Competitive Dominance of Juvenile Spring Chinook Salmon Among Hatchery, Supplementation, and Wild Populations

Jennifer Scott, Todd Pearsons, and Anthony Fritts

Washington Department of FISH AND WILDLIFE

Domestication

- Natural selection in an artificial environment resulting in a change to the genetic structure of the population

3 Lines of Yakima Basin Chinook

- Hatchery: Offspring of hatchery parents returning to CESRF
- Supplementation: Offspring of natural origin Upper Yakima Chinook (at least one generation removed from hatchery)
- Naches: Wild line from unsupplemented Naches Basin

Ultimate Goal

- To determine if there are differences in competitive dominance between the offspring of 2 lines of Upper Yakima River Spring Chinook relative to a wild Naches Basin line

Methods

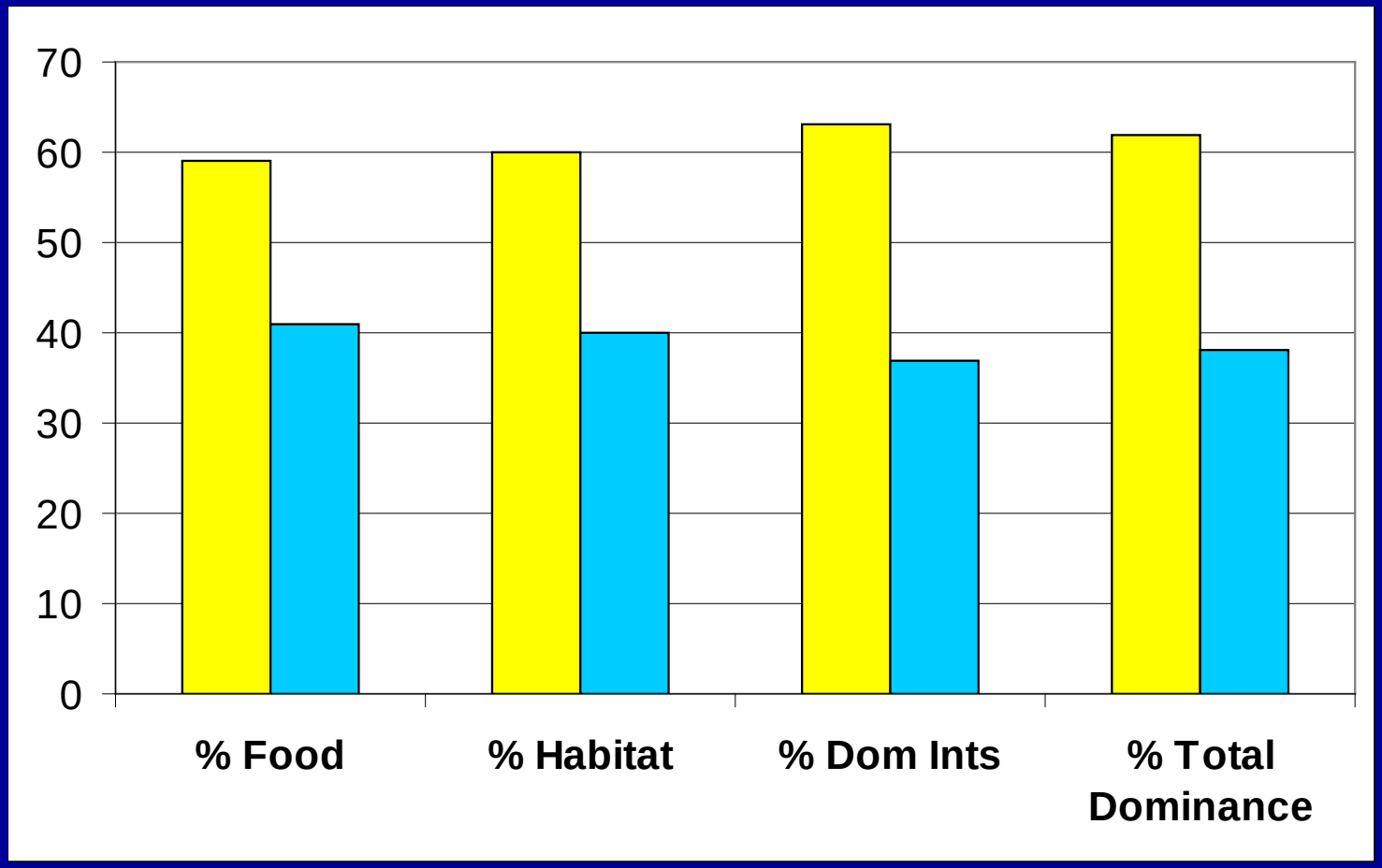
- Size match and mark fry
  - S vs. N
  - H vs. N
  - H vs. S
- Blind experiment
- 6 acclimation days
- Day 7 is observation day
  - Consumer, sweet spot, interactions

