

Novelty Responses of Three Birds in a Desert Suburban Habitat

Nick Vandehei (nvandehe@asu.edu), Department of Applied Sciences and Mathematics, ASU Polytechnic
 Heather Bateman (heatherbateman@asu.edu), Department of Applied Sciences and Mathematics, ASU Polytechnic

Introduction

- Neophobia is the fear of a novel object. Stability of the environment is known to correlate with neophobic behavior (Mettke-Hofmann et al. 2009).
- Birds in stable environments are expected to be neophobic, whereas birds in unstable or complex habitats will express neophilia (Escheverria et al. 2008).
- Many organisms have adapted to life in an urban setting and have undergone novel evolutionary changes through their interactions with humans (Collins et al. 2000).
- My hypothesis was all birds will express neophilia due to the unstable desert neighborhood they inhabit.
- I predicted birds in my neighborhood would take the same amount of time to approach food with and without a novel object near.

Methods

- I used my back yard as the study site (Figure 1). I live in a desert suburban neighborhood in Mesa, AZ that abuts open space and a small mountain (Figure 2).



- I used one large block of quail feed to attract birds.
- I recorded two control approach times for each bird species. I started recording approach times when birds got within 15 feet of the feed.
- If birds took more than 1 hr to feed, 3600 sec was recorded as the approach time.
- Novel objects near food included: traffic cone, ring of cones, ring of rocks, frog statue, yellow stereo, and a deer antler.
- I focused on three birds species (Figure 3-5).



Figure 3. Abert's Towhee (*Pipilo aberti*)



Figure 4. Curve-billed Thrasher (*Toxostoma curvirostre*)



Figure 5. Gambel's Quail (*Callipepla gambelii*)

- To test the differences in approach times for species and type of object, we used a two-way ANOVA.

Results

- Bird species differed by their approach times, with the Gambel's Quail (GAQU) taking significantly longer to approach food compared to Curve-billed Thrasher (CBTH) and the Abert's Towhee (ABTO; Table 1.)
- Type of object also elicited significantly different approach times (Table 1).
- Birds responded differently to the Ring-of-cones, Frog Statue, and Yellow Stereo (Figures 6-8) and responded similarly to the other objects.

Table 1. Results of two-way ANOVA.

Source	DF	MS	F	P
species	2	23.524	121.100	<0.001
type	6	3.090	15.907	0.002
S x T	12	1.927	9.922	0.005
Total	20	3.159		

