Supplementary Materials for

Behavioral responses of terrestrial mammals to COVID-19 lockdowns

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Other Supplementary Material for this manuscript includes the following:

MDAR Reproducibility Checklist

Materials and Methods

Movement Data

We compiled GPS data across 43 mammal species, including 2,300 individuals. All individuals were monitored in both January to May 2019 and 2020. Data were obtained from the Movebank research platform (https://www.movebank.org/), the EUROMMAMALS network (https://euromammals.org/), or were contributed by co-authors directly (Table S1). For our analyses, we focused on two time periods: (i) the initial 2020 lockdown, defined as the date of the first government mandated lockdown in each study area to May 15, 2020; and (ii) the 2019 baseline, covering the same months as the lockdown period, but for 2019. Each study was assigned a lockdown start date based on the government regulations of the area in which the data had been collected, between the 1st of February to the 28th of April, 2020. These dates were provided by the people who collected the data and verified using publicly-available information for all datasets. To examine the potential effects of COVID-19 lockdowns on terrestrial mammals, we examined two metrics of animal movement behavior: (1) displacement distance, i.e., the straight-line distance between consecutive GPS positions; and (2) distance to the nearest road.

Movement

We focused on 1-hour and 10-day displacements to allow the systematic investigation across time scales from short-term to longer-term movements. For the calculation of the displacement distances, we standardized the GPS data to only include locations recorded every hour or every 10-days, to account for different sampling regimes across the different individuals. Not all individuals were included in the final samples for both time scales due to differences in the original GPS sampling rate. For each time interval, we calculated the geodesic distance between the standardized locations using the spherical law of cosines and 6371 km as the mean radius of the Earth (*36*). Time intervals of < 1 hour were not available for most species and time intervals > 10 days resulted in a significant loss in sample size. Standardization precision was set to the inter-location interval ± 4% (e.g., for the 1-hour scale resulting in inter-location intervals varying between 57 and 62 minutes). We checked and removed outliers from the data based on maximum movement speeds that were unlikely for a terrestrial land mammal to achieve over a given time period (>4 m s^{-1};(*37*)), and removed them (<0.001% for the 1-hour data, and none for the 10-day data).

For the lockdown and baseline periods, for each individual and each time interval, when available, we calculated the 50th percentile of the displacements representing average movements, and the 95th percentile of the displacements representing longer movements. Median displacements include resting and sleeping behavior (1- hour scale) or residency in the same area (10-day scale), whereas the 95th percentile represents more directed movement such as avoidance movements on the 1-hour time scale and long-distance movement at the 10-day time scale (*13*).

Roads

We used the GPS tracking data (at the original sampling rate) and the Global Roads Inventory Project (GRIP) dataset (*38*) to calculate distance to road values, including all road types, for each individual for each GPS location. This was performed using the *sf* (*39*) and *geosphere* (*40*) packages in R (*41*). For the lockdown and baseline periods, we then calculated the mean distance to road values for each individual.

Covariates

To examine how the response of mammals to the lockdown related to differences in species traits, environmental context and lockdown strictness, we annotated the data with additional explanatory variables. As larger species tend to travel longer distances (*42*) and may show a greater response to lockdown measures, we included individual body mass values where possible (n = 54 individuals), or otherwise we used species-level values (n = 2246 individuals). Body mass values ranged from 10 to 4000 kg. We assigned each species a diet category of either carnivore, herbivore or omnivore (n = 9, 30, and 4 species, respectively) using the EltonTraits species-level foraging attribute database (*43*). We included diet category because differences in foraging costs and resource availability may influence movements. Different species are active at different times of the day and their response to changes in human mobility may differ, so we assigned each species as diurnal or nocturnal using the COMBINE mammal trait data (*44*). To account for potential differences in behavioral flexibility between species, we also included relative brain size, where larger brain size for a given body size may indicate an improved ability to cope with novel conditions (*45*). Relative brain size has been used widely as proxy for cognitive capacity (*46*, *47*), however we note that there is some discussion on whether it is a robust proxy (*48*). We estimated relative brain size as the residuals from a log-log phylogenetic Generalized Least Square regression of absolute brain size against body mass using *phytools* (*49*). Each species was assigned a brain mass in grams based on (*50*, *51*) and the phylogenetic tree was obtained from (*52*).

The difference in productivity – measured as the Normalized Difference Vegetation Index (NDVI, 250 m resolution, (*53*)) – was included to account for potential differences in displacement related to changes in productivity and resource abundance (*54*) between the lockdown and baseline periods. We used Human Footprint Index (HFI, 1 km resolution, (*21*)) as a proxy of direct and indirect human activities including roads, agriculture and human population density. HFI values range from 0 to 50, where low values represent areas relatively undisturbed by humans (e.g., Northwest Territories, Canada) and high values represent areas with high disturbance levels (e.g., New York City, U.S.A.). Based on previous work (*13*), we expected a stronger behavioral response to the lockdown in areas with a higher footprint. Finally, we included the Oxford COVID-19 Government Response Tracker Stringency Index (SI; (*20*)), to account for lockdown strictness based on country-level containment and closure policies, ranging from 0 (no lockdown) to 100 (very strict lockdown). For each individual and time period (lockdown and baseline period), NDVI, HFI and SI values were assigned to every GPS fix. We calculated a mean NDVI, HFI and SI for each individual based on all of the values for that individual. For the difference in NDVI, we then subtracted the baseline values (2019) from the lockdown values (2020).

Response Ratios

We used a response ratio approach to evaluate individual changes in displacement distance or distance to road values between the lockdown and the baseline periods. The response ratio provides a measure of the relative change in displacement and distance to roads. The natural log response ratio (RR) was estimated using the *metafor* package (*18*) based on the equation:

$$RR = \ln(\frac{\bar{X}_{LD}}{\bar{X}_B}) \quad (1)$$

where $\bar{x}_{LD}$ is the mean 50th and 95th percentiles of displacement distance, or mean distance to road, during the lockdown period, while $\bar{x}_B$ is the corresponding value for the baseline period. RR with positive values (RR > 0) indicate increased displacement distance, or increased distance to roads, during the lockdown, while negative RR (RR < 0) indicate reduced displacement distance, or reduced distance to roads, during the lockdown; RR close to zero (RR ≈ 0) indicate no change in displacement distance, or distance to roads, during the lockdown. For the analyses, the RR were weighted by the inverse sampling variances of each individual. Sampling variances were estimated using *metafor* based on the equation:

$$\hat{\sigma}(RR) = \frac{SD_{LD}^2}{N_{LD}\bar{X}_{LD}^2} + \frac{SD_B^2}{N_B\bar{X}_B^2} \quad (2)$$

where SD_{LD} and SD_B represent the standard deviations of $\bar{x}_{LD}$ and $\bar{x}_B$, respectively, and N_{LD} and N_B are the sample sizes (i.e., the number of standardized GPS locations for each time period for each individual). Results are reported as RR and we back-transformed the RR in order to report percentage increases or decreases in displacement distance or distance to roads:

