

# CAN FISH MAKE FRIENDS?

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Reed College ~ Bio 342

**Cooperation:** a behavior ripe with avenues for adaptive value. It pairs with kin selection, delayed mutualism, sexual selection, reciprocity, and a multitude of other advantageous behaviors..



*Astatotilapia burtoni*, aka African Cichlids, make the perfect organism with which to study this versatile behavior.

“The African cichlid fish, *Astatotilapia burtoni* (formerly: *Haplochromis burtoni*) has become an important model system to study the mechanisms underlying socially mediated behavioral change.” - Suzy Renn

Does cooperation among Cichlid males exist? If so, where does it break down?

We explore these questions and more by observing reactions, both hormonal and behavioral, through familiarizing male cichlids and forming a cichlid “buddy system”.

# Experimental Design: The Cichlid Buddy System

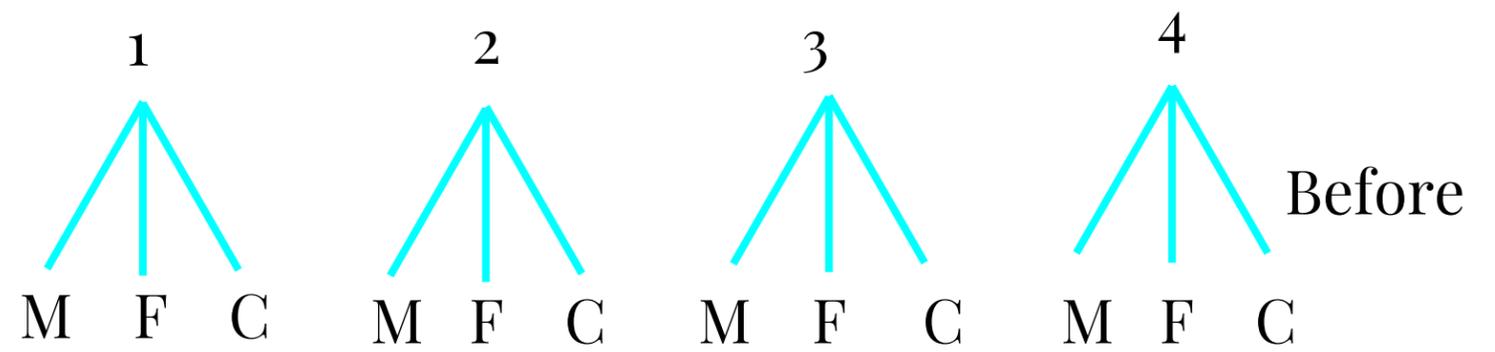


## Hypothesis

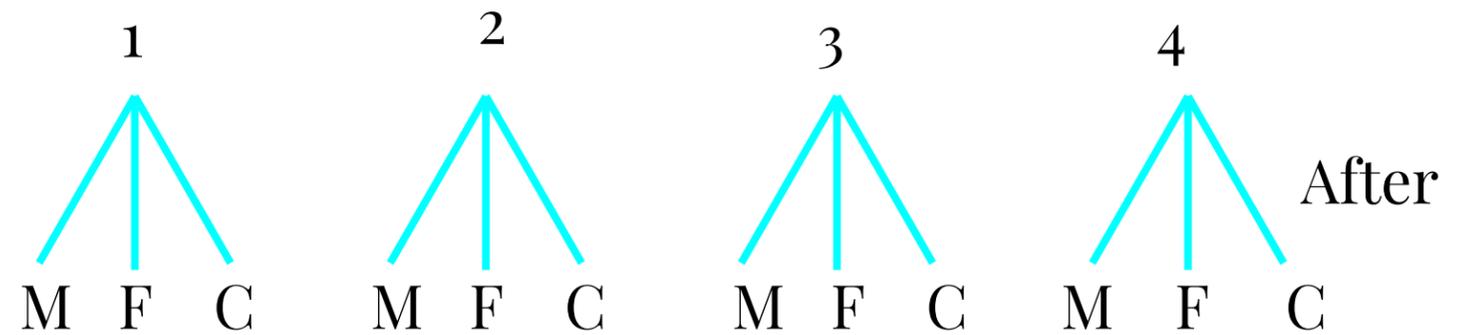
The Cichlid pairs will exhibit greater aggression when introduced to a female than when introduced to another male of similar size.

