

Lateralized behavior in Guiana dolphins, *Sotalia guianensis*, at Pipa Beach, RN, Brazil

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(With 1 figure)

Lateralized behavior patterns are those in which an animal shows a consistent preference for the use of one of the sides. The existence of population-level behavioral asymmetries in non-human species and their implications for the evolution of the brain are very controversial. In the last years, however, several studies have reported the existence of lateralization of brain functions among mammals, birds (see Walker, 1980), fishes, reptiles and amphibians (Bisazza et al., 1998).

In this study, we report data on possible behavioral asymmetries at the population level in Guiana dolphins, *Sotalia guianensis* van Bénédén, 1864, at Madeiro Bay, Pipa Beach (6° 13' S and 35° 04' W), southern of Rio Grande do Norte, Brazil. Our aim in this study was investigate whether Guiana dolphin individuals showed significant bias concerning direction of performance (right or left) in three active behavioral events. We studied three active behavior to test evidence of directional bias: (i) Breaching: the dolphin

jumps out of the water, spinning on its longitudinal axis in one direction; (ii) Flipping: the dolphin raises one flipper (right or left) into the air and shows or slaps it on the water surface; and (iii) Tail slap: the dolphin hurls its tail out of the water. Only breaches and tail slaps to the right or to the left was included in this analysis. Data on these three active behaviors were recorded in the field from a land base, approximately 25 m above sea level, in January and February 2012. Using focal groups 2-minutes scan sampling method, the predominant group behavior was recorded as one of five mutually exclusive states: foraging, feeding, traveling, socializing and resting (Lunardi, 2011). Three size classes were used: adult, juvenile and calf (about ¾ and ½ of the body length of an adult animal, respectively). We tested data for significant directional bias using chi-squared tests. Analyses were performed with PASW 18 (SPSS Inc, Chicago, USA).

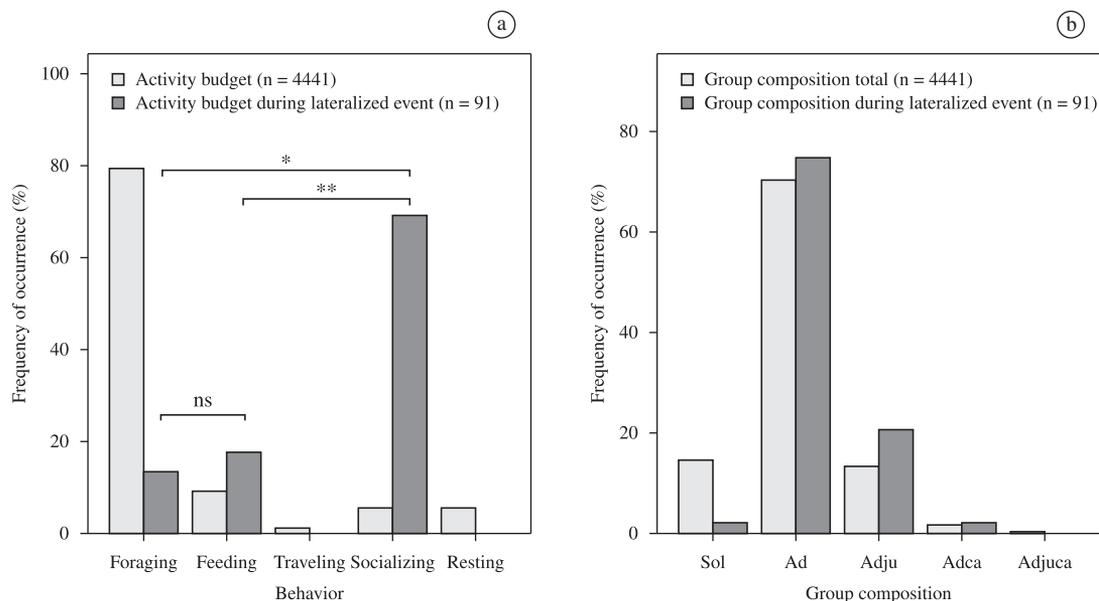


Figure 1. a) Frequency of occurrence of activity budget and activity budget during breaching lateralized event concerning the behavior state of Guiana dolphins, *Sotalia guianensis* ($*\chi^2=34.7$, $df = 1$, $n_{\text{foraging}} = 12$, $n_{\text{socializing}} = 63$, $p < 0.001$. $**\chi^2=28.0$, $df = 1$, $n_{\text{feeding}} = 16$, $p < 0.001$. $^{ns}\chi^2=0.5$, $df = 1$, $p = 0.4$) and b) frequency of occurrence of total group composition and group composition during breaching lateralized event. Sol: solitary; Ad: adult; Adju: adult and juvenile; Adca: adult and calf; and Adjua: adult, juvenile and calf.

We observed 190 active behavioral events for 28 sampling days, for a total of 224 h of effort, in which dolphins were present for 148.4 hours. Only one of the three active behavioral events was lateralized: the majority of breaching events (63%) showed a bias to the right ($\chi^2 = 10.7$, $df = 1$, $n = 157$, $p = 0.001$). Flippering and tail slap events were rare ($n = 23$ and $n = 10$) and were not lateralized ($\chi^2_{\text{flippering}} = 2.1$, $df = 1$, $p = 0.14$; $\chi^2_{\text{tail slap}} = 0.0$, $df = 1$, $p = 1$). Lateralized events were observed only during three behavioral states: foraging, feeding and socializing. Although the foraging has been the predominant behavior according to the activity budget, lateralized events (breaching) were more common during the socializing ($p < 0.001$, Figure 1a). Groups composed solely of adults were more frequent throughout the study period, and the lateralized events followed this pattern, being more common in this type of group composition (Figure 1b).

Evidence of a population-level of lateralized behavior has been reported for several cetacean species as: humpback whales, *Megaptera novaeangliae* Borowski, 1781 (breaching, bottom-feeding and flipper slaps: Clapham et al., 1995), bottlenose dolphins, *Tursiops truncatus* Montagu, 1821 (visual lateralization: Yaman et al., 2003) and striped dolphins, *Stenella coeruleoalba* Meyen, 1833 (visual lateralization: Siniscalchi et al., 2012). Guiana dolphins also showed a bias to the right during the breaching. Thus, this study contributes to the growing evidence for behavioral laterality in cetaceans. Overall, our data suggest that Guiana dolphins exhibit some behavioral asymmetries at the population level, and possibly an asymmetry of somatosensory or a motor function, similar to other cetaceans.

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