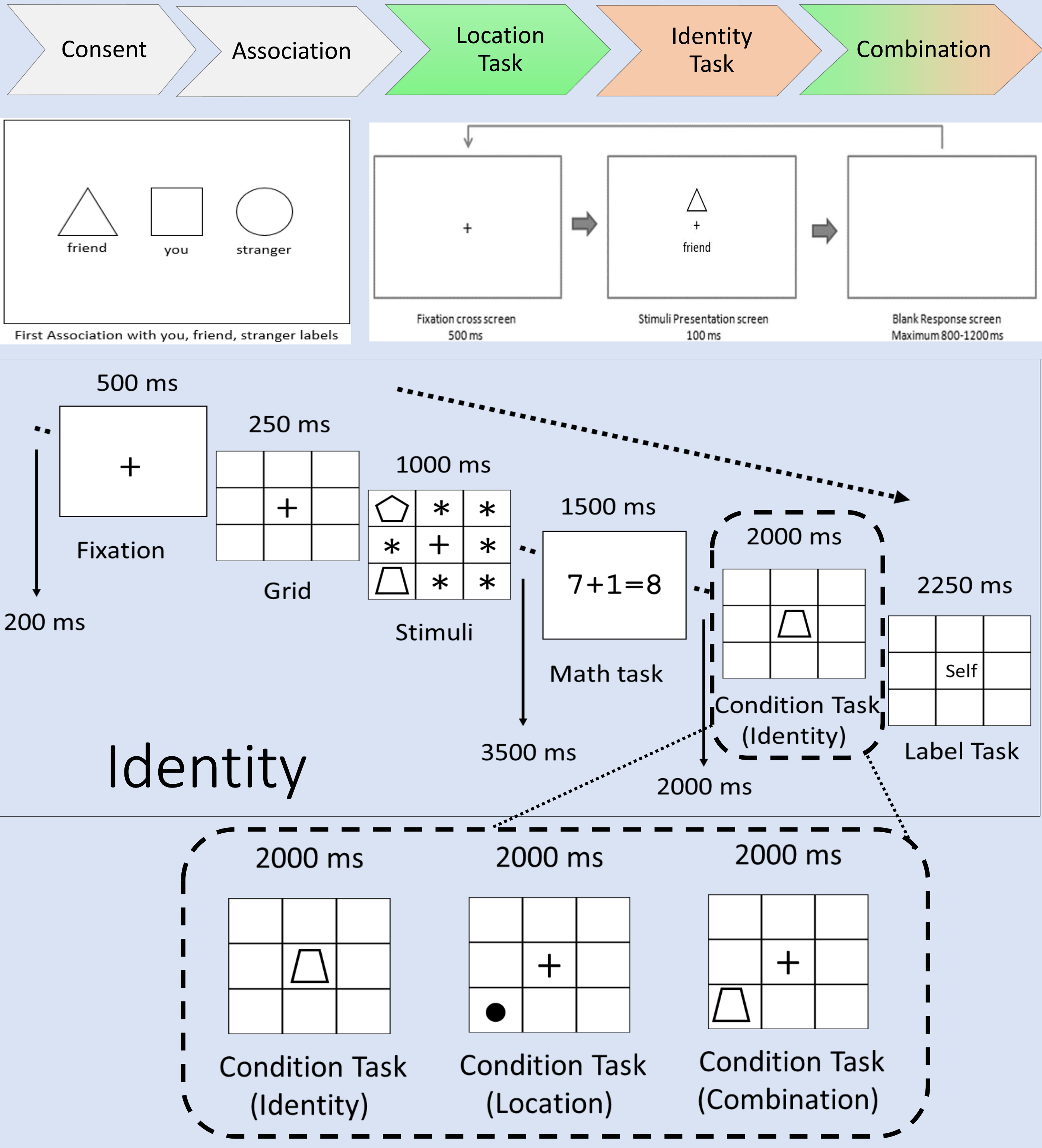
- Post-hoc comparisons showed Self-associated cues to be remembered significantly faster than others across conditions

Condition	Label	Label	t	Cohen’s d	p _{holm}
Identity	Self	Stranger	-2.554	-0.281	0.038*
location	Self	Stranger	-2.951	-0.278	0.013*
Combination	Self	Friend	-2.570	-0.339	0.025*
Combination	Self	Stranger	-3.312	-0.437	0.004*

Discussion

- Evidence for significant self-prioritization across aspects of location and identity and both in a visuo-spatial WM task
- Despite task’s difficulty, self expresses preference with higher efficiency in faster (lower RT) responses of remembering its associated properties
- The absence of accuracy, although surprising, is in line with a few other studies like Sui & Humphreys, 2015; Yin et al., 2019.
- Self-bias thus, is a significant pervasive factor modulating WM binding

Method



Condition	Label	Mean (ms)	SD (ms)
Location	Self	0.748	0.116
	Friend	0.772	0.113
	Stranger	0.780	0.118
Identity	Self	0.884	0.156
	Friend	0.899	0.147
	Stranger	0.929	0.180
Combination	Self	0.774	0.124
	Friend	0.820	0.130
	Stranger	0.833	0.144

Condition	Label	Mean	SD
Location	Self	0.962	0.048
	Friend	0.960	0.058
	Stranger	0.950	0.056
Identity	Self	0.924	0.090
	Friend	0.943	0.078
	Stranger	0.896	0.120
Combination	Self	0.939	0.069
	Friend	0.946	0.067
	Stranger	0.931	0.086

Limitations

- Increased difficulty (low accuracy, high RT) in the Identity condition is not explained
- Examining incongruent condition response, that can be important for co-occurring stimuli, has not been done

Future Work

- Include more relevant social labels
- Check for effect in different WM tasks and its manipulation by WM span
- Computational modelling of the data

Significance

- Our study suggests that preferential Shape-label processing also occurs during encoding in a variety of resource-constrained scenarios
- WM, that is critical in decision-making is heavily influenced by the mostly-automatic Self-bias

References

1. Baddeley, A. (2000). The episodic buffer: a new component of working memory? *Trends in Cognitive Sciences*, 4(11), 417–423.

2. Burglen, F., Marczewski, P., Mitchell, K. J., van der Linden, M., Johnson, M. K., Danion, J.-M., & Salamé, P. (2004). Impaired performance in a working memory binding task in patients with schizophrenia. *Psychiatry Research*, 125(3), 247–255.

3. Kesebir, S., & Oishi, S. (2010). A spontaneous self-reference effect in memory: why some birthdays are harder to remember than others. *Psychological Science*, 21(10), 1525–1531.

4. Prabhakaran, V., Narayanan, K., Zhao, Z., & Gabrieli, J. D. (2000). Integration of diverse information in working memory within the frontal lobe. *Nature Neuroscience*, 3(1), 85–90.

5. Sui, J., & Humphreys, G. W. (2017). The ubiquitous self: what the properties of self-bias tell us about the self. *Annals of the New York Academy of Sciences*, 1396(1), 222–235.

6. Yin, S., Sui, J., Chiu, Y.-C., Chen, A., & Egner, T. (2019). Automatic prioritization of self-referential stimuli in working memory. *Psychological Science*, 30(3), 415–423.