$$\%\ change = [\exp(RR) - 1] * 100 \quad (3)$$

Analyses

To examine the overall effect of the lockdown on displacement distance and distance to roads, as well as variation in RR, we used Bayesian mixed-effects models (*brms* package (*55*)). Our analyses of the RR followed a two-step process, following previous work (*53*, *56*). First, we fit mixed-effects regression models with only the intercept to estimate the overall change in displacement distance and distance to roads during the lockdown. Second, we fit mixed-effects regression models to examine to what degree the variability in RR across the different individuals was explained by body mass, diet, relative brain size, NDVI difference, human footprint and strictness of the lockdown. Because some studies included multiple species in one study, we included a random effect for species-study combination, to account for nonindependence between effect sizes from the same study and/or species. We specified weakly informative half Cauchy priors (mean = 0, SD = 1) for the random effects. In all models, we weighted the RR by their inverse sampling variances. We also re-fit our models without weighting the RR to test how robust our results were, and the results were similar for the weighted (Table S2 –S7) and unweighted models (Table S9 – S14). For each model, we fit four chains of 8,000 iterations, excluding the first 1,000 iterations as warmup in each chain, resulting in a total of 28,000 posterior samples. We inspected the trace plots and Gelman-Rubin statistic ($\hat{R}$< 1.1; (*57*)) to ensure model convergence. In all cases, the models converged. We present posterior means and 95% credible intervals (CIs). We interpreted cases where the 95% CIs did not overlap with zero as evidence that a covariate was associated either positively or negatively with the RR (*58*). We used Pagel's lambda to examine all model residuals for the presence of phylogenetic autocorrelation, where 0 indicates no phylogenetic signal and 1 indicates a strong phylogenetic signal (i.e., distribution expected under the Brownian motion model of evolution) (*59*), using the 100 random mammal phylogenetic trees (*52*). We used 100 random mammal phylogenies to resolve the branch lengths and the polytomies present in the base mammal phylogeny, where polytomies are nodes where more than two species diverge at a single point in time due to insufficient phylogenetic information. We found no significant effect of phylogenetic autocorrelation in the residuals of any model (Tables S8 and S15).

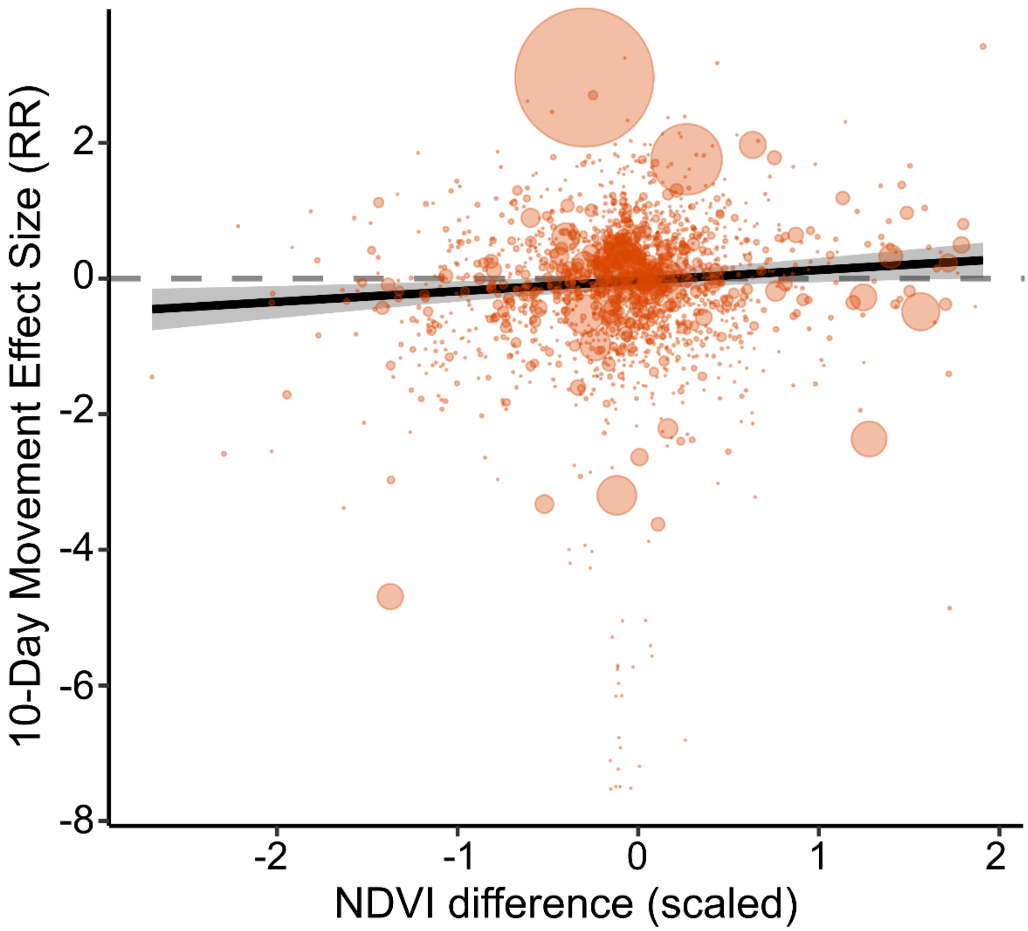

Fig. S1 Change in 10-day median displacement distances in response to the NDVI difference during the COVID-19 lockdowns. Colored points are individual effect sizes (n = 1,725). Black lines are the predicted effect size (response ratio; RR), shaded area is the 95% credible intervals and the dashed grey line at zero indicates no change. The size of data points in all three panels is proportional to the inverse sampling variance of the response ratio for each individual. Negative values indicate reduced movement during the initial 2020 lockdown, while positive values indicate increased movement during the lockdown.

Table S1 List of species, data sources, data permits and spatial coordinate access information. A subset of the spatial coordinate datasets is available from Zenodo, and others are available only through requests made to the authors due to conservation and Indigenous sovereignty concerns. Some of these datasets are also stored on Movebank.

