Neuronal model for startling coupled with a collective behavior model

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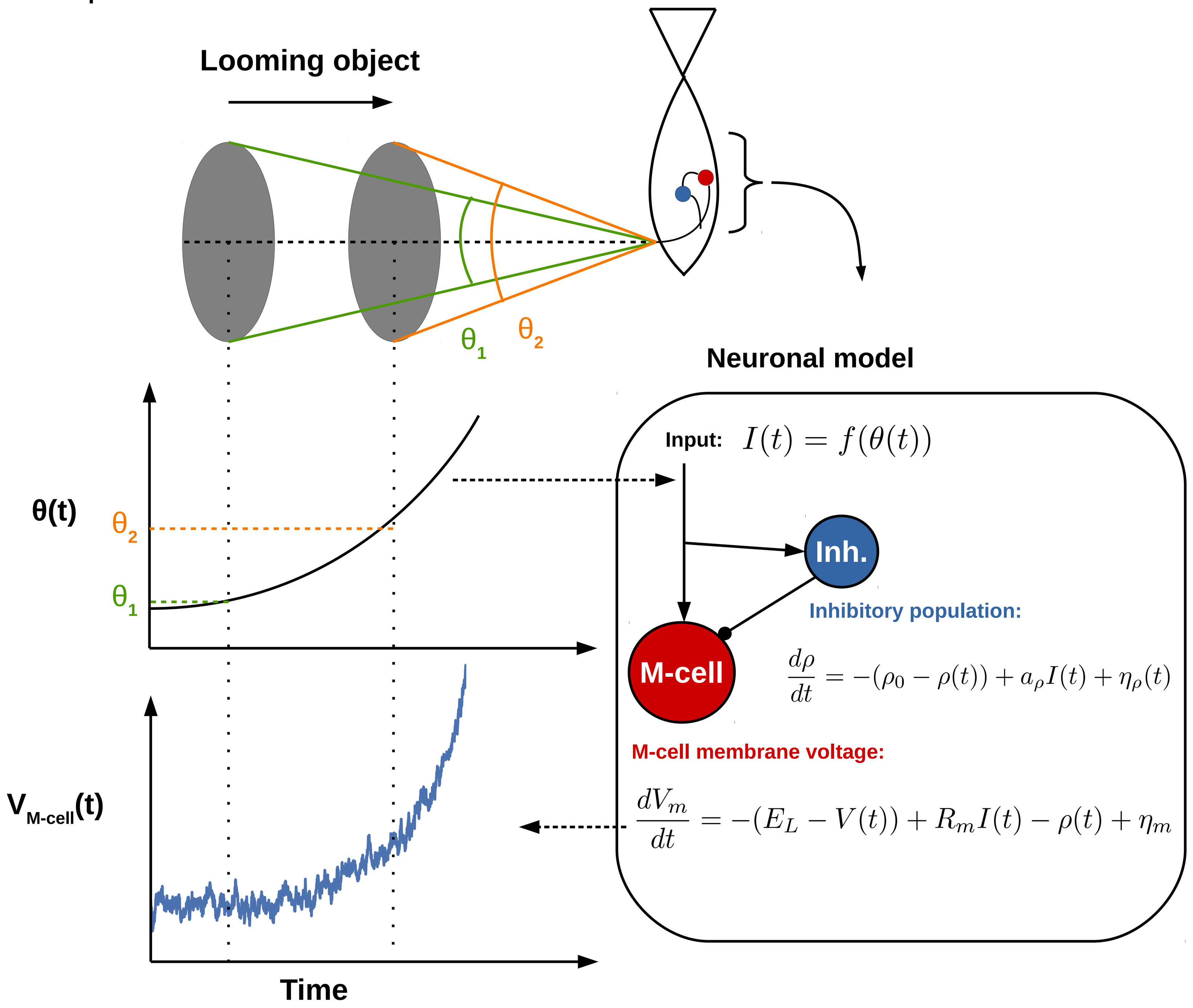
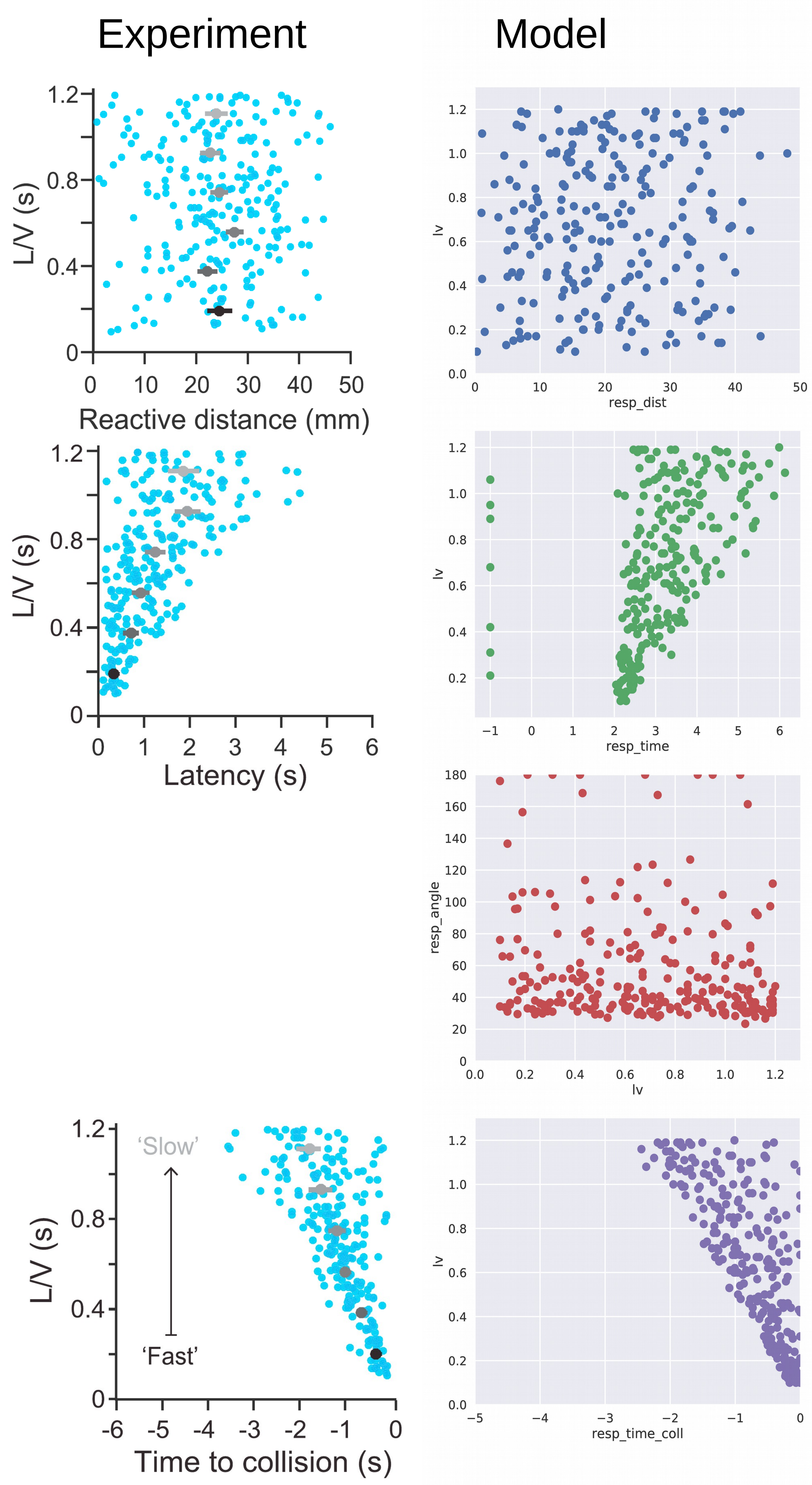
1) Introduction