Behaviors Evaluated

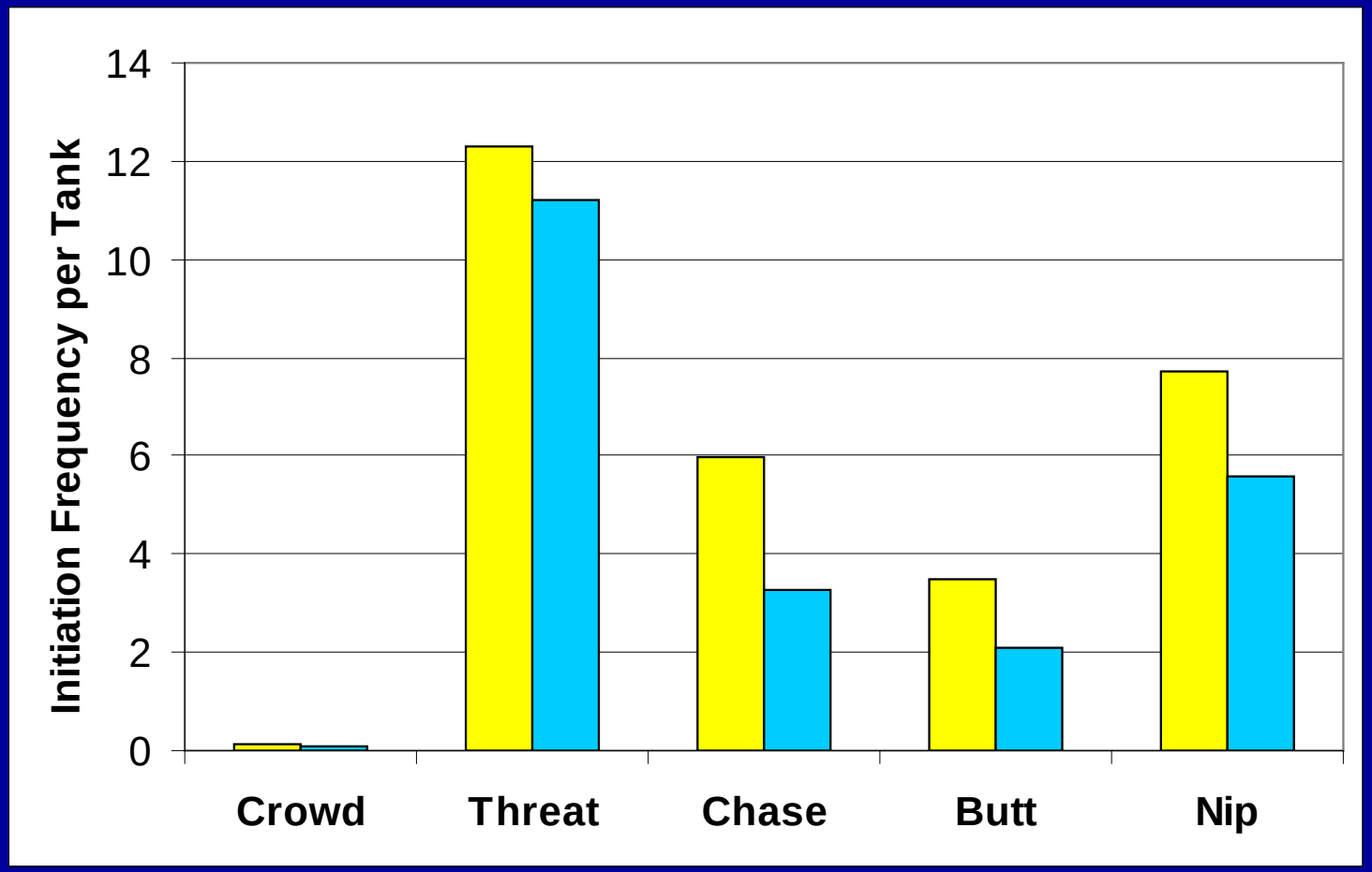
- Overall Dominance
  - 2 of 3: Food, Habitat, Dominated Interactions
- Aggression
  - Types of Interactions
  - Interaction Rates