Ring-of-cones

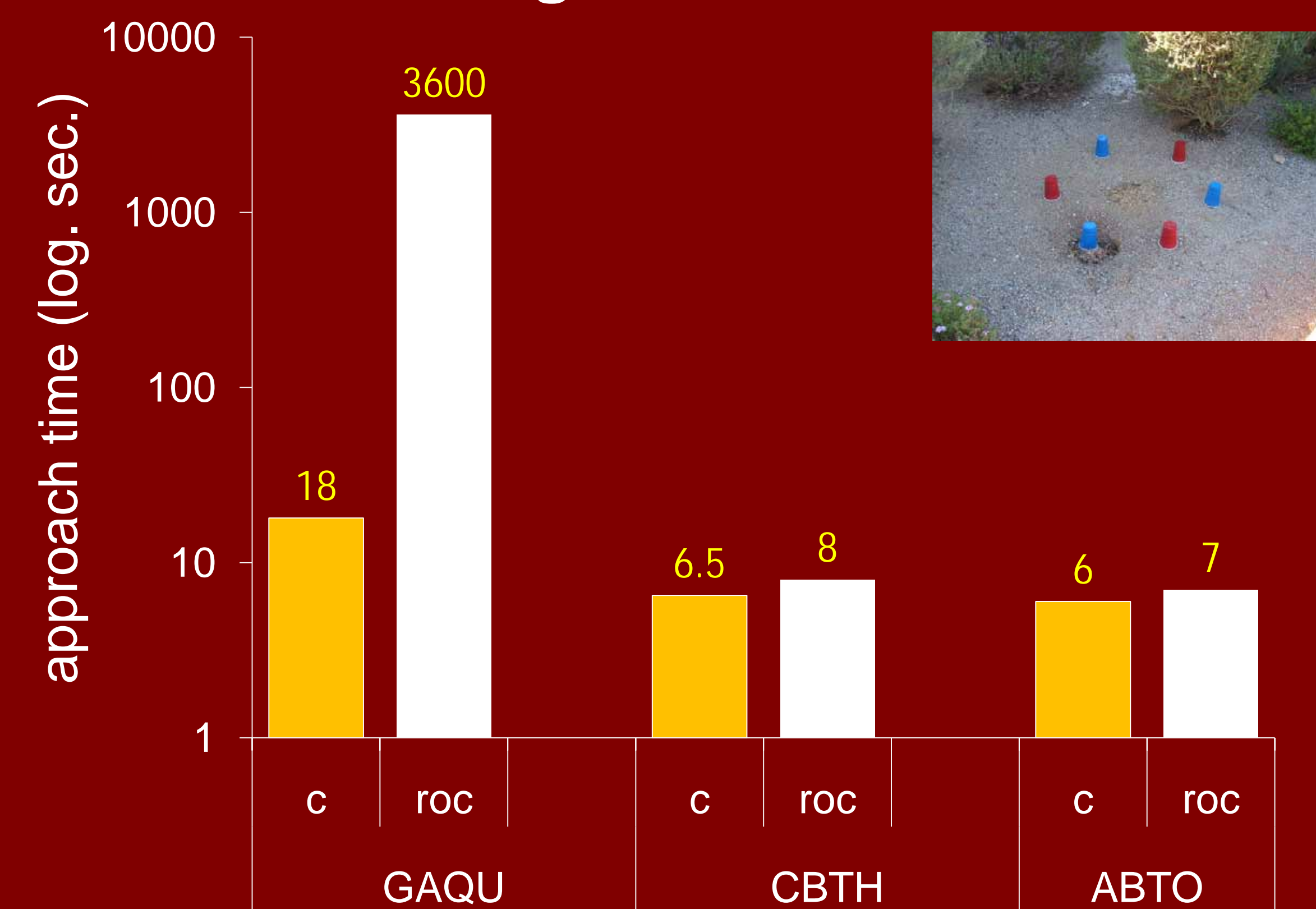


Figure 6. Time (sec) for three bird species to approach food without (c) and with a ring-of-cones (roc). GAQU took longer to approach food compared to CBTH (P=0.001) and ABTO (P=0.001).