- The Mauthner-cell (M-cell) circuit has been identified to be responsible for the startle response in fish but we still lack a mechanistic understanding
- The startle response is known to spread in fish schools dependent on the network structure (Rosenthal et al. 2015).
- Here we:
  1)Find a neuronal model that reproduces behavior in a visual looming stimulus experiment (Bhattacharyya et al. 2017)
  2)Combine the neuronal model with a collective behavior model to explore the initiation of startles in a fish school



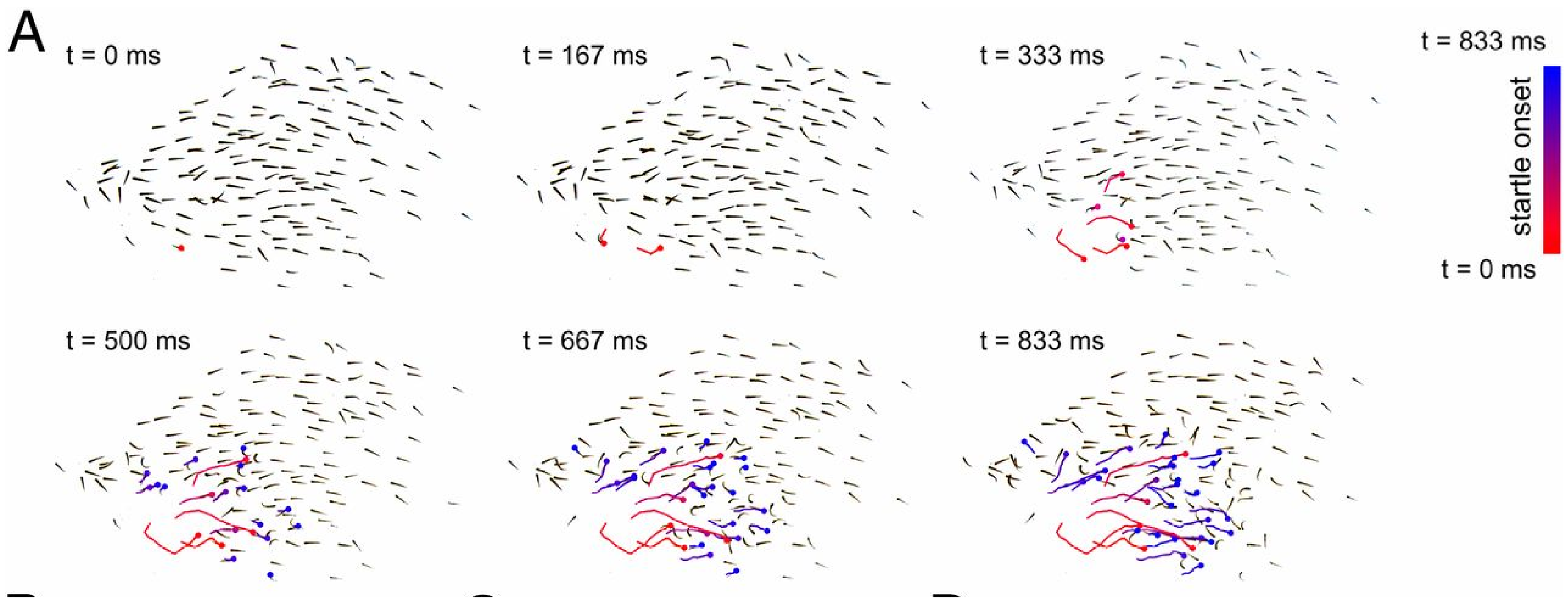
2) Neuronal model reproduces experimental response properties

Using the instantaneous visual angle as input for the neuronal model we can reproduce the patterns of response distance, time and time-to-collision as well as the response angle that were found for in an experiment with different approach speeds of a looming stimulus.



Hello, this is a text about the data that you can see on the left. Look at it, isn't it beautiful?

2) Coupling with collective behavior model



$$\frac{d\varphi_i}{dt} = \frac{1}{s_i + c_s}\left(F_{i,\varphi} + \eta_{i,\varphi}\right)$$

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3) Collective behavior results

4) Conclusions

5) References