Study	Species	Spatial Coordinate Access	Movebank Study ID	Contact Person	Contact Details	Authorising institutions, permits and protocols
Puma California	*Puma concolor*	Available in Zenodo dataset: https://doi.org/10.5281/zenodo.7704108		Christopher Wilmers	cwilmers@ucsc.edu	UCSC IACUC #Wilmc1912
Belledonne Ibex	*Capra ibex*	Request via data contact for qualified researchers. Restrictions regarding conservation related information apply, including no distribution or publication of the coordinates or detailed maps.		Pascal Marchand	pascal.marchand@ofb.gouv.fr	Préfecture de l'Isère
Bargy Ibex	*Capra ibex*	Request via data contact for qualified researchers. Restrictions regarding conservation related information apply, including no distribution or publication of the coordinates or detailed maps.		Pascal Marchand	pascal.marchand@ofb.gouv.fr	Préfecture de la Haute-Savoie
Welgevonden Elephants	*Loxodonta africana*	Request via data contact for qualified researchers. Restrictions regarding conservation related information apply, including no distribution or publication of the coordinates or detailed maps.		Jasper Eikelboom	jasper.eikelboom@wur.nl	Welgevonden Game Reserve
Mongolian Khulan	*Equus hemionus hemionus*	Available in Zenodo dataset: https://doi.org/10.5281/zenodo.7704108		Petra Kaczensky / Buuveibaatar Bayarbaatar	petra.kaczensky@inn.no buuveibaatar@wcs.org	Ministry of Environment and Tourism Mongolia
Mongolian Gazelle	*Procapra gutturosa*	Available in Zenodo dataset: https://doi.org/10.5281/zenodo.7704108		Nandintsetseg Dejid	dnandintsetseg@gmail.com	Ministry of Environment and Tourism Mongolia
Upper Powder River Mule Deer	*Odocoileus virginianus*	Request via data contact for qualified researchers. Restrictions regarding conservation related information apply, including no distribution or publication of the	659095288	Cheyenne Stewart	cheyenne.stewart@wyo.gov	Wyoming Game and Fish IACUC #18-02

		coordinates or detailed maps.				
Red Deer Norway	*Cervus elaphus*	Available in Zenodo dataset: https://doi.org/10.5281/zenodo.7704108		Erling Meisingset	erling.meisingset@nibio.no	University of Oslo (Mysterud), Norwegian Institute of Bioeconomy Research (Meisingset)
Reindeer Norway	*Rangifer tarandus*	Available in Zenodo dataset: https://doi.org/10.5281/zenodo.7704108		Bram Van Moorter	Bram.Van.Moorter@nina.no	Data collected in accordance with institutional guidelines.
Moose Norway	*Alces alces*	Available in Zenodo dataset: https://doi.org/10.5281/zenodo.7704108		Bram Van Moorter	Bram.Van.Moorter@nina.no	Data collected in accordance with institutional guidelines.
Dinaric Mountains Mammals	*Ursus arctos*	Request via data contact for qualified researchers. Restrictions regarding conservation related information apply, including no distribution or publication of the coordinates or detailed maps.		Duško Ćirović	dcirovic@bio.bg.ac.rs	Data collected in accordance with institutional guidelines.
Kenyan Lions	*Panthera leo*	Available in Zenodo dataset: https://doi.org/10.5281/zenodo.7704108		Jacob Goheen	jgoheen@uwyo.edu	Kenya Wildlife Service; Permit KWS/SCM/5705
Southern Canadian Rockies Grizzly Bear (Ursus arctos)	*Ursus arctos*	Request via data contact for qualified researchers. Restrictions regarding conservation related information apply, including no distribution or publication of the coordinates or detailed maps.	1044288582	Clayton Lamb	ctlamb@ualberta.ca	University of Alberta #AUP00002181, Province of British Columbia #CB17-264200
Giant Anteaters Brazil	*Myrmecophaga tridactyla*	Request via data contact for qualified researchers. Restrictions regarding conservation related information apply, including no distribution or publication of the coordinates or detailed maps.	1574830796	Nina Attias	nina.attias@gmail.com	Instituto Chico Mendes de Conservação da Biodiversidade (ICMBio), license numbers 38218–4 and 53798–7.
Red deer Czech Republic	*Cervus elaphus*	Available in Zenodo dataset: https://doi.org/10.5281/zenodo.7704108		Miloš Ježek	jezekm@fld.czu.cz	Ministry of the Environment of the Czech Republic number MZP/2019/630/361
Ya Ha Tinda Elk	*Cervus canadensis*	Available in Zenodo dataset: https://doi.org/10.5281/zenodo.7704108	897981076	Mark Hebblewhite	Mark.Hebblewhite@mso.umt.edu	University of Montana IACUC #066-18MHWB-123118 ; Parks Canada Permit #YHTR-2017-26977 ; Alberta

						Fish and Wildlife Permits #: 18-001, 18-229, 18-323, 19- 002, 19-003, 20-004, 20-003, 57633, 57631
Banff Mammals	*Canis lupus*	Available in Zenodo dataset: https://doi.org/10.5281/zenodo.7704108	52734116	Mark Hebblewhite	Mark.Hebblewhite@mso.umt.edu	University of Montana IACUC #066-18MHWB-123118 ; Parks Canada Permit #YHTR-2017-26977 and 2020-37281 ; Alberta Fish and Wildlife Permits #: 18-001, 18-229, 18-323, 19- 002, 19-003, 20-004, 20-003, 57633, 57631
Banff Mammals	*Ursus americanus*	Available in Zenodo dataset: https://doi.org/10.5281/zenodo.7704108		Jesse Whittington	jesse.whittington@pc.gc.ca	Parks Canada Research & Collection Permit # 2020-42862.
Gorongosa National Park Antelopes	*Tragelaphus angasii*	Available in Zenodo dataset: https://doi.org/10.5281/zenodo.7704108		Robert Pringle	rpringle@princeton.edu	Gorongosa National Park; Princeton University IACUC #2075F-16; University of Idaho #IACUC-2019-32
Gorongosa National Park Antelopes	*Tragelaphus strepsiceros*	Available in Zenodo dataset: https://doi.org/10.5281/zenodo.7704108		Robert Pringle	rpringle@princeton.edu	Gorongosa National Park; Princeton University IACUC #2075F-16; University of Idaho #IACUC-2019-32
Gorongosa National Park Antelopes	*Tragelaphus sylvaticus*	Available in Zenodo dataset: https://doi.org/10.5281/zenodo.7704108		Robert Pringle	rpringle@princeton.edu	Gorongosa National Park; Princeton University IACUC #2075F-16; University of Idaho #IACUC-2019-32
Gorongosa National Park Elephants	*Loxodonta africana*	Available in Zenodo dataset: https://doi.org/10.5281/zenodo.7704108		Robert Pringle	rpringle@princeton.edu	Gorongosa National Park; Princeton University IACUC #2075F-16; University of Idaho #IACUC-2015-39
Red Deer Denmark	*Cervus elaphus*	Available in Zenodo dataset: https://doi.org/10.5281/zenodo.7704108		Peter Sunde	psu@ecos.au.dk	Danish Nature and Forest Agency #SM 302-009
Serengeti Mammals	*Connochaetes taurinus*	Available in Zenodo dataset: https://doi.org/10.5281/zenodo.7704108		Grant Hopcraft	Grant.Hopcraft@glasgow.ac.uk	Data collected in accordance with institutional guidelines.
Serengeti Mammals	*Equus quagga*	Available in Zenodo dataset: https://doi.org/10.5281/zenodo.7704108		Grant Hopcraft	Grant.Hopcraft@glasgow.ac.uk	Data collected in accordance with institutional guidelines.
Staten Island Deer	*Odocoileus virginianus*	Request via data contact for qualified researchers.		New York City Department	Richard.Simon@parks.nyc.gov	New York State Department of Environmental