Supplementation vs. Naches

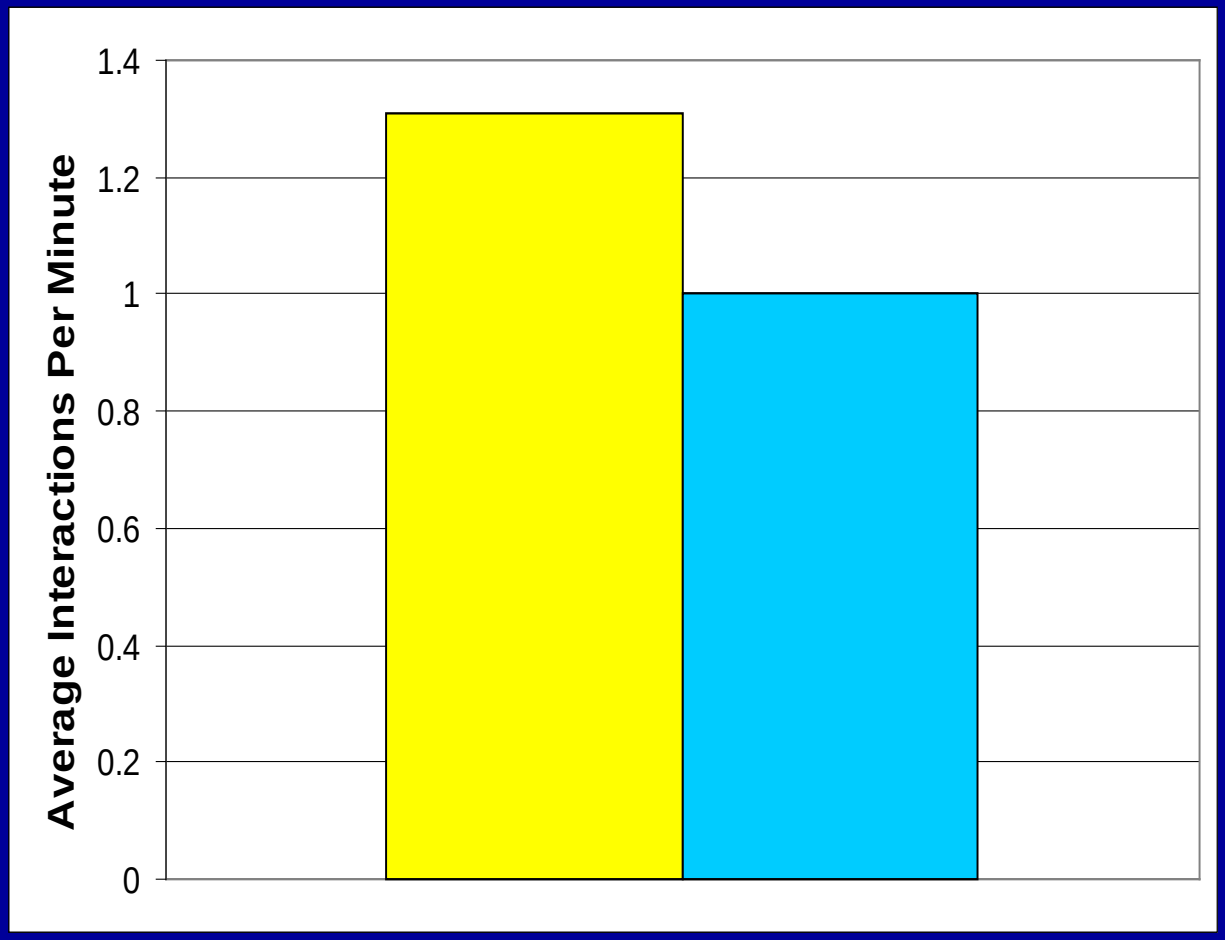
n=266 p<0.0001**



S (7883) vs. N (5925)
Interaction Type p=0.989

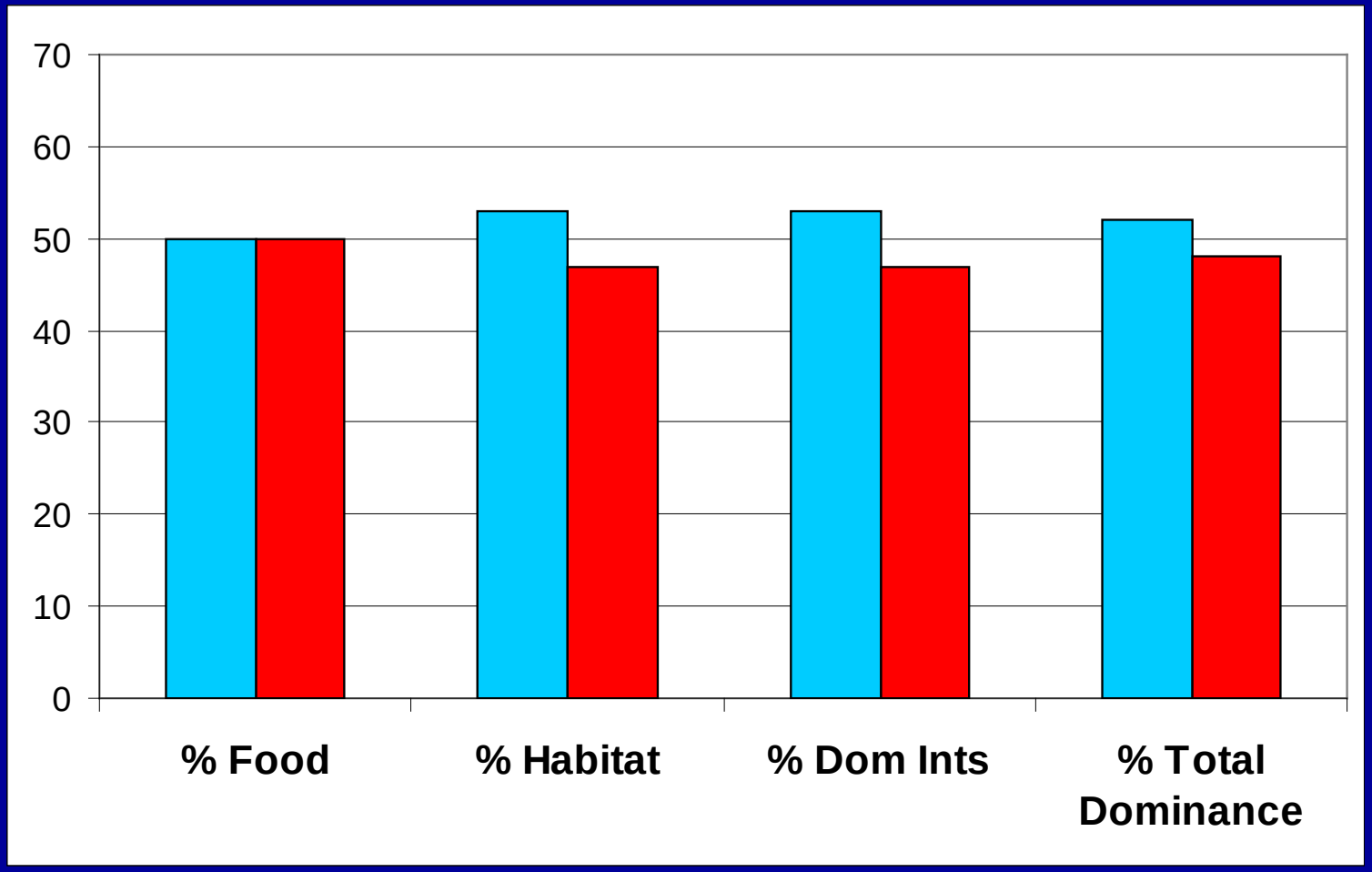


S vs. N Interaction Rate
p=0.0001**

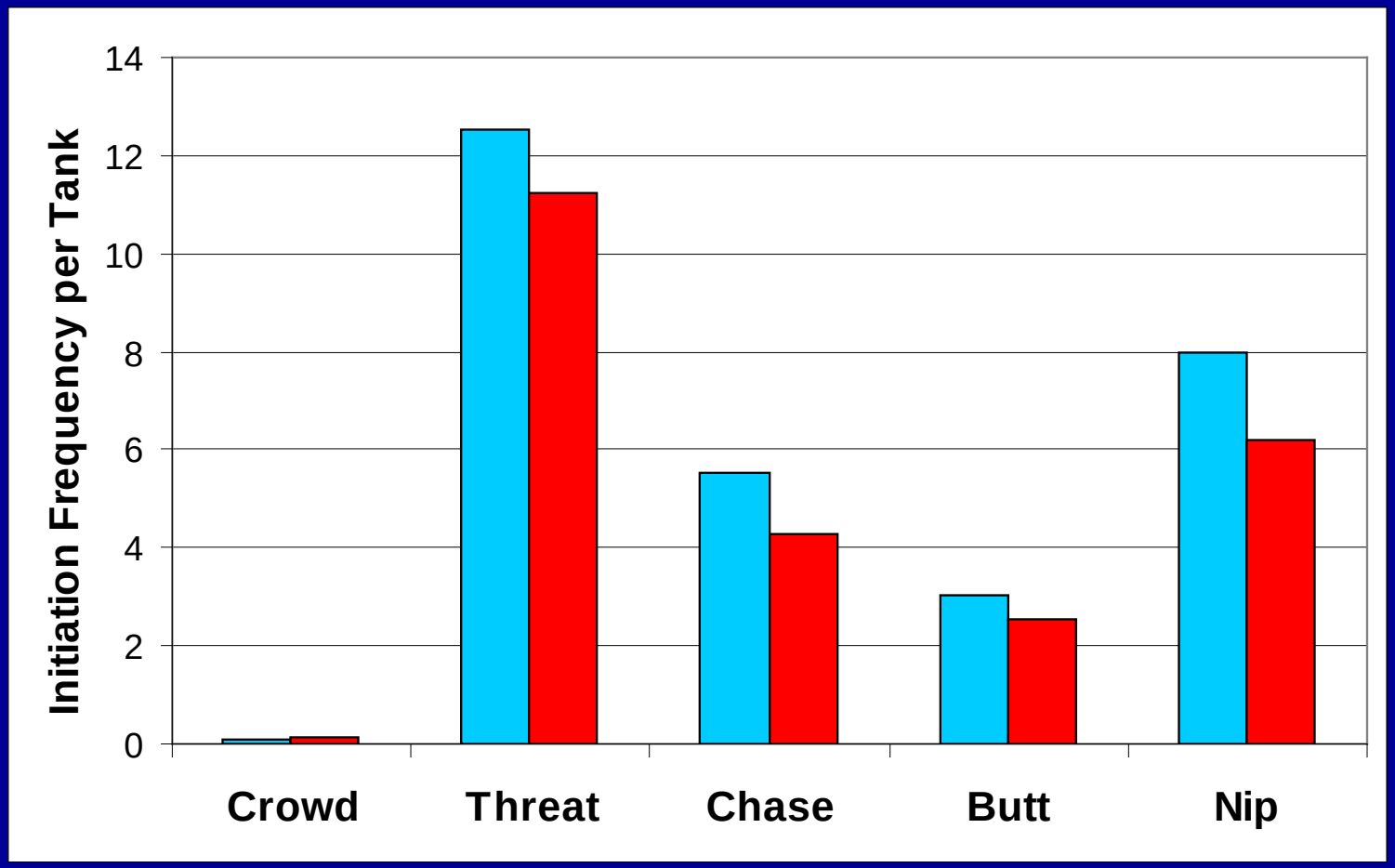


