Modelling response times in multi-alternative categorization with TVA

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Background

In TVA1 it is assumed that encoding in VSTM is a race between competing categorizations. Previously2, we presented a Poisson Counter model of visual identification of mutually confusable stimuli in pure accuracy tasks. Here we propose and test a multi-dimensional Poisson Random Walk model to explain response time distributions in four alternatives.

Experiment

Fixation  ◮ Stimulus  ◮ Response  ◮

Spaced response time task

Respond as quickly and accurately as possible (4-AFC).

Task:

Judge the orientation of a Landolt C-ring

Varying difficulty: ±33 deg, ±39 deg, and ±42 deg

Three participants were tested in 4800 trials

Results

Individual fits

Group results

Conclusions

The assumption of a relative response rule with exponential processing leads to a simple Poisson random walk model that can easily be generalized to multiple alternatives. The Poisson Random Walk model accounts well for observed performance in a speeded response time task with multiple alternatives.

References


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