

Individual Variation in Activity Budgets of a Stable Population of Killer Whales in Managed Care Across a Year

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Introduction

- Activity budgets facilitate understanding daily activities of individuals or groups. Having a baseline activity budget for a population can provide a good tool to monitor the health of that population.
- Only a few studies focusing on feeding ecology or acoustics have led to partial activity budgets using broad behavioral categories in wild killer whales (Heimlich-Boran, 1988; Ford, 1989; Felleman et al., 1991; Ashes et al., 2010; Holt et al., 2013).
- Creating activity budget of *in situ* killer whale populations in their murky environment will only lead to a partial set of information, whereas *ex situ* populations offer an unparalleled opportunity with animals accessible and visible at all times with minimal effort.

Our Goal → Explore the behavioral activities of a stable group of ex situ killer whales over a year

Methods

- Study Site — SeaWorld California**
- 8 Killer Whales**
 - 4 Females — 4 Males — Age 9 to 56 + years
- Duration — April 2022 to January 2023**
 - Exports in April, June, August, September, November 2022, and January 2023
- Surface Video Recording**
 - All 5 Pools
 - 10 Camera Angles
 - 72 hours of video per camera every 2 months
- Scan Sample — 1 scan/min. for 10 min. at top of each hour during *daylight* time based on sunrise/sunset**
- BORIS (version 7.13.9, Friard & Gamba, 2016)**
 - Behavioral Categories** — Attention to Trainers, Attention to Environment, Resting, Play/Exploration, Rubbing, Social, Pattern, Swimming Pattern, NA/NV, Training