		Restrictions regarding conservation related information apply, including no distribution or publication of the coordinates or detailed maps.		of Parks & Recreation		Conservation, License to Collect or Possess: Scientific Permit #2100
Fort Indiatown Gap Deer	*Odocoileus virginianus*	Available in Zenodo dataset: https://doi.org/10.5281/zenodo.7704108	1153281001	Vickie DeNicola	vickie.denicola@whitebuffaloinc.org	Pennsylvania Game Commission, Special Use Permit #44762
Roe Deer Cembra	*Capreolus capreolus*	Available in Zenodo dataset: https://doi.org/10.5281/zenodo.7704108		Francesca Cagnacci	francesca.cagnacci@fmach.it	Resolution of the Provincial Government n. 602, under approval of the Wildlife Committee of 20/09/2011, and successive integration approved on the 23/04/2015
Giraffe Conservation Foundation	*Giraffa camelopardalis antiquorum*	Request via data contact for qualified researchers. Restrictions regarding conservation related information apply, including no distribution or publication of the coordinates or detailed maps.		Julian Fennessy	julian@giraffeconservation.org	MoU between African Parks Network and GCF
Giraffe Conservation Foundation	*Giraffa camelopardalis camelopardalis*	Request via data contact for qualified researchers. Restrictions regarding conservation related information apply, including no distribution or publication of the coordinates or detailed maps.		Julian Fennessy	julian@giraffeconservation.org	MoU between Uganda Wildlife Authority and GCF; UWA/TBDP/RES/50
Giraffe Conservation Foundation	*Giraffa camelopardalis peralta*	Request via data contact for qualified researchers. Restrictions regarding conservation related information apply, including no distribution or publication of the coordinates or detailed maps.		Julian Fennessy	julian@giraffeconservation.org	Agreement between Government of Niger and GCF
Giraffe Conservation Foundation	*Giraffa giraffa angolensis*	Request via data contact for qualified researchers. Restrictions regarding conservation related information apply, including no		Julian Fennessy	julian@giraffeconservation.org	Giraffe Conservation Foundation in Namibia: 2018011402/AN2028011402/RVIV00042018

		distribution or publication of the coordinates or detailed maps.				
Brown Bear Alaska	*Ursus arctos*	Available in Zenodo dataset: https://doi.org/10.5281/zenodo.7704108		Jerrold Belant	jbelant@msu.edu	State University of New York College of Environmental Science and Forestry Institutional Animal Care and Use (IACUC) (protocol 180503), and Alaska Department of Fish and Game (ADFG; IACUC protocol 0030-2017-37).
Black Bear Missouri	*Ursus americanus*	Request via data contact for qualified researchers. Restrictions regarding conservation related information apply, including no distribution or publication of the coordinates or detailed maps.		Missouri Department of Conservation	Records@mdc.mo.gov	SUNY ESF IACUC 180504
Wolf Michigan	*Canis lupus*	Available in Zenodo dataset: https://doi.org/10.5281/zenodo.7704108		Jerrold Belant	jbelant@msu.edu	State University of New York College of Environmental Science and Forestry, NY, USA (Protocol 180505)
White Tailed Deer Michigan	*Odocoileus virginianus*	Available in Zenodo dataset: https://doi.org/10.5281/zenodo.7704108		Jerrold Belant	jbelant@msu.edu	State University of New York College of Environmental Science and Forestry, NY, USA (Protocol 180505)
White Tailed Deer Movement Michigan	*Odocoileus virginianus*	Available in Zenodo dataset: https://doi.org/10.5281/zenodo.7704108		Jerrold Belant	jbelant@msu.edu	State University of New York College of Environmental Science and Forestry, NY, USA (Protocol 180505)
Elk South East British Colombia	*Cervus canadensis*	Available in Zenodo dataset: https://doi.org/10.5281/zenodo.7704108		Kim Poole	kpoole@aurorawildlife.com	Province of British Columbia Animal Care permit CB16-220413
Wyoming Mule Deer	*Odocoileus hemionus*	Available in Zenodo dataset: https://doi.org/10.5281/zenodo.7704108		Kevin Monteith	Kevin.Monteith@uwyo.edu	University of Wyoming IACUC 20200305KM00412
Rocky Mountain Big Horn Sheep	*Ovis canadensis*	Available in Zenodo dataset: https://doi.org/10.5281/zenodo.7704108		Kevin Monteith	Kevin.Monteith@uwyo.edu	University of Wyoming IACUC 20180305KM00296
Wyoming Moose	*Alces alces*	Available in Zenodo dataset: https://doi.org/10.5281/zenodo.7704108		Kevin Monteith	Kevin.Monteith@uwyo.edu	University of Wyoming IACUC 20181218KM00331
Ecrins National Park Ibex	*Capra ibex*	Request via data contact for qualified researchers. Restrictions regarding		Alexandre Garnier/ Yannick Chaval	alexandre.garnier@pyrenees-parcnational.fr/ yannick.chaval@inrae.fr	Préfecture de l'Isère

		conservation related information apply, including no distribution or publication of the coordinates or detailed maps.				
Pyrenees National Park Ibex	*Capra pyrenaica*	Request via data contact for qualified researchers. Restrictions regarding conservation related information apply, including no distribution or publication of the coordinates or detailed maps.		Alexandre Garnier/ Yannick Chaval	alexandre.garnier@pyrenees-parcnational.fr/ yannick.chaval@inrae.fr	Préfecture des Pyrénées Atlantiques
Elk British Colombia	*Cervus canadensis*	Request via data contact for qualified researchers. Restrictions regarding conservation related information apply, including no distribution or publication of the coordinates or detailed maps.		Marie-Pier Poulin	mpoulin1@uwyo.edu	Parks Canada Agency Research Permit and Animal Care #37145
Mammals Turkey	*Ursus arctos*	Request via data contact for qualified researchers. Restrictions regarding conservation related information apply, including no distribution or publication of the coordinates or detailed maps.		Çağan Şekercioğlu	c.s@utah.edu	Turkey Department of Nature Conservation and National Parks permit no. 72784983-488.04-114100
IZW Cheetah	*Acinonyx jubatus*	Request via data contact for qualified researchers. Restrictions regarding conservation related information apply, including no distribution or publication of the coordinates or detailed maps.	7277858	Movebank	Via Movebank	Ministry of Environment, Forestry and Tourism, Namibia, research permit number (2018050101)
Deer in Germany and Austria	*Cervus elaphus*	Available in Zenodo dataset: https://doi.org/10.5281/zenodo.7704108		Johannes Signer	jsigner@uni-goettingen.de	Landesamt Kärnten permit number 10-TVG-12/2-2021; Regierung von Oberbayern permit number 55.2-1-54-2532-160-2016.
Algonquin Provincial Park Wolves	*Canis lycaon cf.*	Request via data contact for qualified researchers. Restrictions regarding conservation related information apply, including no		Brent Patterson	brent.patterson@ontario.ca	Data collected in accordance with institutional guidelines.

