Saliency and valuation in decisions

- an online behavioral experiment

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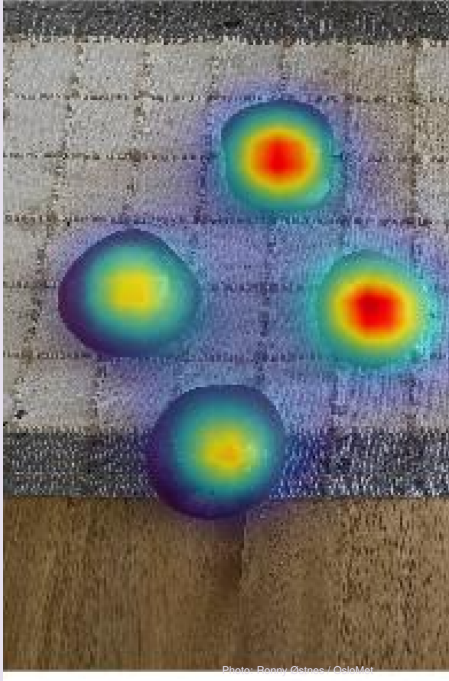

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Research Question

Experiment Design

- Subjects are asked to choose either left pile or right pile under a time pressure.
- Each unit fruit is associated with a monetary amount.
- Pile value = sum of all fruits.

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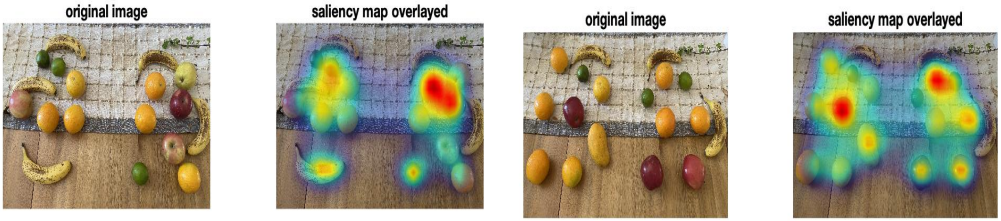
Saliency and the Stimuli



- Saliency measure is determined from SAM algorithm.
- SAM is trying to predict the attention allocation of the whole image.
- We select only images with one -side saliency center (left example).

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Stimulus and Parameters

Two types of stimuli

Congruent Condition: The rewarding pile is also the salient pile.
Incongruent Condition: The rewarding pile is the unsalient pile.

- Each subject: 20 image trials, with 8 congruent trials and 12 incongruent trials.
- Value difference: 10 images below 5 and 10 images ranging from 5-11
- Left right balanced for saliency
- Six types of fruits, unit value in integers from 3 to 6.
- Time limit: 20 seconds

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Data

- N=25, on Prolific
- Approval rate >75%
- Batch 1) many fruits (reported) Batch 2) four fruits(unreported)

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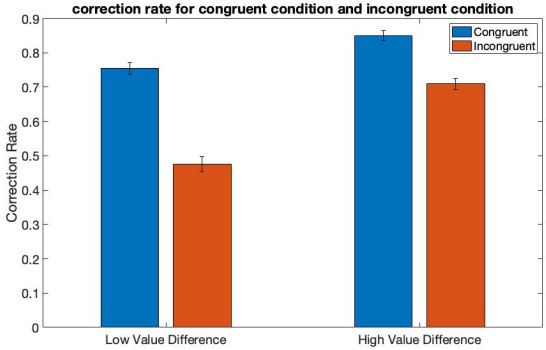
Result - Error Rate

- People make more mistakes when saliency property conflicts with reward property.
- Such results holds regardless of valuation difference.



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	Dependent variable: Choice			
Rewarding	0.913***	0.887***	0.773***	
	(0.116)	(0.192)	(0.106)	
Salient	0.876***	0.857***		0.395**
	(0.214)	(0.241)		(0.184)
Value*saliency		0.040		
		(0.241)		
Constant	−0.492***	−0.474**	−0.013	0.090
	(0.159)	(0.192)	(0.106)	(0.128)
Observations	489	489	489	489
Log Likelihood	-296.478	-296.464	-305.405	-331.742
Akaike Inf. Crit.	598.956	600.929	614.811	667.484
Note:				*p<0.1; **p<0.05; ***p<0.01

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	Dependent variable: correctness			
	(1)	(2)	(3)	(4)
congruency	0.979***	0.867***		0.985***
	(0.343)	(0.213)		(0.219)
valueDiff	0.103***		0.082***	0.103***
	(0.036)		(0.029)	(0.030)
interaction	0.001			
	(0.066)			
Constant	−0.071	0.457***	0.383**	−0.073
	(0.214)	(0.120)	(0.162)	(0.192)
Observations	489	489	489	489
Log Likelihood	-290.304	-296.601	-301.186	-290.304
Akaike Inf. Crit.	588.607	597.203	606.371	586.608
Note:				*p<0.1; **p<0.05; ***p<0.01

	Dependent variable: Response Time		
	(1)	(2)	(3)
valueDiff	−0.162**	−0.083	−0.156**
	(0.063)	(0.081)	(0.063)
congruency	−0.342	0.593	
	(0.460)	(0.763)	
interaction		−0.198	
		(0.129)	
Constant	9.048***	8.632***	8.882***
	(0.441)	(0.517)	(0.380)
Observations	489	489	489
R^2	0.014	0.018	0.012
Adjusted R^2	0.010	0.012	0.010
F Statistic	3.351** (df = 2; 486)	3.026** (df = 3; 485)	6.153** (df = 1; 487)