Results

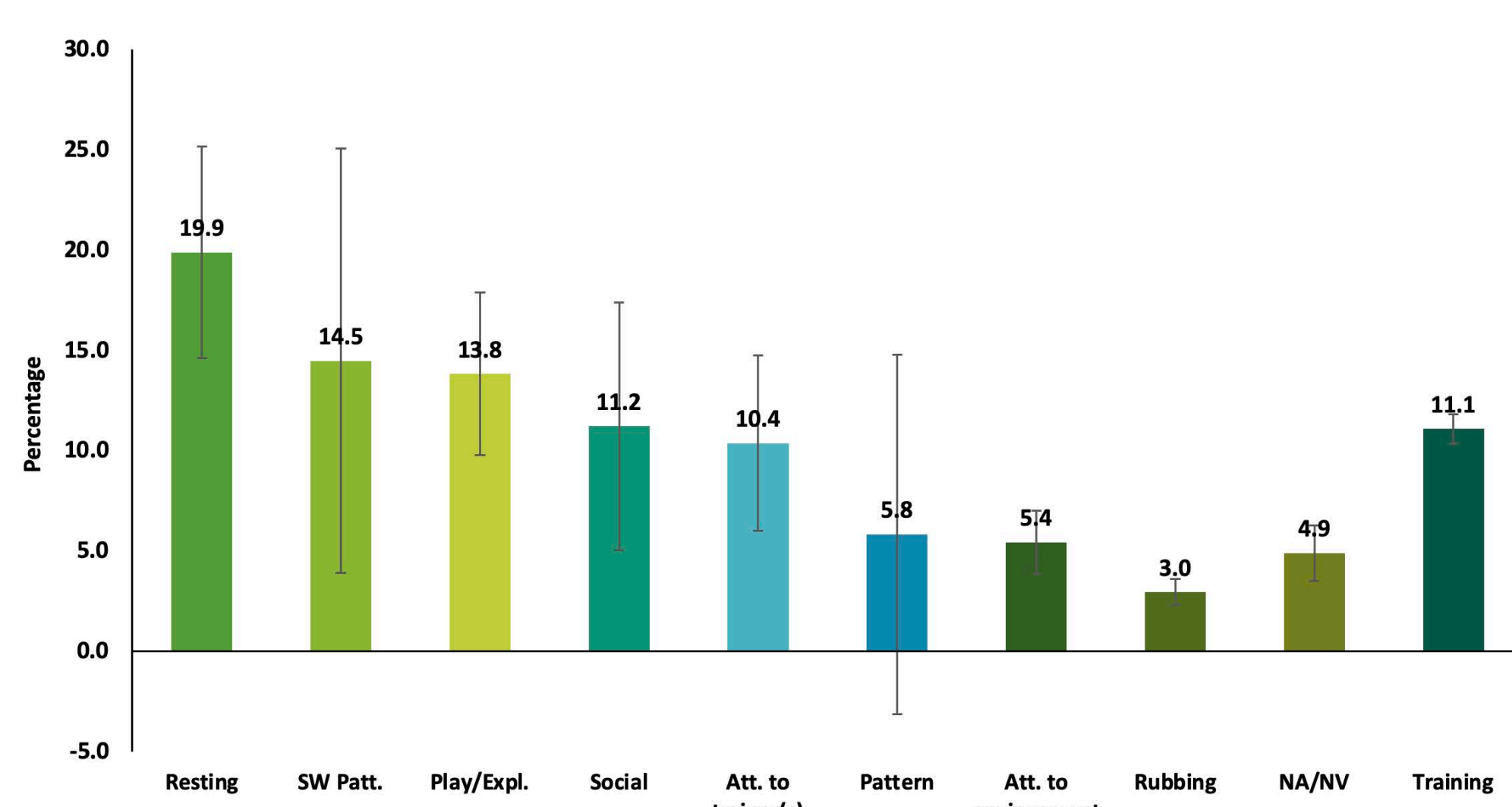


Fig. 1. Distribution of each behavioral category for all KW over the year, with SD error bars.

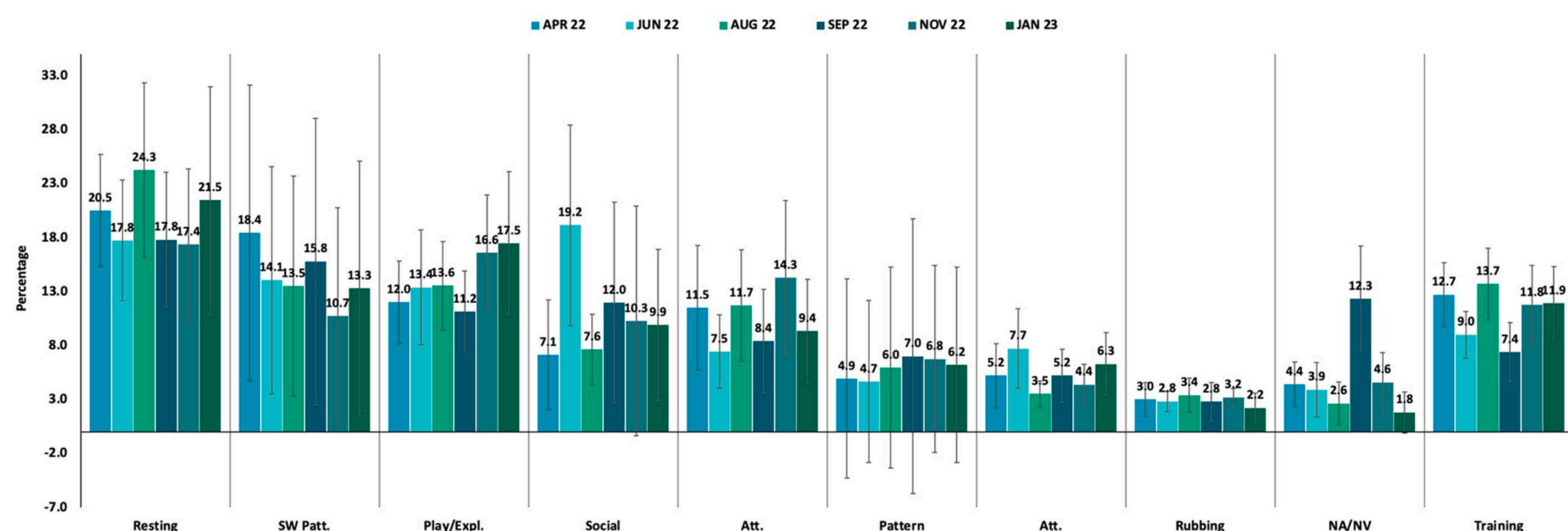


Fig. 2. Distribution of each behavioral category per month with SD errors bar showing individual variability.