		distribution or publication of the coordinates or detailed maps.				
Hluhluwe-iMfolozi Park Mammals	*Connochaetes taurinus*	Request via data contact for qualified researchers. Restrictions regarding conservation related information apply, including no distribution or publication of the coordinates or detailed maps.		Simon Chamaillé-Jammes	simon.chamaille@cefe.cnrs.fr	Ezemvelo Permit E/5130/02
Hluhluwe-iMfolozi Park Mammals	*Equus quagga*	Request via data contact for qualified researchers. Restrictions regarding conservation related information apply, including no distribution or publication of the coordinates or detailed maps.		Simon Chamaillé-Jammes	simon.chamaille@cefe.cnrs.fr	Ezemvelo Permit E/5130/02
Red deer Bavaria	*Cervus elaphus*	Available in Zenodo dataset: https://doi.org/10.5281/zenodo.7704108		Marco Heurich	Marco.Heurich@npv-bw.bayern.de	Government of Upper Bavaria (ROB-55.2Vet-2532.Vet_02-17-190)
Myanmar Elephants	*Elephas maximus*	Request via data contact for qualified researchers. Restrictions regarding conservation related information apply, including no distribution or publication of the coordinates or detailed maps.		Aung Chan	Aung.Chan@colostate.edu	Smithsonian National Zoological Park, Washington, D.C., Approved IACUC #17-30
Wisconsin Mammals	*Canis latrans*	Available in Zenodo dataset: https://doi.org/10.5281/zenodo.7704108		David Drake	ddrake2@wisc.edu	UW Madison IACUC, A005905; Wisconsin Department of Natural Resources, SRLN-21-07
Golden Jackals in Slovenia	*Canis aureus*	Available in Zenodo dataset: https://doi.org/10.5281/zenodo.7704108		Hubert Potočnik	hubert.potocnik@gmail.com	Ministry of the Environment and Spatial Planning of the Republic of Slovenia (permit No. 35601-115/2017-4)
Maned Wolves Brazil	*Chrysocyon brachyurus*	Available in Zenodo dataset: https://doi.org/10.5281/zenodo.7704108	626060827	Rogerio Cunha de Paula	rogerio.paula@icmbio.gov.br	Instituto Chico Mendes de Conservação da Biodiversidade (ICMBio), license numbers 61097-6 and 61097-7
Elk Cody	*Cervus canadensis*	Request via data contact for qualified researchers. Restrictions	1120798935	Avery Shawler	avery.shawler@gmail.com	UC Berkeley IACUC AUP-2018-07-11261

		regarding conservation related information apply, including no distribution or publication of the coordinates or detailed maps.				
Brown Bear Sweden	*Ursus arctos*	Available in Zenodo dataset: https://doi.org/10.5281/zenodo.7704108		Jonas Kindberg	jonas.kindberg@rovdata.no	Swedish Ethical Committee on Animal Research (Uppsala, Sweden; Dnr 5.8.18–03376/2020), the Swedish Environmental Protection Agency (NV-00741-18)
Save the Elephants	*Loxodonta africana*	Request via data contact for qualified researchers. Restrictions regarding conservation related information apply, including no distribution or publication of the coordinates or detailed maps.		George Wittemyer	G.Wittemyer@colostate.edu	Data collected in accordance with institutional guidelines.
YSNP Ungulates	*Antilocapra americana*	Available in Zenodo dataset: https://doi.org/10.5281/zenodo.7704108		Daniel Stahler	Dan_Stahler@nps.gov	Data collected in accordance with institutional guidelines.
YSNP Ungulates	*Bison bison*	Request via data contact for qualified researchers. Restrictions regarding conservation related information apply, including no distribution or publication of the coordinates or detailed maps.		Daniel Stahler	Dan_Stahler@nps.gov	IMR_YELL_White_Ungulates_2018.A3
YSNP Ungulates	*Odocoileus hemionus*	Available in Zenodo dataset: https://doi.org/10.5281/zenodo.7704108		Daniel Stahler	Dan_Stahler@nps.gov	IMR_YELL_White_Ungulates_2018.A3
YSNP Ungulates	*Ovis canadensis*	Available in Zenodo dataset: https://doi.org/10.5281/zenodo.7704108		Daniel Stahler	Dan_Stahler@nps.gov	IMR_YELL_White_Ungulates_2018.A3
YSNP Elk	*Cervus canadensis*	Available in Zenodo dataset: https://doi.org/10.5281/zenodo.7704108		Daniel Stahler	Dan_Stahler@nps.gov	IMR_YELL_White_Ungulates_2018.A3
YSNP Wolves	*Canis lupus*	Available in Zenodo dataset: https://doi.org/10.5281/zenodo.7704108		Daniel Stahler	Dan_Stahler@nps.gov	NPS IACUC approved protocols. No assigned permit number
GNWT Dehcho Boreal Woodland Caribou	*Rangifer tarandus caribou*	Available in Zenodo dataset: https://doi.org/10.5281/zenodo.7704108	384182382	Movebank	Via Movebank	Annual Northwest Territories wildlife research permits WCC protocols, including NWTWCC 2018-019

GNWT Inuvik Barren Ground Caribou	*Rangifer tarandus groenlandicus*	Available in Zenodo dataset: https://doi.org/10.5281/zenodo.7704108	579621649	Movebank	Via Movebank	Government of the Northwest Territories wildlife research permits and WCC protocols
GNWT North Slave Barren Ground Caribou: Bathurst	*Rangifer tarandus groenlandicus*	Available in Zenodo dataset: https://doi.org/10.5281/zenodo.7704108	140788890	Movebank	Via Movebank	Government of the Northwest Territories wildlife research permits and WCC protocols
GNWT North Slave Boreal Caribou	*Rangifer tarandus*	Available in Zenodo dataset: https://doi.org/10.5281/zenodo.7704108	469002388	Movebank	Via Movebank	Annual Northwest Territories wildlife research permits WCC protocols, including NWTWCC 2017-010, NWTWCC 2018-001
GNWT South Slave Barren Ground Caribou: Beverly and Ahiak	*Rangifer tarandus groenlandicus*	Available in Zenodo dataset: https://doi.org/10.5281/zenodo.7704108	242950074	Movebank	Via Movebank	Government of the Northwest Territories Wildlife Research Permit WL5000771; Government of the Northwest Territories WCC Protocol NWTWCC 2019-020; reviewed annually
GNWT South Slave Boreal Woodland Caribou	*Rangifer tarandus caribou*	Available in Zenodo dataset: https://doi.org/10.5281/zenodo.7704108	149370498	Movebank	Via Movebank	Government of the Northwest Territories Wildlife Research Permit WL5000771; Government of the Northwest Territories WCC Protocol NWTWCC 2019-020; reviewed annually
Namibian Elelphants	*Loxodonta africana*	Available in Zenodo dataset: https://doi.org/10.5281/zenodo.7704108		Morgan Hauptfleisch	mhauptfleisch@nust.na	Namibian Ministry of Environment, Forestry and Tourism, Namibia University of Science and Technology Biodiversity Research Centre. Permit RCIV0032018:20190602
Elk Refuge Elk	*Cervus canadensis*	Request via data contact for qualified researchers. Restrictions regarding conservation related information apply, including no distribution or publication of the coordinates or detailed maps.	1153369719	Eric Cole	eric_cole@fws.gov	Wyoming Game and Fish Department Chapter 33 Permit number 33-394

