

Saliency and valuation in decisions

- an online behavioral experiment

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Caltech

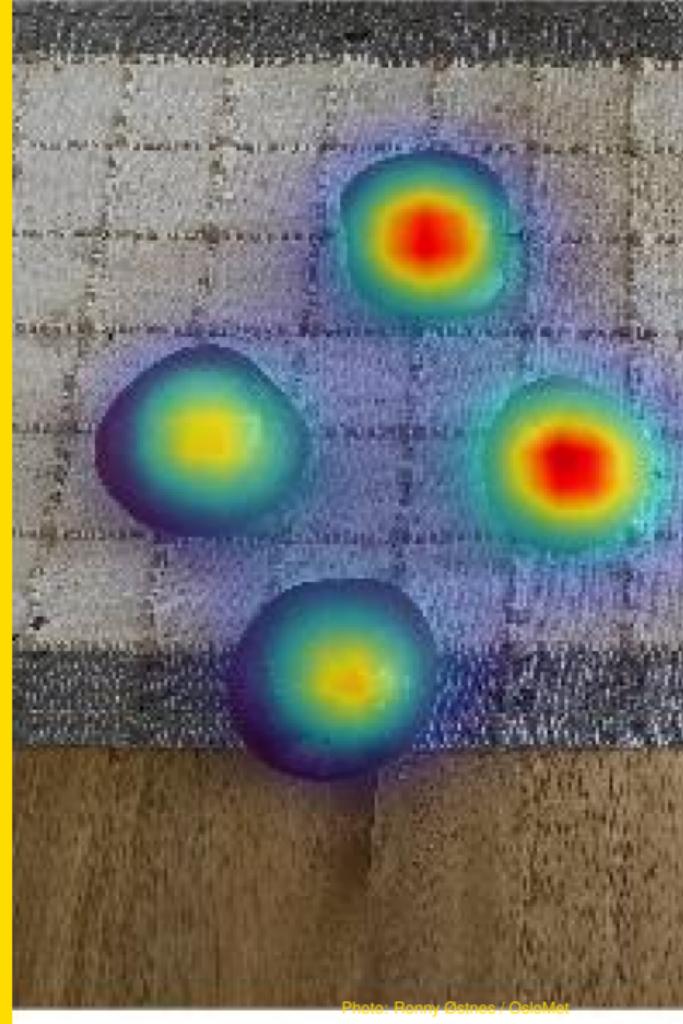


Table of contents

1 Motivation

2 Designs and Experiments

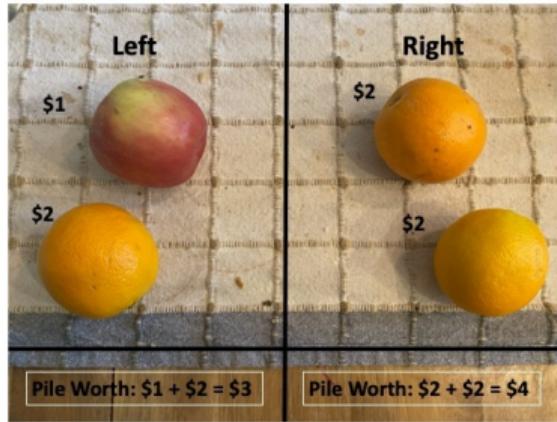
- Experiment Design
- Saliency

3 Result and Analysis

Research Question

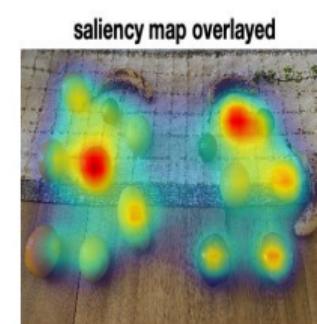
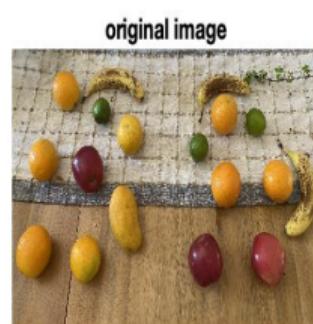
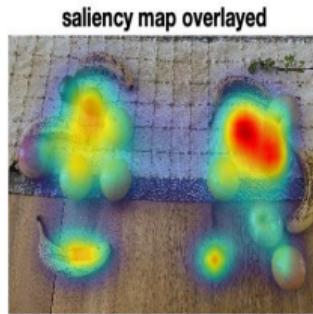
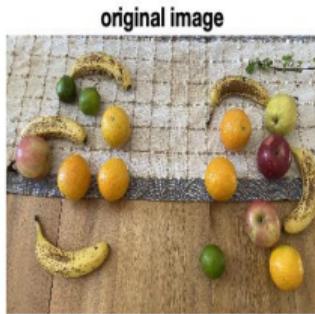


Experiment Design



- 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.

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).

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.

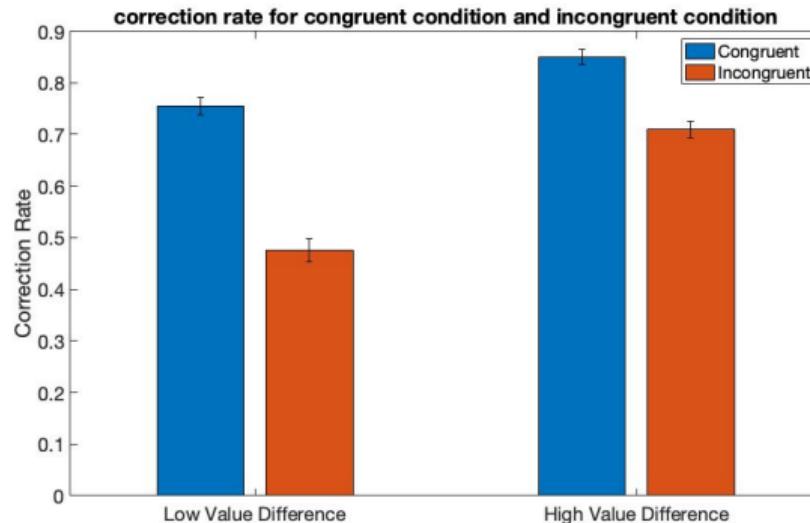
- Each subject: 20 image trials, with 8 congruent trials and 12 incongruent trials.
- Value difference: 10 images below 5 and 10 images ranging from 5-11
- Left right balanced for saliency
- Six types of fruits, unit value in integers from 3 to 6.
- Time limit: 20 seconds

Data

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

Result - Error Rate

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



<i>Dependent variable: Choice</i>				
Rewarding	0.913*** (0.116)	0.887*** (0.192)	0.773*** (0.106)	
Salient	0.876*** (0.214)	0.857*** (0.241)		0.395** (0.184)
Value*saliency		0.040 (0.241)		
Constant	-0.492*** (0.159)	-0.474** (0.192)	-0.013 (0.106)	0.090 (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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<i>Dependent variable: correctness</i>				
	(1)	(2)	(3)	(4)
congruency	0.979*** (0.343)	0.867*** (0.213)		0.985*** (0.219)
valueDiff	0.103*** (0.036)		0.082*** (0.029)	0.103*** (0.030)
interaction	0.001 (0.066)			
Constant	-0.071 (0.214)	0.457*** (0.120)	0.383** (0.162)	-0.073 (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** (0.063)	-0.083 (0.081)	-0.156** (0.063)
congruency	-0.342 (0.460)	0.593 (0.763)	
interaction		-0.198 (0.129)	
Constant	9.048*** (0.441)	8.632*** (0.517)	8.882*** (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)