Results

Frog Statue

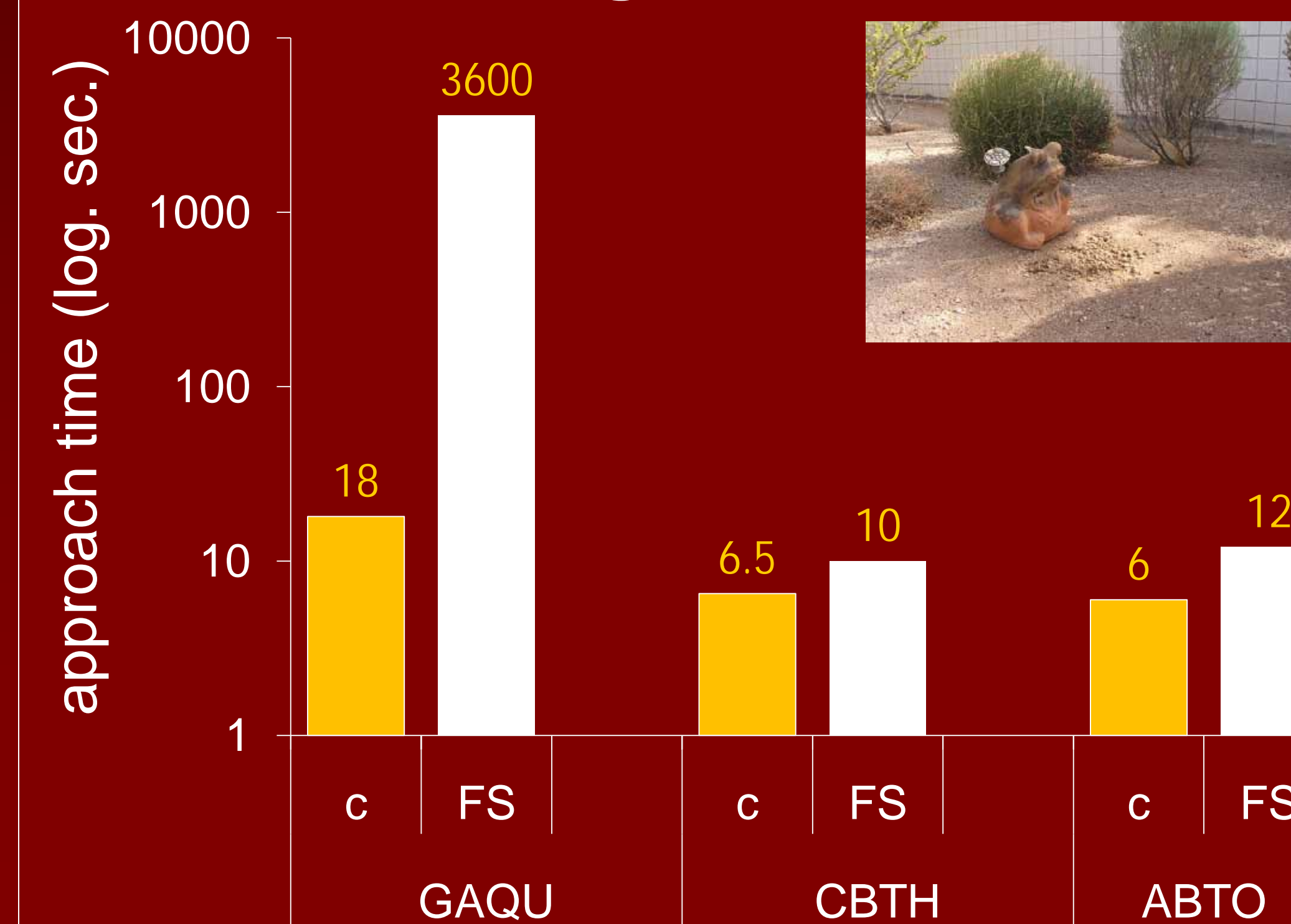


Figure 7. Time (sec) for three bird species to approach food without (c) and with a frog statue (FS). GAQU took longer to approach food compared to CBTH (P=0.001) and ABTO (P=0.001).