Jackson Hole Elk	*Cervus canadensis*	Request via data contact for qualified researchers. Restrictions regarding conservation related information apply, including no distribution or publication of the coordinates or detailed maps.	995013494	Alyson Courtemanch	alyson.courtemanch@wyo.gov	Data collected in accordance with institutional guidelines.
Jackson Hole Wolves	*Canis lupus*	Request via data contact for qualified researchers. Restrictions regarding conservation related information apply, including no distribution or publication of the coordinates or detailed maps.		Kristin Barker	kbarker@berkeley.edu	NPS IACUC approved protocols. No assigned permit number
Jaguars Paraguay	*Panthera onca*	Request via data contact for qualified researchers. Restrictions regarding conservation related information apply, including no distribution or publication of the coordinates or detailed maps.	1228193116	Movebank	Via Movebank	Ministerio del Ambiente y Desarrollo Sostenible 155/2018
Wyoming Mammals	*Alces alces*	Available in Zenodo dataset: https://doi.org/10.5281/zenodo.7704108		Matthew Kauffman	mkauffm1@uwyo.edu	University of Wyoming IACUC 20200406MK00416-01
Wyoming Mammals	*Antilocapra americana*	Available in Zenodo dataset: https://doi.org/10.5281/zenodo.7704108		Matthew Kauffman	mkauffm1@uwyo.edu	University of Wyoming IACUC 20200518MK00425-01
Wyoming Mammals	*Odocoileus hemionus*	Available in Zenodo dataset: https://doi.org/10.5281/zenodo.7704108		Matthew Kauffman	mkauffm1@uwyo.edu	University of Wyoming IACUC 20200302MK00411-02
Mongolian Snow Leopards	*Panthera uncia*	Request via data contact for qualified researchers. Restrictions regarding conservation related information apply, including no distribution or publication of the coordinates or detailed maps.		Orjan Johansson	orjan@snowleopard.org	Ministry for Environment and Green Development, Mongolia, and Mongolian Academy of Sciences
Illinois Mammals	*Odocoileus virginianus*	Available in Zenodo dataset: https://doi.org/10.5281/zenodo.7704108		Guillaume Bastille-Rousseau	gbr@siu.edu	SIU IACUC 19-002
Carpathian Bears	*Ursus arctos*	Available in Zenodo dataset: https://doi.org/10.5281/zenodo.7704108		Nuria Selva	nuriselva@gmail.com	General Directorate for Environmental Protection (permit no. DOP-OZ.6401.08.2.2013

						.ls.1, and DZP-WG.6401.08.8.2014.JRO) and the I Local Ethical Committee in Krakow (permit no. 21/2013 and 101/2014) and Ministry of Environment (permit DLP-III-4102-487136418/14/MD, DOPog.-4201-04-17/04/aj, DOPog.-4200/IV-17/9185/05/aj)
Wild Dogs Botswana	*Lycaon pictus*	Request via data contact for qualified researchers. Restrictions regarding conservation related information apply, including no distribution or publication of the coordinates or detailed maps.		Gabriele Cozzi	gabriele.cozzi@uzh.ch	University of Zurich, Switzerland
Elephants Botswana	*Loxodonta africana*	Request via data contact for qualified researchers. Restrictions regarding conservation related information apply, including no distribution or publication of the coordinates or detailed maps.		Michael Chase	er@info.bw	Data collected in accordance with institutional guidelines.
Utah Mammals	*Antilocapra americana*	Available in Zenodo dataset: https://doi.org/10.5281/zenodo.7704108		Julie Young	julie.young@usu.edu	Data collected in accordance with institutional guidelines.
Utah Mammals	*Cervus canadensis*	Available in Zenodo dataset: https://doi.org/10.5281/zenodo.7704108		Julie Young	julie.young@usu.edu	Data collected in accordance with institutional guidelines.
Utah Mammals	*Odocoileus hemionus*	Available in Zenodo dataset: https://doi.org/10.5281/zenodo.7704108		Julie Young	julie.young@usu.edu	Data collected in accordance with institutional guidelines.
Utah Mammals	*Ovis canadensis californiana*	Available in Zenodo dataset: https://doi.org/10.5281/zenodo.7704108		Julie Young	julie.young@usu.edu	Data collected in accordance with institutional guidelines.
Utah Mammals	*Ovis canadensis canadensis*	Available in Zenodo dataset: https://doi.org/10.5281/zenodo.7704108		Julie Young	julie.young@usu.edu	Data collected in accordance with institutional guidelines.
Utah Mammals	*Ovis canadensis nelsoni*	Available in Zenodo dataset: https://doi.org/10.5281/zenodo.7704108		Julie Young	julie.young@usu.edu	Data collected in accordance with institutional guidelines.
Utah Mammals	*Puma concolor*	Available in Zenodo dataset: https://doi.org/10.5281/zenodo.7704108		Julie Young	julie.young@usu.edu	QA1907 and QA3040 - USDA National Wildlife Research Center

Table S2 Model coefficients, 95% credible intervals of the intercept only model for each of the displacement and road distance models. The model also included a random effect for species-study combined. The response ratios were weighted by their inverse sampling variances. Bold text indicates estimates with 95% CIs that do not overlap zero. Values reported are response ratios and values in the main text are back-transformed to percentage change.

	Estimate	**95% CI**
1-hour Median Displacement	-0.05	-0.14, 0.04
1-hour 95th Percentile Displacement	**-0.13**	**-0.25, -0.01**
10-day Median Displacement	-0.02	-0.13, 0.10
10-day 95th Percentile Displacement	-0.16	-0.36, 0.05
Road Distance	-0.01	-0.05, 0.03

Table S3 Model coefficients, 95% credible intervals, r^2 and sample sizes of the model predicting 1-hour 95th percentile displacements. Predictor variables included body mass, diet (i.e., carnivore, omnivore or herbivore), NDVI difference, relative brain size, Human Footprint Index (HFI), Stringency Index (SI). The model also included a random effect for species-study combined. The response ratios were weighted by their inverse sampling variances. We calculated the marginal r^2 (variance explained by the fixed effects) and conditional r^2 (variance explained by both fixed and random factors). Values reported are response ratios and values in the main text are back-transformed to percentage change.