## Procedure

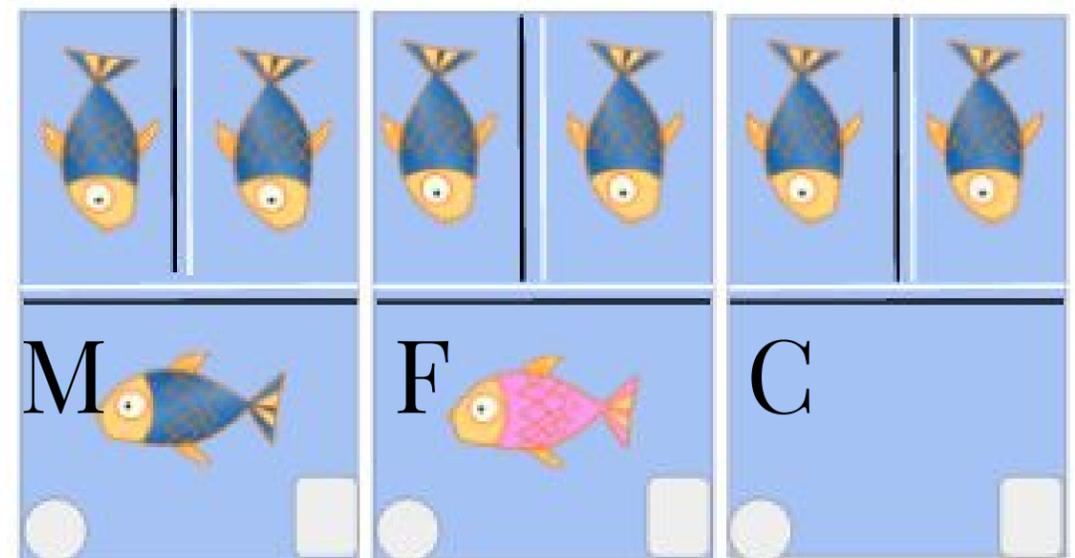
Two male Cichlids of similar size were familiarized as buddies and “fought” against another similarly sized male, a female, and nothing (control).



These diagrams show the design for taking our 24 hormone samples: each fish ID, before and after, for 3 different fights (Male, Female, Control)



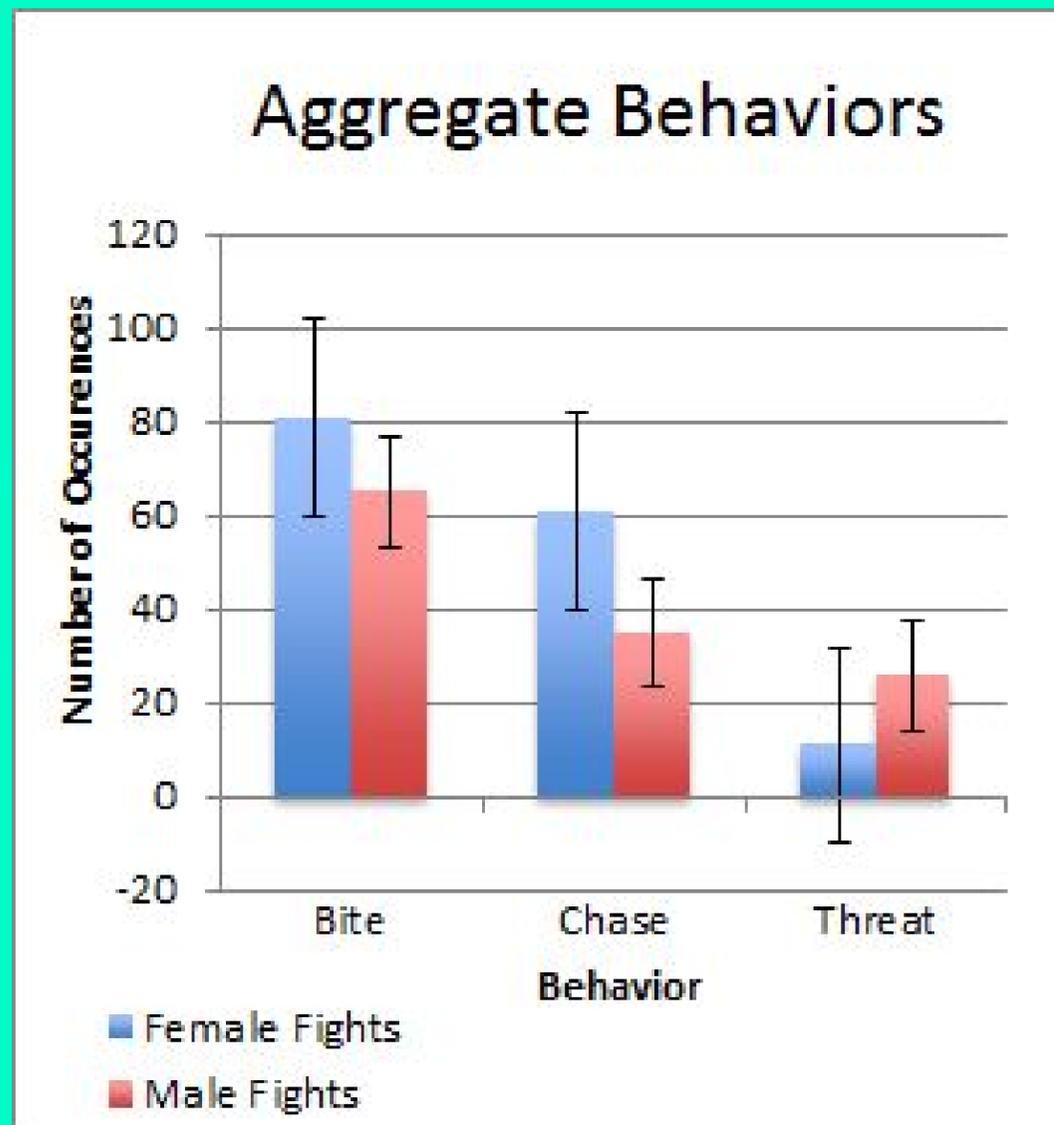
Three tanks were tri-partitioned with barriers and blinders. Male, female, and control fish were rotated between tanks for fights.



