Modelling response times in multi-alternative categorization with TVA

Blurton, Steven Paul; Kyllingsbæk, Søren; Bundesen, Claus

Publication date: 2017

Document version
Other version

Document license: Unspecified

Citation for published version (APA):
Background
In TVA\(^1\) it is assumed that encoding in VSTM is a race between competing categorizations. Previously\(^2\), 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 speeded response task**

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

**Task:**

Judge the orientation of a Landolt C-ring

Varying difficulty:

\(\pm 33\) deg, \(\pm 39\) deg, and \(\pm 42\) deg

Three participants were tested in 4800 trials.

Multi-alternative random walk model

Competitive Poisson accumulator model: Evidence for one alternative counts as evidence against all other alternatives. Inhibition can never lead to negative activation. For two alternatives, the model is equivalent to the standard random walk.

**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


This work was funded by University of Copenhagen Excellence Programme for Interdisciplinary Research.

Presented at the 2017 ECVP

Contact: steven.blurton@psy.ku.dk