	Estimate	**95% CI**
Intercept	-1.58	-5.19, 2.18
Body Mass	-0.03	-0.25, 0.2
Diet (Carnivore)	-0.18	-0.71, 0.37
Diet (Omnivore)	0.13	-0.41, 0.66
NDVI Difference	0.11	-0.05, 0.27
Relative Brain Size	-0.06	-0.69, 0.59
Human Footprint	-0.003	-0.09, 0.08
Stringency Index	0.84	-1.22, 2.82
r2 Marginal	0.04	
r2 Conditional	0.13	
Individuals	423	

Table S4 Model coefficients, 95% credible intervals, r^2 and sample sizes of the model predicting 1-hour median displacements. Predictor variables included body mass, diet (i.e., carnivore, omnivore or herbivore), NDVI difference, relative brain size, Human Footprint Index (HFI), Stringency Index (SI). The model also included a random effect for species-study combined. The response ratios were weighted by their inverse sampling variances. We calculated the marginal r^2 (variance explained by the fixed effects) and conditional r^2 (variance explained by both fixed and random factors). Values reported are response ratios and values in the main text are back-transformed to percentage change.

	Estimate	**95% CI**
Intercept	-1.52	-4.31, 1.47
Body Mass	-0.06	-0.23, 0.12
Diet (Carnivore)	-0.12	-0.62, 0.39
Diet (Omnivore)	-0.02	-0.4, 0.37
NDVI Difference	0.06	-0.05, 0.18
Relative Brain Size	-0.34	-0.84, 0.17
Human Footprint	0.02	-0.04, 0.07
Stringency Index	0.95	-0.69, 2.48
r2 Marginal	0.04	
r2 Conditional	0.14	
Individuals	423	

Table S5 Model coefficients, 95% credible intervals, r^2 and sample sizes of the model predicting 10-day 95th percentile displacements. Predictor variables included body mass, diet (i.e., carnivore, omnivore or herbivore), NDVI difference, relative brain size, Human Footprint Index (HFI), Stringency Index (SI) and activity. The model also included a random effect for species-study combined. The response ratios were weighted by their inverse sampling variances. We calculated the marginal r^2 (variance explained by the fixed effects) and conditional r^2 (variance explained by both fixed and random factors). Bold text indicates estimates with 95% CIs that do not overlap zero. Values reported are response ratios and values in the main text are back-transformed to percentage change.

	Estimate	**95% CI**
Intercept	**-13.37**	**-20.02,-6.99**
Body Mass	-0.24	-0.68, 0.20
Diet (Carnivore)	0.01	-0.70, 0.71
Diet (Omnivore)	-0.11	-1.4, 1.17
NDVI Difference	**0.29**	**0.17, 0.41**
Relative Brain Size	0.51	-0.94, 1.95
Human Footprint	-0.02	-0.1, 0.05
Stringency Index	**7.31**	**3.76, 10.88**
Activity (Nocturnal)	0.48	-1.78, 2.77
r2 Marginal	0.07	
r2 Conditional	0.28	
Individuals	1,725	

Table S6 Model coefficients, 95% credible intervals, r^2 and sample sizes of the model predicting 10-day median displacements. Predictor variables included body mass, diet (i.e., carnivore, omnivore or herbivore), NDVI difference, relative brain size, Human Footprint Index, Stringency Index (SI) and activity. The model also included a random effect for species-study combined. The response ratios were weighted by their inverse sampling variances. We calculated the marginal r^2 (variance explained by the fixed effects) and conditional r^2 (variance explained by both fixed and random factors). Bold text indicates estimates with 95% CIs that do not overlap zero. Values reported are response ratios and values in the main text are back-transformed to percentage change.

	Estimate	**95% CI**
Intercept	-3.89	-7.98, 0.28
Body Mass	-0.16	-0.4, 0.06
Diet (Carnivore)	0.3	-0.11. 0.7
Diet (Omnivore)	0.61	-0.44, 1.67
NDVI Difference	**0.16**	**0.05, 0.28**
Relative Brain Size	-0.02	-0.74, 0.69
Human Footprint	0.05	-0.01, 0.12
Stringency Index	2.2	-0.07, 4.42
Activity (Nocturnal)	0.09	-1.36, 1.55
r2 Marginal	0.02	
r2 Conditional	0.05	
Individuals	1,725	

Table S7 Model coefficients, 95% credible intervals, r^2 and sample sizes of the model predicting road distance. Predictor variables included body mass, diet (i.e., carnivore, omnivore or herbivore), NDVI difference, relative brain size, Human Footprint Index, Stringency Index (SI) and activity. The model also included a random effect for species-study combined. The response ratios were weighted by their inverse sampling variances. We calculated the marginal r^2 (variance explained by the fixed effects) and conditional r^2 (variance explained by both fixed and random factors). Bold text indicates estimates with 95% CIs that do not overlap zero. Values reported are response ratios and values in the main text are back-transformed to percentage change.

	Estimate	**95% CI**
Intercept	-0.63	-1.87, 0.62
Body Mass	0.00005	-0.00003, 0.0001
Diet (Carnivore)	0.02	-0.17, 0.21
Diet (Omnivore)	0.23	-0.02, 0.47
NDVI Difference	0.12	-0.16, 0.4
Relative Brain Size	0.08	-0.33, 0.5
Human Footprint	**-0.13**	**-0.16, -0.09**
Stringency Index	0.49	-0.18, 1.17
Activity (Nocturnal)	0.08	-0.5, 0.66
r2 Marginal	0.07	
r2 Conditional	0.08	
Individuals	2,160	

Table S8 Pagels' lambda and respective P-values across 100 random phylogenetic trees from Upham et al. (*60*) for each of the movement and road distance models. All models included body mass, diet (i.e., carnivore, omnivore or herbivore), NDVI difference, relative brain size, Human Footprint Index and Stringency Index (SI). The model also included a random effect for species-study combined. The response ratios were weighted by their inverse sampling variances.

Model	Median Lambda (95th percentile)	Median p (95th percentile)
1-hour Median Displacement	<0.001 (<0.001 – <0.001)	1 (1-1)
1-hour 95th Percentile Displacement	<0.001 (<0.001 – <0.001)	1 (1-1)
10-day Median Displacement	<0.001 (<0.001 – <0.001)	1 (1-1)
10-day 95th Percentile Displacement	<0.001 (<0.001 – <0.001)	1 (1-1)
Road Distance	<0.001 (<0.001 – <0.001)	1 (1-1)

Table S9 Model coefficients, 95% credible intervals of the intercept only model for each of the displacement and road distance models. The model also included a random effect for species-study combined. Response ratios *not* weighted by their inverse sampling variances. Bold text indicates estimates with 95% CIs that do not overlap zero. Values reported are response ratios and values in the main text are back-transformed to percentage change.

	Estimate	**95% CI**
1-hour Median Movement	-0.02	-0.11, 0.06
1-hour 95th Percentile Movement	**-0.13**	**-0.25, -0.01**
10-day Median Movement	-0.21	-0.49, 0.07
10-day 95th Percentile Movement	-0.15	-0.36, 0.05
Road Distance	-0.01	-0.05, 0.03

Table S10 Model coefficients, 95% credible intervals, r^2 and sample sizes of the model predicting 1-hour 95th percentile displacements. Predictor variables included body mass, diet (i.e., carnivore, omnivore or herbivore), NDVI difference, relative brain size, Human Footprint Index (HFI), Stringency Index (SI). The model also included a random effect for species-study combined. Response ratios *not* weighted by their inverse sampling variances. We calculated the marginal r^2 (variance explained by the fixed effects) and conditional r^2 (variance explained by both fixed and random factors). Values reported are response ratios and values in the main text are back-transformed to percentage change.

