

Reporting Summary

Nature Research wishes to improve the reproducibility of the work that we publish. This form provides structure for consistency and transparency in reporting. For further information on Nature Research policies, see our [Editorial Policies](#) and the [Editorial Policy Checklist](#).

Statistics

For all statistical analyses, confirm that the following items are present in the figure legend, table legend, main text, or Methods section.

n/a Confirmed

- | | | |
|-------------------------------------|-------------------------------------|--|
| ☐ | ☒ | The exact sample size (n) for each experimental group/condition, given as a discrete number and unit of measurement |
| ☐ | ☒ | A statement on whether measurements were taken from distinct samples or whether the same sample was measured repeatedly |
| ☒ | ☐ | The statistical test(s) used AND whether they are one- or two-sided
<i>Only common tests should be described solely by name; describe more complex techniques in the Methods section.</i> |
| ☒ | ☐ | A description of all covariates tested |
| ☐ | ☒ | A description of any assumptions or corrections, such as tests of normality and adjustment for multiple comparisons |
| ☐ | ☒ | A full description of the statistical parameters including central tendency (e.g. means) or other basic estimates (e.g. regression coefficient) AND variation (e.g. standard deviation) or associated estimates of uncertainty (e.g. confidence intervals) |
| ☒ | ☐ | For null hypothesis testing, the test statistic (e.g. F , t , r) with confidence intervals, effect sizes, degrees of freedom and P value noted
<i>Give P values as exact values whenever suitable.</i> |
| ☒ | ☐ | For Bayesian analysis, information on the choice of priors and Markov chain Monte Carlo settings |
| ☒ | ☐ | For hierarchical and complex designs, identification of the appropriate level for tests and full reporting of outcomes |
| ☒ | ☐ | Estimates of effect sizes (e.g. Cohen's d , Pearson's r), indicating how they were calculated |

Our web collection on [statistics for biologists](#) contains articles on many of the points above.

Software and code

Policy information about [availability of computer code](#)

Data collection Field data from our instruments were downloaded and stored in Microsoft Excel 2016, and later analyzed in Echoview (for acoustic data), Matlab 2014, and R v. 3.6

Data analysis The code for this paper's results, figures can be found at our GitHub repository: https://github.com/mssavoca/prey_consumption_paper;

For manuscripts utilizing custom algorithms or software that are central to the research but not yet described in published literature, software must be made available to editors and reviewers. We strongly encourage code deposition in a community repository (e.g. GitHub). See the Nature Research [guidelines for submitting code & software](#) for further information.

Data

Policy information about [availability of data](#)

All manuscripts must include a [data availability statement](#). This statement should provide the following information, where applicable:

- Accession codes, unique identifiers, or web links for publicly available datasets
- A list of figures that have associated raw data
- A description of any restrictions on data availability

Code to reproduce the figures and analyses in this paper are available at: https://github.com/mssavoca/prey_consumption_paper; all data and code are available on Github.

Field-specific reporting

Please select the one below that is the best fit for your research. If you are not sure, read the appropriate sections before making your selection.

☐ Life sciences ☐ Behavioural & social sciences ☒ Ecological, evolutionary & environmental sciences

For a reference copy of the document with all sections, see [nature.com/documents/nr-reporting-summary-flat.pdf](https://www.nature.com/documents/nr-reporting-summary-flat.pdf)

Ecological, evolutionary & environmental sciences study design

All studies must disclose on these points even when the disclosure is negative.

Study description	Study included
Research sample	Fieldwork consisted of attaching tags (n = 321) to baleen whales in the wild, and also to measure the whales length by aerial drone and the dynamics of the prey patch using active acoustics from a small vessel.
Sampling strategy	Fieldwork consisted of attaching tags (n = 321) to baleen whales in the wild, and also to measure the whales length by aerial drone and the dynamics of the prey patch using active acoustics from a small vessel. Whales were tagged opportunistically on their foraging grounds.
Data collection	Members of the research team (the paper's authors) collected, processed, and analyzed the field data described above and in detail in the Methods section.
Timing and spatial scale	Fieldwork and analysis was conducted from 2010-2019. Our field sites for this study included the California Current, coastal South Africa, Stellwagen Bank National Marine Sanctuary, western Greenland, and the western Antarctic Peninsula (see Fig. S3 in paper).
Data exclusions	Tag deployments that did not include any feeding behavior were excluded as we were interested in calculating foraging behavior (feeding lunges, prey consumed) given it was a day that the animal was feeding. More details are provided in the Methods section.
Reproducibility	All of our methods of fieldwork, data processing and analysis, and inference are described in detail in paper. Substantial detail is provided such that our study could be replicated if desired.
Randomization	This study did not consist of a controlled experiment; randomization was not necessary.
Blinding	This study did not consist of a controlled experiment; blinding was not necessary.
Did the study involve field work?	☒ Yes ☐ No

Field work, collection and transport

Field conditions	Fieldwork was conducted on days where weather permitted small boat operations (i.e., minimal to moderate wind and swell). Field seasons are the summer months in each hemisphere.
Location	Our field sites were baleen whale feeding grounds in the California Current, coastal South Africa, Stellwagen Bank National Marine Sanctuary, western Greenland, and the western Antarctic Peninsula (see Fig. S3 in paper).
Access & import/export	All fieldwork was conducted with proper permitting. National Marine Fisheries Service permits 16111, 14809, 19116, 21678, 20430, and National Marine Sanctuary permits MULTI-2017-007 and MULTI-2019-009
Disturbance	Other than tagging the whales, a distance of 50m+ was kept at all times. As we were interested in capturing natural foraging behavior, minimizing disturbance to the animals was paramount for our objectives.

Reporting for specific materials, systems and methods

We require information from authors about some types of materials, experimental systems and methods used in many studies. Here, indicate whether each material, system or method listed is relevant to your study. If you are not sure if a list item applies to your research, read the appropriate section before selecting a response.

Materials & experimental systems

n/a	Involved in the study
☒	☐ Antibodies
☒	☐ Eukaryotic cell lines
☒	☐ Palaeontology and archaeology
☐	☐ Animals and other organisms
☒	☐ Human research participants
☒	☐ Clinical data
☒	☐ Dual use research of concern

Methods

n/a	Involved in the study
☒	☐ ChIP-seq
☒	☐ Flow cytometry
☒	☐ MRI-based neuroimaging

Animals and other organisms

Policy information about [studies involving animals](#); [ARRIVE guidelines](#) recommended for reporting animal research

Laboratory animals	No laboratory animals were used in this study.
Wild animals	Fieldwork consisted of attaching tags to baleen whales in the wild, and also to measure the whales length by aerial drone and the dynamics of the prey patch using active acoustics from a small vessel. All fieldwork was conducted with proper permitting. National Marine Fisheries Service permits 16111, 14809, 19116, 21678, 20430, and National Marine Sanctuary permits MULTI-2017-007 and MULTI-2019-009
Field-collected samples	We did not perform analyses on samples collected from the field in this study, only on data collected by drone, echosounder, and the tags themselves.
Ethics oversight	Research was conducted in accordance with Stanford University's IACUC (# 30123)

Note that full information on the approval of the study protocol must also be provided in the manuscript.