Naches vs. Hatchery

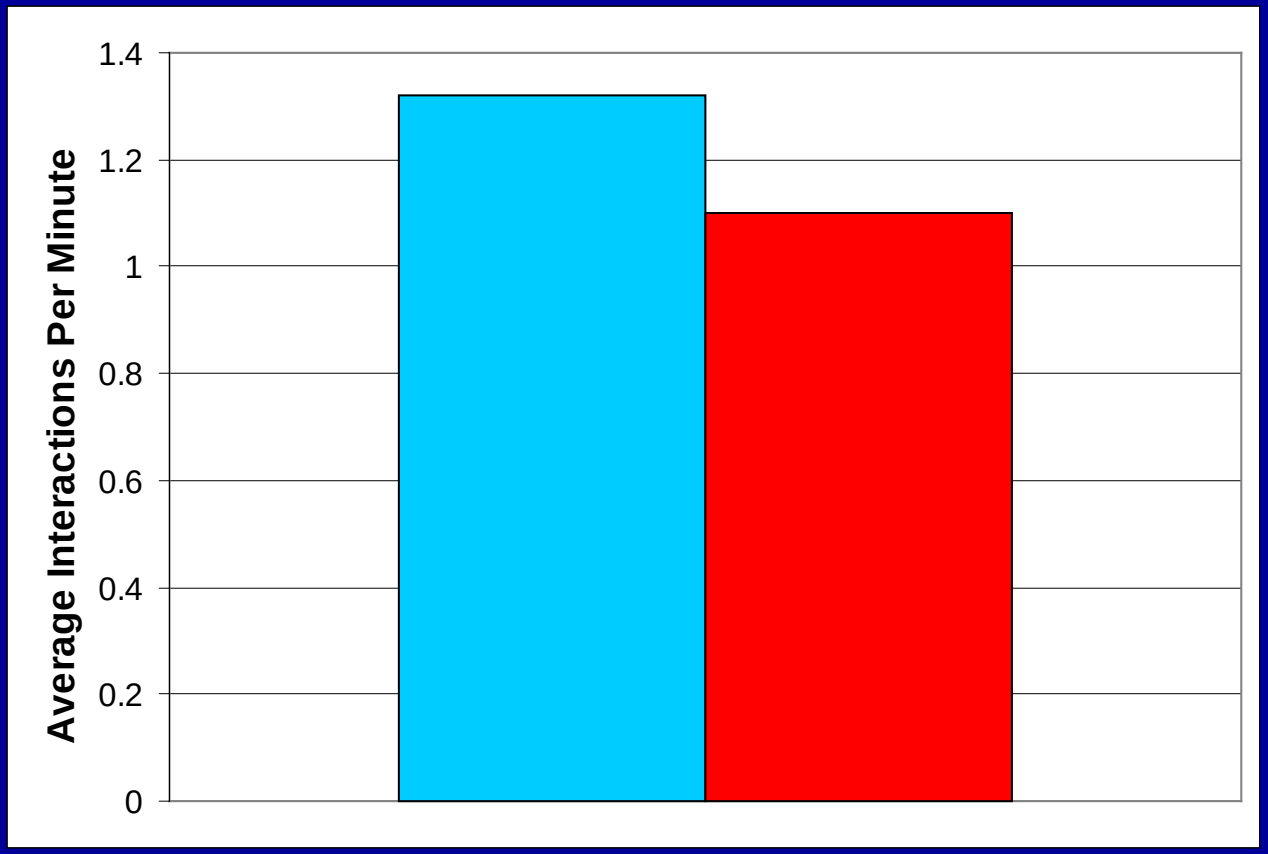
n=258 p=0.729



N (7526) vs. H (6314)
Interaction Type p=1.000

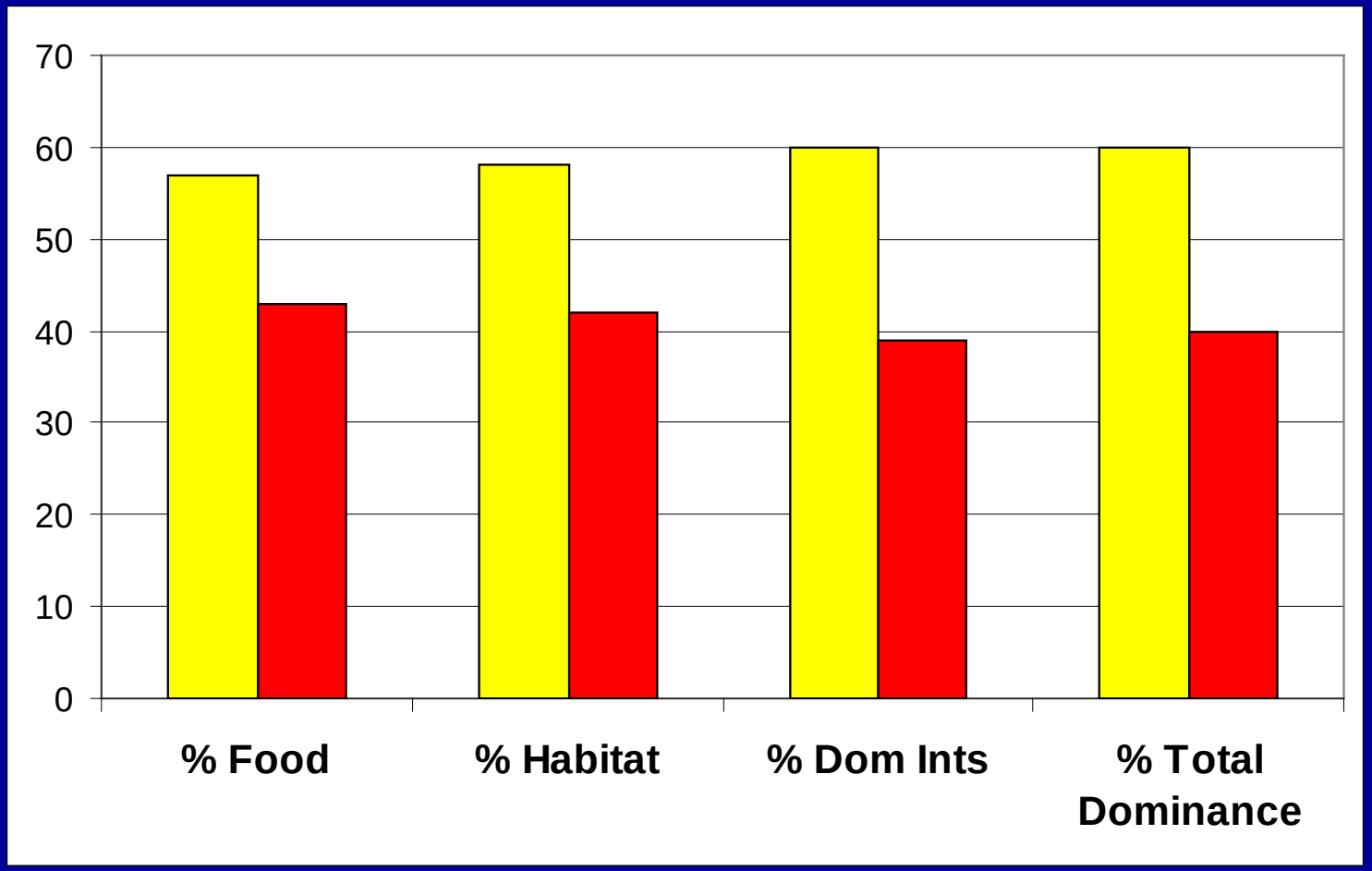


N vs. H Interaction Rates
p=0.045**



