Evidence for emotional-lateralization in zebrafish

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Introduction

- Emotional lateralization–use of one side of the body to interact with dangerous stimuli and the other side to interact with positive stimuli–has been found in a range of vertebrates
- Previous research has found zebrafish preferentially use their left eye to inspect novel objects but emotional motivation is unclear
- Group lateralized behaviour has not yet been described in zebrafish
- Objective: test if left eye lateralization is driven by a negative emotional context in zebrafish and assess tank-level lateralization


(Photo credit to Varsharani2)

Zebrafish inspect a human observer using their left eye

Materials and Methods

- Experiment was conducted with stable social groups of 10 in their home tank (n = 6)
- Nine novel objects (resembling predators, non-threatening objects, such as rocks and plants, and items not found in nature e.g. a pink spongy ball) were inserted one at a time near the front of the tank for 10 min
- The eye facing the object was recorded for both front and back passes during the first 100s
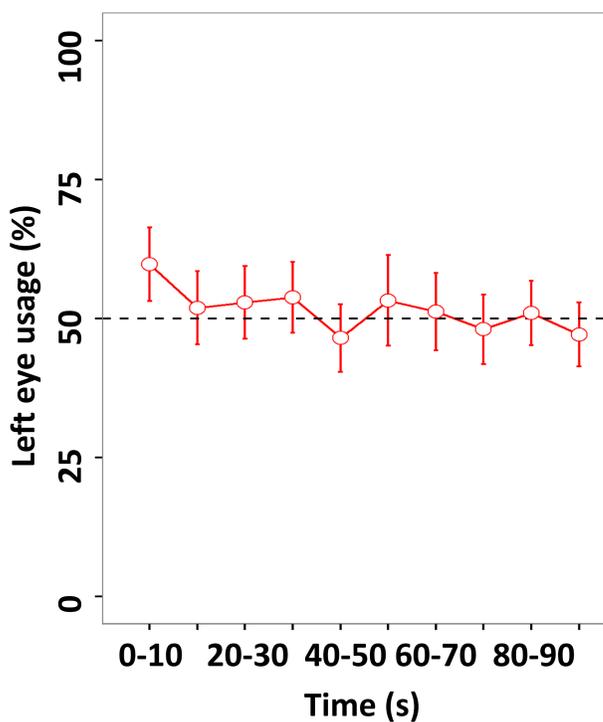
Top view of tank (object on left)

Tank back

Object

Tank front
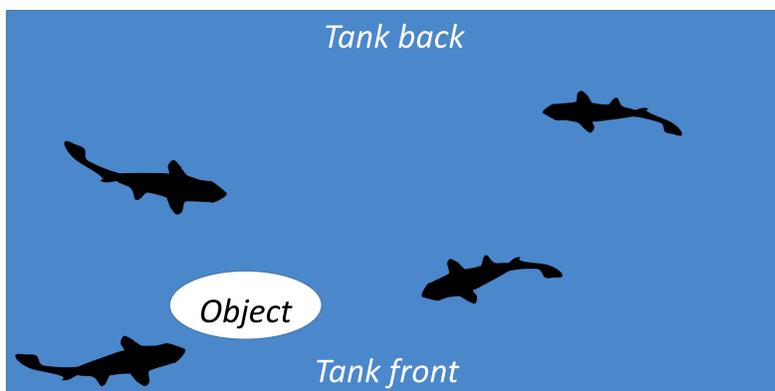
Tank schematic, showing how fish could approach the novel object

Front view of tank (object on right)
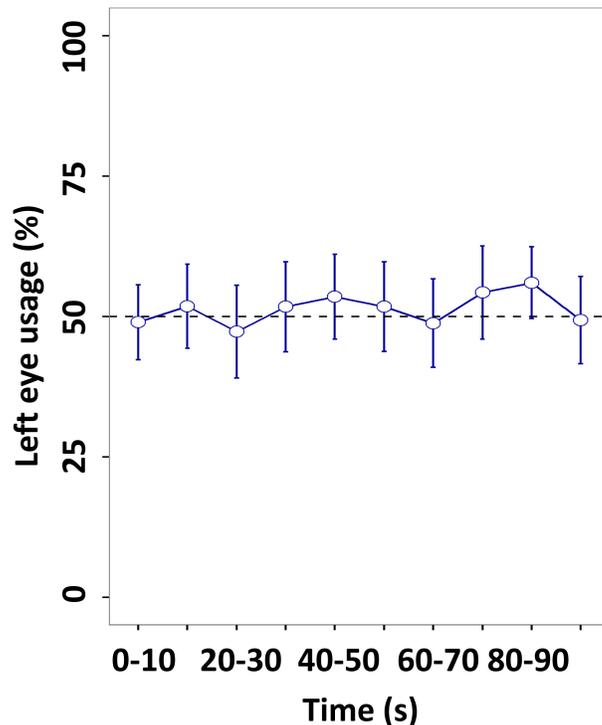

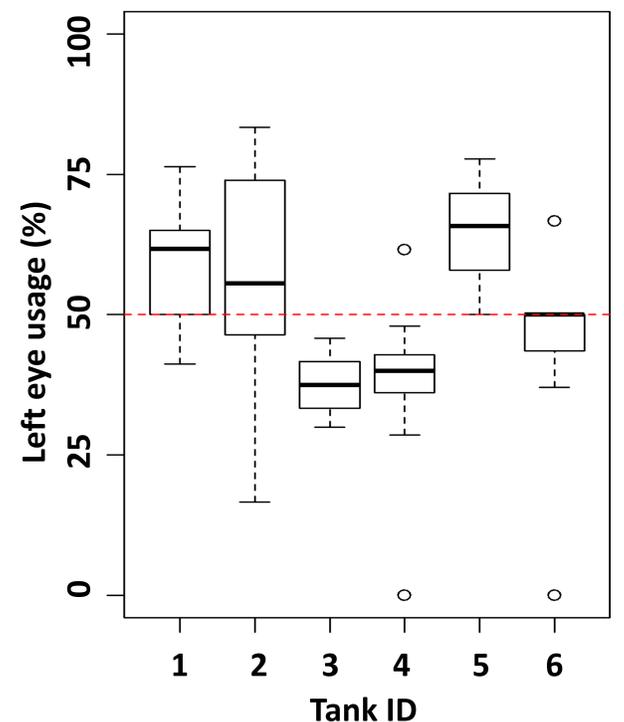*Photograph from the front of the tank*

Results

Zebrafish used their left eye more in the first 10 s for front inspections (P = 0.003)

Zebrafish showed no eye preference when inspecting from the back (P>0.8)

Eye usage varied among the tanks (P<0.001)

Discussion

- Overall, we found limited evidence for behavioral lateralization when inspecting novel stimuli in the home tank
- Zebrafish did show *emotional lateralization:* favoring the left eye for risky inspections (1st 10 sec, front) only
- Throughout the first 100 sec, lateralization varied by tank; no previous literature has described this behaviour