# Perception and prediction of non-linear changes

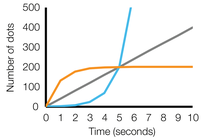
Yu Wang[1], Yu Luo[1], Alejandra Echeverri[2], & Jiaying Zhao[1,2]

[1]Department of Psychology, [2]Institute for Resources, Environment and Sustainability, University of British Columbia

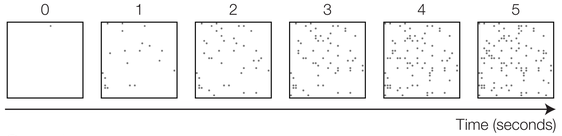
## General paradigm

### Increase

The number of dots increases in different ways




Task: viewing dots increase in a tank for 5 seconds

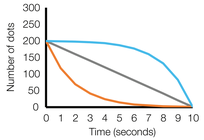



Questions:

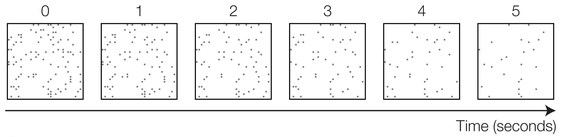
Estimation: How many dots are there in the tank after 5 seconds?
Prediction: How many dots will there be in the tank in 5 more seconds?

### Decrease

The number of dots decreases in different ways




Task: viewing dots decrease in a tank for 5 seconds

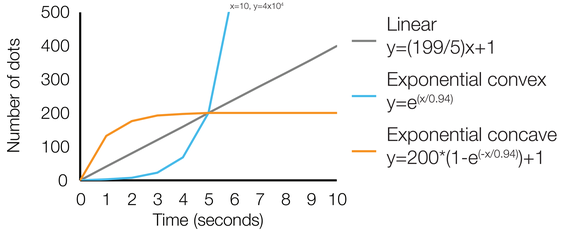


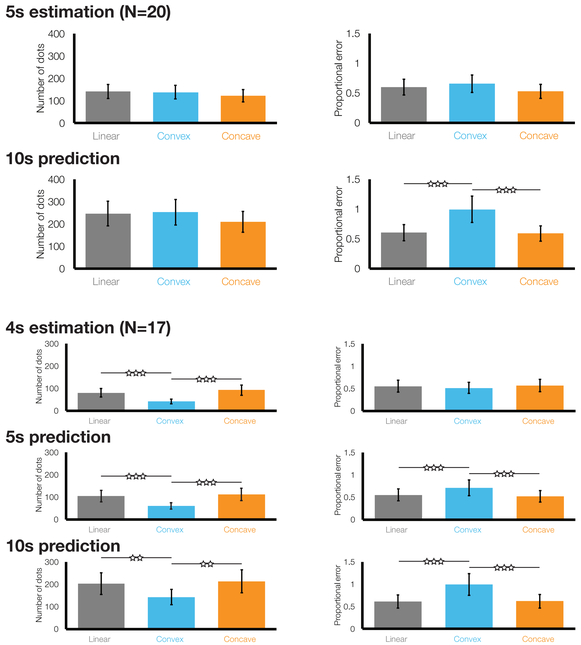

Questions:

Estimation: How many dots are there in the tank after 5 seconds?
Prediction: How many dots will there be in the tank in 5 more seconds?
Prediction: How many more seconds will it take for the tank to be left with only 1 dot?

## Exponential changes

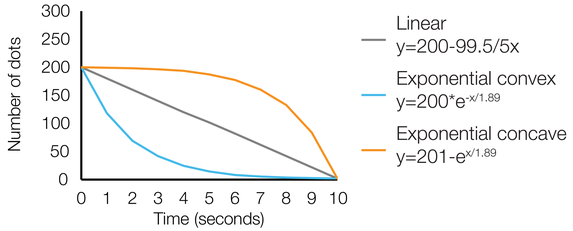
### Increase

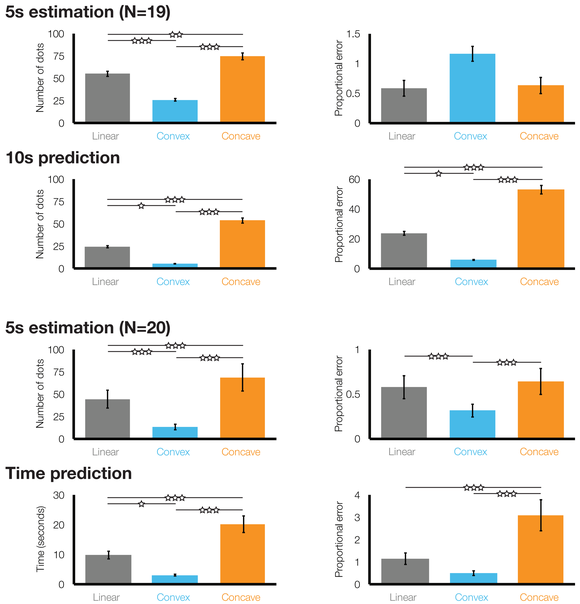



People severely under-predict exponential convex growth in the future

### Decrease

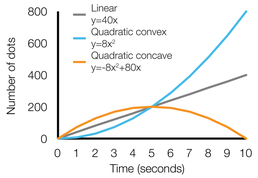


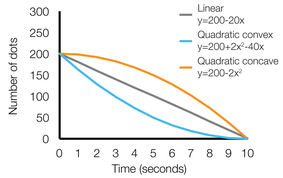

People severely under-predict exponential concave decay in the future

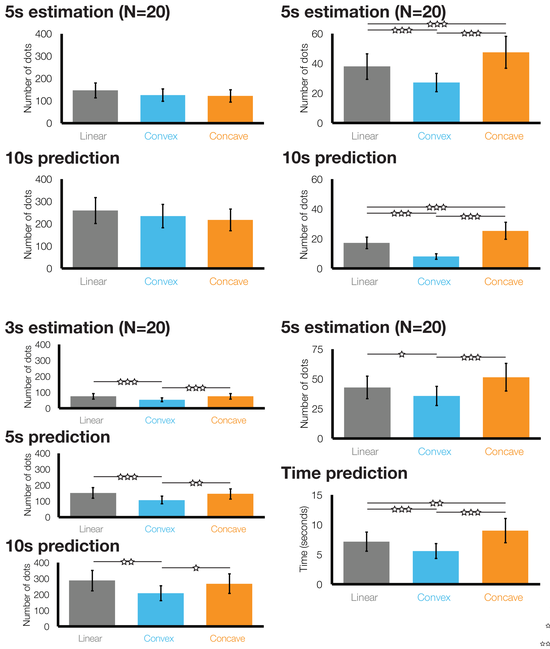
## Quadratic changes (replication)

### Increase




### Decrease




$^{*}p < .05$
$^{**}p < .01$
$^{***}p < .001$

People severely under-predict quadratic convex growth or concave decay in the future