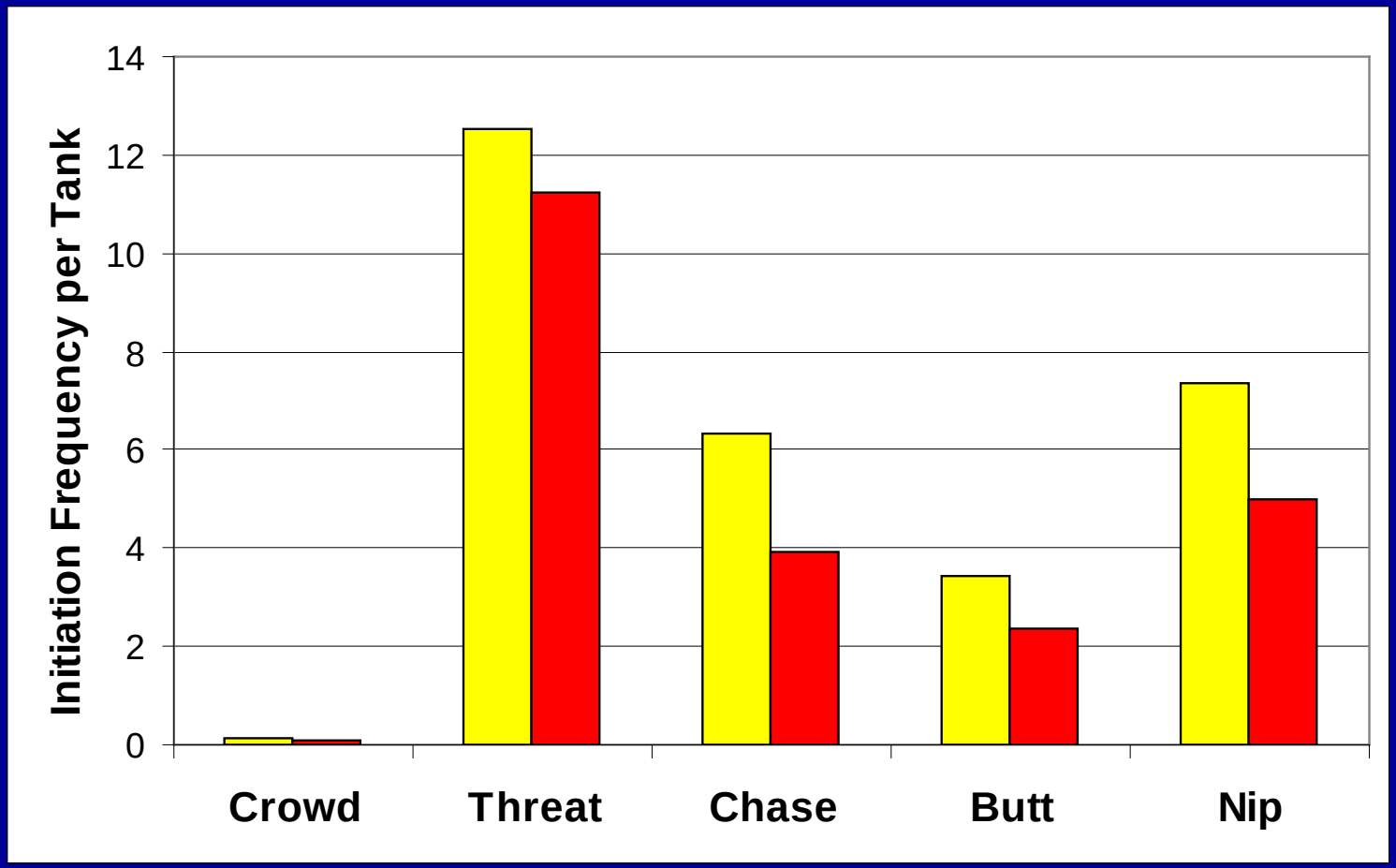
Supplementation vs. Hatchery

n=287 p=0.006**



S (8553) vs. H (6489)

Interaction Type p=0.995



S vs. H Interaction Rates
p=0.0002**

Summary

- Supplementation dominated Naches and were more aggressive
  - Stock specific differences?
- Supplementation dominated Hatchery and were more aggressive
  - Evidence of domestication?
- No significant difference in dominance, but Naches were more aggressive than Hatchery fish
  - Combination of stock differences and domestication?

- Similar types of interactions were used by each line, Supplementation just used them more often

So What?

- Supplementation reduces domestication effects?
  - Cautiously optimistic
- Multiple years of data are necessary to draw more accurate conclusions
  - Opportunity to follow this study through several generations
  - Year to year differences—selection pressures in the natural environment

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