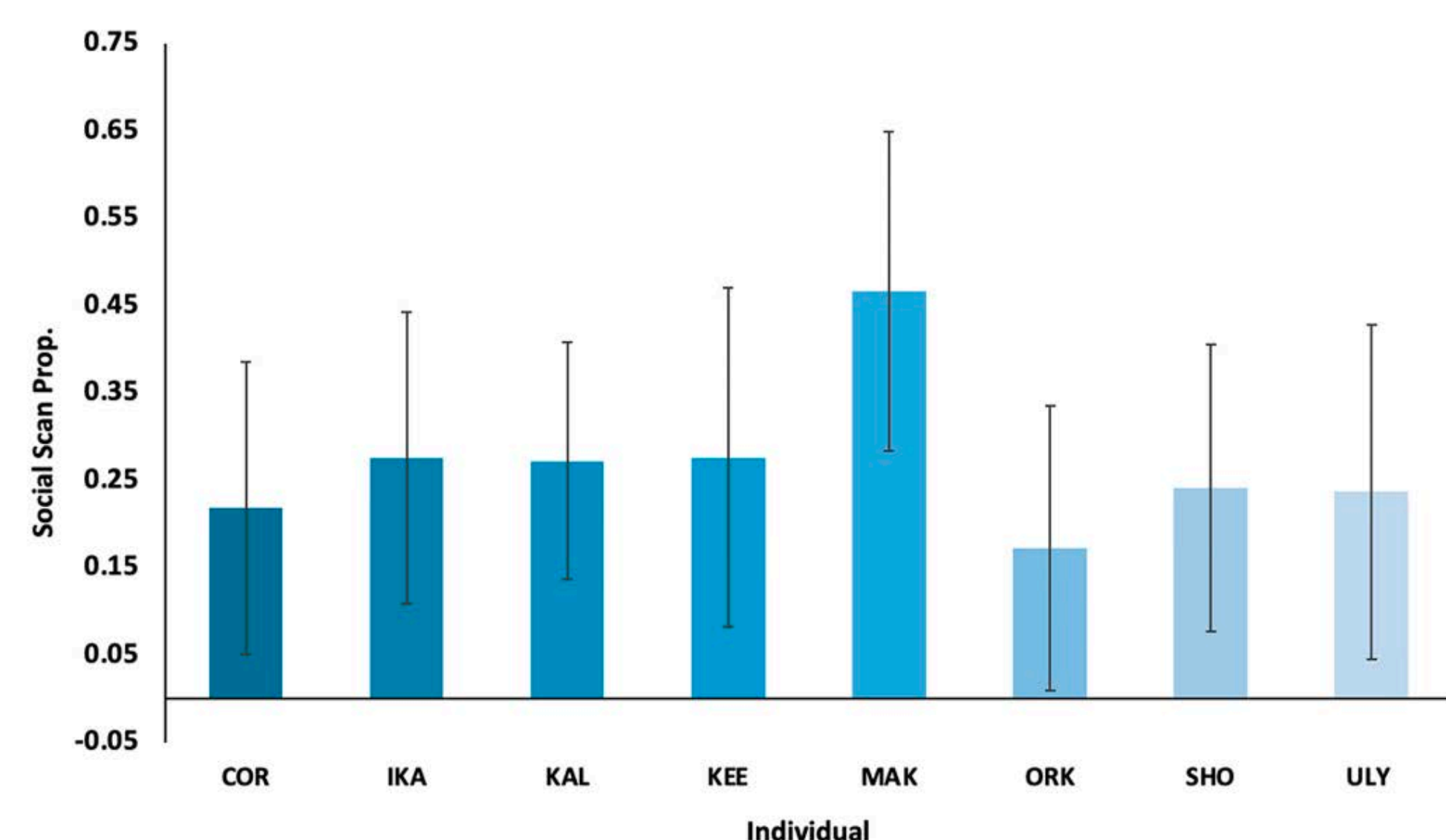


Fig. 3. Social scan mean proportions distribution across individual KW with SD error bars.

- 261 hours** of surface videos coded.
- 2 410 scans per KW = **20 150** data entries.
- Active behavioral categories represented **54%** of the group's activity budget (**Fig. 1**).
- There was significant individual variability for each behavioral category (**Fig. 1 & Fig. 2**).
- Each behavioral category presented variation between months across the year (**Fig. 2**).
- The youngest male (MAK) showed more social scans compared to other KW (**Fig. 3 & Fig. 4**).



Fig. 4. Example of socio-social behavior between MAK & ULY, including rubbing and pair swimming.

Discussion

- Our results provide a detailed examination of KW activity budget over a year and by month across a year, suggesting individual variability is greater than any diurnal or seasonal pattern.
- This level of detail is not currently available for comparison with free-ranging KW individuals or populations as studies usually focus on 4 behavioral categories (Noren & Hauser, 2016): foraging, travelling, socializing, and resting.

- Still, our results are similar to Noren & Hauser (2016) review:
 - Free-ranging KW: Resting 6 to 16%, Foraging 21 to 47%, Travelling 24 to 70%, Socializing 1 to 15%, Rubbing 5%* (*from Ford, 1989).
 - Present study: Resting 20%, Foraging 11%, Travelling 28%, Socializing 11%, Rubbing 3%.
- The next part of our study will focus on inter-individual interactions from the underwater perspective for examination of KW social behaviors and comparison to free-ranging populations.

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