Yellow Stereo

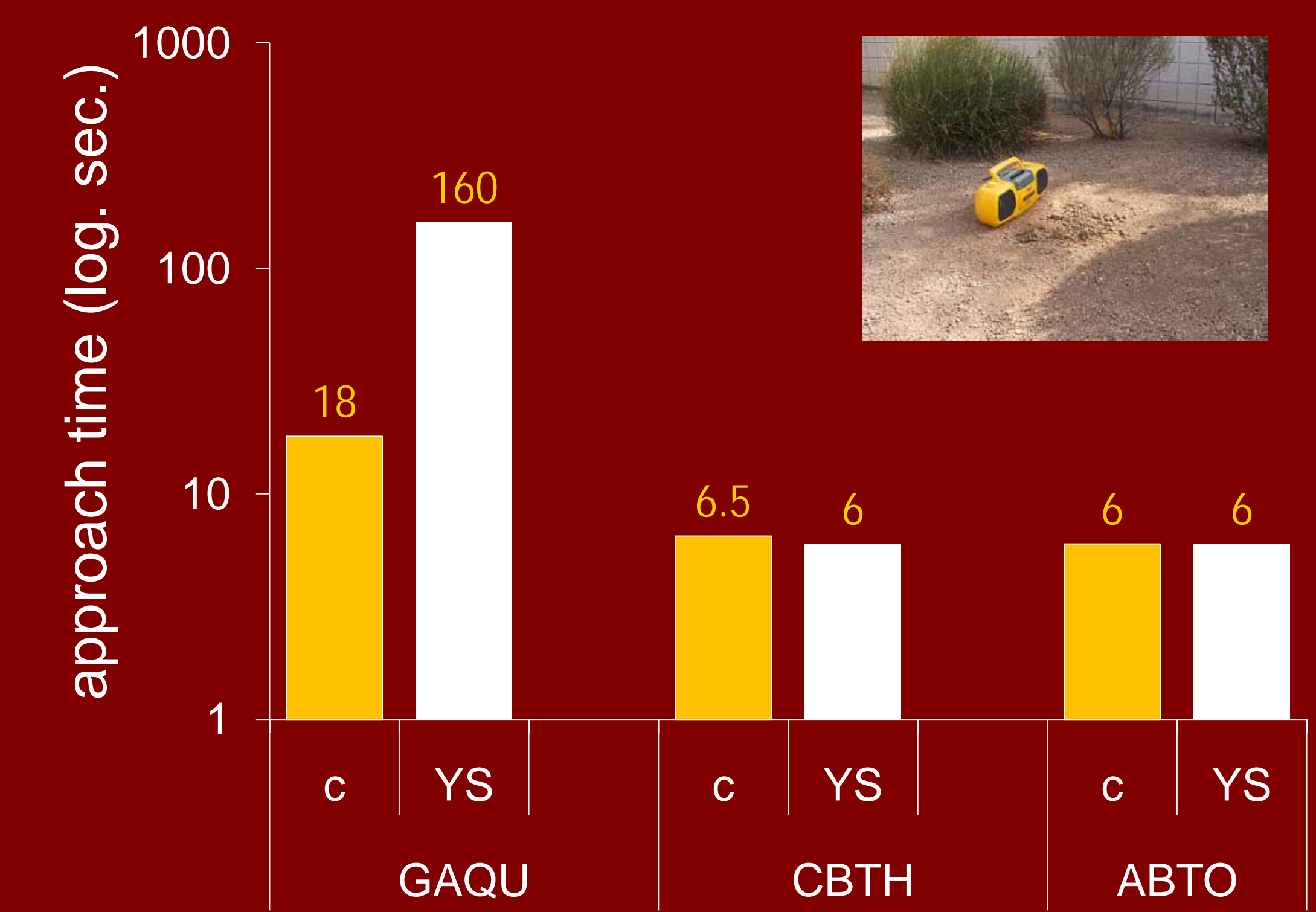


Figure 8. Time (sec) for three bird species to approach food without (c) and with a yellow stereo (YS). GAQU took longer to approach food compared to CBTH (P=0.005) and ABTO (P=0.005).

Summary

- Overall, Gambel's Quail appeared to be more neophobic compared to Abert's Towhee and Curve-billed Thrasher.
- Quail were more hesitant to approach food compared to the other two birds species in the study perhaps due to differences in locomotion and behavior. The quail approached food by walking, whereas the thrasher and towhee flew up to the food.
- Quail were also observed to forage in groups (7 or more birds), whereas the thrasher and towhee arrived solo or in small groups (2-3 birds).
- These results contradicted Escheverria et al. (2008) findings, where passerine birds foraging in groups were less neophobic compared to solo foragers.
- This study can help the conservation of species living in urban habitats by understanding species feeding and group foraging behavior.

References & Acknowledgements

- Collins, J.P., A. Kinzing, N.B. Grimm, W.F. Fagan, D. Hope, J. Wu & E.T. Borer. 2000. A new urban ecology. *American Scientist* 88:416-425.
- Escheverria, A.I., & A.I. Vassallo. 2008. Novelty responses in a bird assemblage inhabiting an urban area. *Ethology* 114:616-624.
- Mettke-Hofmann, C., S. Lorentzen, E. Schlicht, & F. Werner. 2009. Spatial neophilia and spatial neophobia in resident and migratory warblers (*Sylvia*). *Ethology* 115:482-492.
- All photos take by N. Vandehei, except Figures 3-5 taken from Google images.
- Funding for poster printing provided from ASU Polytechnic, Dept. of Applied Sciences and Mathematics