Perception and prediction of non-linear changes

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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?

Exponential changes

Increase
Linear
Exponential convex
Exponential concave

Decrease
Linear
Exponential convex
Exponential concave

Quadratic changes (replication)

Increase
Linear
Exponential convex
Exponential concave

Decrease
Linear
Exponential convex
Exponential concave

Number of dots

5s estimation (N=20)
10s prediction

4s estimation (N=17)
5s prediction

5s estimation (N=20)
10s prediction

3s estimation (N=20)
5s estimation (N=20)

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

Proportional error

People severely under-predict quadratic convex growth in the future