

Debrief form (Kalman experiments)

Humans can predict the location of unseen objects using an internal model that integrates information such as velocity, last known location, and prior knowledge about the object's behavior. These internal models can be updated when presented with new information. It is theorized that humans use a cognitive process similar to a Kalman filter which integrates predicted information with new recordings (feedback) to make a new prediction. For example, when a car is moving on your neighborhood street you expect it to be going at the same speed as all the cars that have passed your house in the past. A car that is moving faster will challenge this internal model and you will be forced to change your prediction of when the car will pass you.

In this set of experiments, we aim to determine if you trust your internal model, or use the feedback given to you to correctly predict where a dot will be. One experiment asked you to quickly reach to the location that you expect the red dot to appear at, meaning you must prepare a movement plan prior to moving. In the other two versions, you pressed a button when you expected the dot to be inside a circle, given you knew the speed and trajectory of the dot. In one of these two experiments, you were randomly given feedback on the dot's location. In the other you could decide when the feedback was given, but there were incentives to landing within a second goal zone during the feedback.

Sometimes the feedback you were given was not correct. The goal of this set of experiments was to determine **how much you used the feedback** to inform your future predictions. In addition, we hope these experiments will shed light on how your integration of information changed across time. For example, you may have used the feedback more in the beginning vs the end of the experiment or your internal model may have become more/less precise after you were exposed to more trials.

This research you have participated in will help expand fundamental scientific knowledge on the computational models by which humans change their beliefs, and could lead to a better description and understanding of human cognition.

Thank you for your participation!