	Estimate	**95% CI**
Intercept	-1.42	-5.02, 2.39
Body Mass	-0.03	-0.26, 0.21
Diet (Carnivore)	-0.18	-0.72, 0.38
Diet (Omnivore)	0.12	-0.43, 0.66
NDVI Difference	0.11	-0.05, 0.27
Relative Brain Size	-0.06	-0.69, 0.6
Human Footprint	0.003	-0.09, 0.08
Stringency Index	0.77	-1.33, 2.74
r2 Marginal	0.04	
r2 Conditional	0.13	
Individuals	423	

Table S11 Model coefficients, 95% credible intervals, r^2 and sample sizes of the model predicting 1-hour median displacements. Predictor variables included body mass, diet (i.e., carnivore, omnivore or herbivore), NDVI difference, relative brain size, Human Footprint Index (HFI) and Stringency Index (SI). The model also included a random effect for species-study combined. Response ratios *not* weighted by their inverse sampling variances. We calculated the marginal r^2 (variance explained by the fixed effects) and conditional r^2 (variance explained by both fixed and random factors). Values reported are response ratios and values in the main text are back-transformed to percentage change.

	Estimate	**95% CI**
Intercept	-1.84	-4.61, 1.03
Body Mass	-0.07	-0.23, 0.08
Diet (Carnivore)	-0.17	-0.55, 0.21
Diet (Omnivore)	-0.01	-0.42, 0.41
NDVI Difference	0.04	-0.09, 0.18
Relative Brain Size	-0.4	-0.83, 0.05
Human Footprint	0.02	-0.05, 0.09
Stringency Index	1.16	-0.42, 2.68
r2 Marginal	0.05	
r2 Conditional	0.09	
Individuals	423	

Table S12 Model coefficients, 95% credible intervals, r^2 and sample sizes of the model predicting 10-day 95th percentile displacements. Predictor variables included body mass, diet (i.e., carnivore, omnivore or herbivore), NDVI difference, relative brain size, Human Footprint Index (HFI), Stringency Index (SI) and activity. The model also included a random effect for species-study combined. Response ratios *not* weighted by their inverse sampling variances. We calculated the marginal r^2 (variance explained by the fixed effects) and conditional r^2 (variance explained by both fixed and random factors). Bold text indicates estimates with 95% CIs that do not overlap zero. Values reported are response ratios and values in the main text are back-transformed to percentage change.

	Estimate	**95% CI**
Intercept	**-13.62**	**-20.28, -7.31**
Body Mass	-0.23	-0.68, 0.22
Diet (Carnivore)	0.01	-0.69, 0.72
Diet (Omnivore)	-0.13	-1.43, 1.13
NDVI Difference	**0.29**	**0.17, 0.41**
Relative Brain Size	0.52	-0.96, 2.05
Human Footprint	-0.02	-0.1, 0.05
Stringency Index	**7.43**	**4.01, 10.99**
Activity (Nocturnal)	0.49	-1.79, 2.78
r2 Marginal	0.07	
r2 Conditional	0.28	
Individuals	1,725	

Table S13 Model coefficients, 95% credible intervals, r^2 and sample sizes of the model predicting 10-day median displacements. Predictor variables included body mass, diet (i.e., carnivore, omnivore or herbivore), NDVI difference, relative brain size, Human Footprint Index, Stringency Index (SI) and activity. The model also included a random effect for species-study combined. Response ratios *not* weighted by their inverse sampling variances. We calculated the marginal r^2 (variance explained by the fixed effects) and conditional r^2 (variance explained by both fixed and random factors). Bold text indicates estimates with 95% CIs that do not overlap zero. Values reported are response ratios and values in the main text are back-transformed to percentage change.

	Estimate	**95% CI**
Intercept	-5.35	-12.78, 1.92
Body Mass	0.04	-0.55, 0.62
Diet (Carnivore)	0.53	-0.41, 1.44
Diet (Omnivore)	0.14	-1.40, 1.67
NDVI Difference	**0.14**	**0.02, 0.26**
Relative Brain Size	1.14	-0.87 3.10
Human Footprint	0.02	-0.06, 0.1
Stringency Index	2.36	-1.53, 6.34
Activity (nocturnal)	0.98	-1.88, 3.82
r2 Marginal	0.06	
r2 Conditional	0.40	
Individuals	1,725	

Table S14 Model coefficients, 95% credible intervals, r^2 and sample sizes of the model predicting road distance. Predictor variables included body mass, diet (i.e., carnivore, omnivore or herbivore), NDVI difference, relative brain size, Human Footprint Index, Stringency Index (SI) and activity. The model also included a random effect for species-study combined. Response ratios *not* weighted by their inverse sampling variances. We calculated the marginal r^2 (variance explained by the fixed effects) and conditional r^2 (variance explained by both fixed and random factors). Bold text indicates estimates with 95% CIs that do not overlap zero. Values reported are response ratios and values in the main text are back-transformed to percentage change.

	Estimate	**95% CI**
Intercept	-0.65	-1.87, 0.59
Body Mass	0.00005	-0.00003,0.0001
Diet (Carnivore)	0.02	-0.18, 0.21
Diet (Omnivore)	0.23	-0.01, 0.49
NDVI Difference	0.13	-0.15, 0.41
Relative Brain Size	0.07	-0.34, 0.49
Human Footprint	**-0.13**	**-0.16, -0.09**
Stringency Index	0.51	-0.16, 1.17
Activity (Nocturnal)	0.08	-0.5, 0.67
r2 Marginal	0.07	
r2 Conditional	0.08	
Individuals	2,160	

Table S15 Pagels' lambda and respective P-values across 100 random phylogenetic trees from Upham et al. (*60*) for each of the displacement and road distance models. All models included body mass, diet (i.e., carnivore, omnivore or herbivore), NDVI difference, relative brain size, Human Footprint Index, Stringency Index (SI). The model also included a random effect for species-study combined. Response ratios *not* weighted by their inverse sampling variances.

Model	Median Lambda (95th percentile)	Median p (95th percentile)
1-hour Median Displacement	<0.001 (<0.001 – <0.001)	1 (1-1)
1-hour 95th Percentile Displacement	<0.001 (<0.001 – <0.001)	1 (1-1)
10-day Median Displacement	<0.001 (<0.001 – <0.001)	1 (1-1)
10-day 95th Percentile Displacement	<0.001 (<0.001 – <0.001)	1 (1-1)
Road Distance	<0.001 (<0.001 – <0.001)	1 (1-1)

References and Notes

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