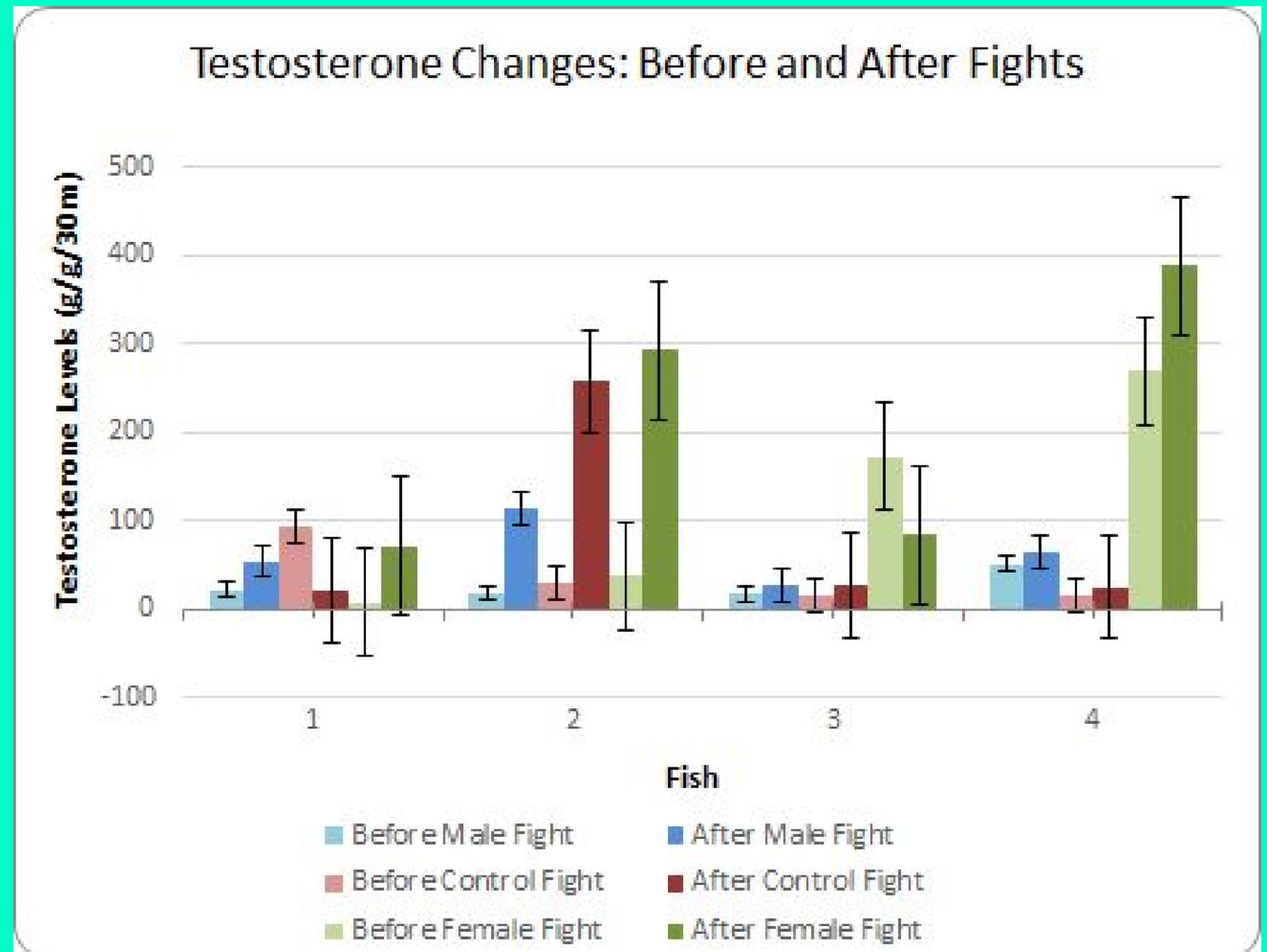
# Results

Our behavioral observations and our hormonal ELISA assay both resulted in data confirming our hypothesis that male aggression increases more when a female is introduced than when another male is introduced.

## Behavioral Analysis

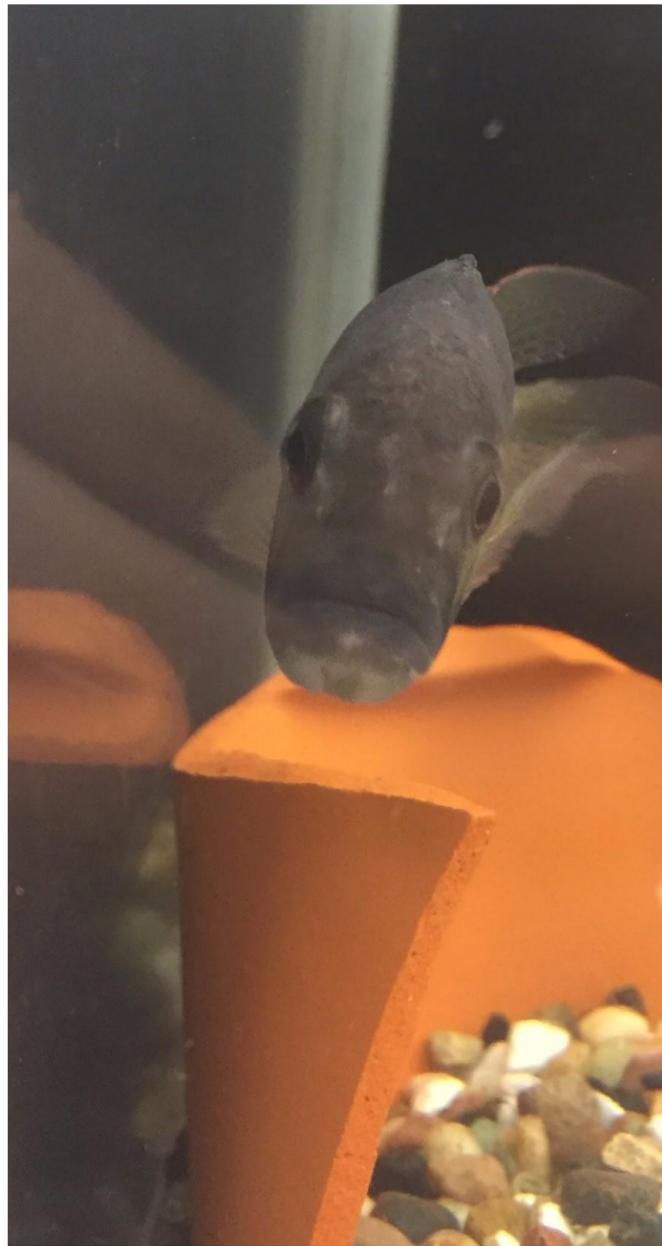


## Hormone Analysis



# Conclusions

Familiar pairs were more aggressive in the presence of a visible reward (a female mate), rather than a threat (a third male). Our results reinforce previous theories of sexual selection and competition, since the cichlid pairs exhibited aggressive behavior, and higher testosterone levels, in front of a possible mate.



# Next Steps

Future research should look at a larger sample size of cichlids, to hopefully make more definitive correlations between cooperation and competition. Our findings should also be examined in a group dynamic- Do cichlids exhibit higher testosterone levels when mating options are presented to more than 2 males? Or does the threat of a stranger male warrant more cooperation from a group?

## References

Suzy Renn's Bio 342 - Cichlid Lab Behavioral Fight Protocol. Reed College.

Suzy Renn's Bio 342 - Cichlid Lab ELISA Assay Protocol. Reed College.

ELISA Kit for Hormone Assay

[www.jwatcher.ucla.edu](http://www.jwatcher.ucla.edu)

## Acknowledgments

We would like to thank the Reed Biology stockroom staff, who were always there to lend a hand, and a vortexer. As well as Suzy Renn for her guidance and support.

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