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Corresponding author(s): Matthew Metz

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 Authors & Referees and the Editorial Policy Checklist.

Statistical parameters

When statistical analyses are reported, confirm that the following items are present in the relevant location (e.g. 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
☐	☒	An indication of 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 *Only common tests should be described solely by name; describe more complex techniques in the Methods section.*
☐	☒	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 statistics 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 *Give P values as exact values whenever suitable.*
☒	☐	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
☐	☒	Clearly defined error bars *State explicitly what error bars represent (e.g. SD, SE, CI)*

Our web collection on statistics for biologists may be useful.

Software and code

Policy information about availability of computer code

Data collection	No software was used.
Data analysis	All software used for analyses is cited.

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/reviewers upon request. 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

Data used for analyses is available at https://datadryad.org/resource/doi:10.5061/dryad.j72tt79.

Field-specific reporting

Please select 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/authors/policies/ReportingSummary-flat.pdf

Ecological, evolutionary & environmental sciences study design

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

Study description	Our study evaluated wolf preference for antlerless male elk in northern Yellowstone National Park during the initial period (i.e., March) of antler casting.
Research sample	Our research sample consisted of a) 55 observations of wolf-adult male elk encounters (over an 11-year period) and b) detection of 216 wolf-killed adult male elk (over a 13-year period) during March in northern Yellowstone National Park.
Sampling strategy	Sample sizes were determined by a) the number of observations of hunting encounters of wolves on adult male elk individuals/ groups for which we also recorded the antler condition of the male elk over an 11-year period and b) the number of wolf-killed adult male elk that we detected over a 13-year period.
Data collection	Described in the Methods.
Timing and spatial scale	Described in the Methods.
Data exclusions	No data were excluded from the analyses.
Reproducibility	Our findings in this paper are from observations of wild wolves and elk over a 13-year period in Yellowstone National Park and are not able to be replicated.
Randomization	Randomization was not relevant to our study because we attempted to detect each wolf-adult male elk hunting encounter and wolf-killed adult male elk in our study area. Individual male elk were assigned to classes dependent on their characteristics.
Blinding	Blinding was not relevant to our study of wild wolves and elk.

Did the study involve field work? ☒ Yes ☐ No

Field work, collection and transport

Field conditions	Our study occurred during March (2004 - 2016) in northern Yellowstone National Park. During March in northern Yellowstone National Park, temperatures generally range from -10 to 15 C, and snowfall is common.
Location	The location of our study is described in the Methods.
Access and import/export	Access and use of our field site was in accordance with Yellowstone National Park research permit (Milestones Research Project 2016-105; investigators include Smith, Stahler, and Metz).
Disturbance	Samples were collected in accordance with Yellowstone National Park research permit (Milestones Research Project 2016-105; investigators include Smith, Stahler, and Metz). Only samples allowed under this permit were collected.

Reporting for specific materials, systems and methods

Materials & experimental systems

n/a	Involved in the study
☒	☐ Unique biological materials
☒	☐ Antibodies
☒	☐ Eukaryotic cell lines
☒	☐ Palaeontology
☐	☒ Animals and other organisms
☒	☐ Human research participants

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	*For laboratory animals, report species, strain, sex and age OR state that the study did not involve laboratory animals.*
Wild animals	Wolves were captured in Yellowstone National Park via helicopter darting. Wolves were captured and handled following guidelines of the American Society of Mammalogists and approved under University of Montana IACUC protocol 043-15MHWB-121515.
Field-collected samples	All bone marrow samples were stored in a freezer until the bone marrow samples were dried in an oven.