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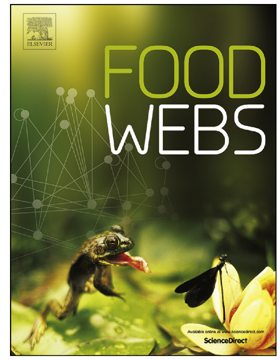

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Prey preferences of modern human hunter-gatherers

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Abstract

Understanding traditional hunter-gatherer lifestyles in our modern world is fundamental to our understanding of their viability, as well as the role of humans as predators in structuring ecosystems. Here, we examine the factors that drive prey preferences of modern hunter-gatherer people by reviewing 85 published studies from 161 tropical, temperate and boreal sites across five continents. From these studies, we estimated Jacobs' selectivity index values (*D*) for 2,243 species/spatiotemporal records representing 504 species from 42 vertebrate orders based on a sample size of 799,072 kill records (median=259). Hunter-gatherers preferentially hunted 11 large-bodied, riskier species, and were capable of capturing species ranging from 0.6 to 535.3 kg, but avoided those smaller than 2.5 kg. Human prey preferences were driven by whether prey were arboreal or terrestrial, the threats the prey afforded hunters, and prey body mass. Variation in the size of prey species pursued by hunter-gatherers across each continent is a reflection of the local size spectrum of available prey, and historical or prehistorical prey depletion during the Holocene. The nature of human subsistence hunting reflects the ability to use a range of weapons and techniques to capture food, and the prey deficient wildlands where people living traditional lifestyles persist.

Keywords

Prey preference, human subsistence, group hunters, foraging, hunter-gatherers, predator-prey interactions, hominid, human ecology, human evolution

Introduction

Hunting and meat consumption of non-domesticated animals are integral components of traditional modern human hunter-gatherer lifestyles (Lee et al., 2020; Bennett and Robinson, 2000). Modern human hunter-gatherer groups tend to have a set of behaviors and motives that direct what or when to hunt, and how to hunt safely. These behaviors, which are passed from generation to generation, are often shaped by needs within each group and likely follow the tenets of the optimal foraging theory (Chacon, 2012; Chang & Drohan, 2018).

Optimal foraging theory posits that hunting preferences are shaped by the cost:benefit ratio of searching, handling and ingesting specific prey items (Stephens & Krebs, 1986). Specifically, prey items are selected to minimize the energetic and injury-related costs of prey acquisition and handling, while maximizing energy ingested (Belovsky, 1988; Pyke, 1984). Energetic hunting costs may vary by habitat and/or season because of differences in prey communities and their accessibility; taking into consideration prey traits such as body mass, herd or group size, population density, and degree of arboreality in forest habitats. Large-bodied animals tend to pose a greater threat to hunters due to their size, unpredictable temperament as well as physical self-defense features, including teeth, tusks, antlers, horns, or powerful legs with sharp hooves (Crosmary et al., 2012), yet yield large energetic returns if safely captured (Broughton et al., 2011). However, other animals, like venomous snakes or small animals possessing weapons (Kerley, 2018), can also be dangerous even if they are relatively small.

Modern human hunter-gatherers have developed a suite of technologies to reduce energetic costs, for example by using snares/traps to capture prey with minimal proximity, energy expenditure, projectile weaponry to bring down riskier prey from a distance, or dogs to detect and subdue prey (Koster, 2008). Thus, it is vital for hunter-gatherers to develop a formative understanding of prey behaviour, seasonal changes, and their distribution in the environment before deploying hunting strategies (Hawkes et al., 1982). Energy-maximizing prey preferences are, in a sense, a form of food security. Knowing where prey resources are, when and how to harvest them effectively, and achieving optimal nutritional value, all reduce the energetic costs associated with foraging (Webster & Webster, 1984).

Here, we aimed to determine whether modern human hunter-gatherers preferentially select specific prey to satisfy their dietary requirements (Speth, 2010), what those preferences are, and what factors drive such patterns. Based on studies of large carnivores, we predicted that modern human hunter-gatherers would prefer to kill large-bodied herbivores due to the high energetic yields afforded by these species (Hayward et al., 2012, Hayward & Kerley, 2005). We tested these hypotheses using a comprehensive review of the literature synthesizing prey density, biomass, hunting method and dietary data to describe hunting patterns of modern hunter-gatherer people that still practice an extractive lifestyle in different biomes across the world. Addressing these questions will advance our understanding of the roles of modern humans in structuring ecosystems, and the characteristics necessary to maintain traditional livelihoods in the face of global wildlife declines.

Materials and Methods

To assess preferential prey selection by modern human hunter-gatherer groups, we used methods established for large carnivores from Hayward and colleagues (2005, 2012, 2017). We conducted a review using JSTOR, Web of Science, and Google Scholar for the following keywords – “human” AND “prey preference” OR “hunt*” OR “diet” OR “subsistence” OR “harvesting” OR “hunting strategies”. These returned both peer-reviewed journal articles and grey literature. In our secondary search, we reviewed the reference lists of each of these papers to attain any additional studies not captured in the primary search. Studies, irrespective of hunting laws, were excluded from consideration when they included insufficient data or involved non-subsistence motivation for prey acquisition such as trophy hunting. Insufficient data were classified as cumulative abundance and kill numbers less than 20, with only 1 or 2 species reported as killed at a particular site, or a sample size <3 for particular species collected. Where only kill or abundance data was provided, we contacted authors to solicit supplementary information or referred to other researchers who worked at the same site, around the same time ± 1 year, to obtain the missing information. If an author did not respond, we searched for missing information from the same study area around the same year using Google Scholar and https://journalmap.org (Table 1).

From each paper, we recorded site information (site coordinates, site name, and country), biome, and continent. We extracted variables, from these papers, including the prey species killed (scientific names included and referred to in Table 2), hunting strategy (e.g. firearms, gun-traps, snares, bow-and-arrow, etc.), degree of prey threat to hunter-gatherers based on morphological defense traits or large body size, prey population abundance or density (actual or relative) of those species, reported prey numbers killed, and prey body mass (kg). In cases where body mass was not reported, we used the lower end of values presented in Wilson & Mittermeier (2009), and multiplied mean adult prey body mass by ¾ to account for young, juvenile, sub-adult, and sexually dimorphic prey consumed (Jooste et al., 2013). Prey threat was assigned to a scale of 0-2 with small or slow moving prey scored as 0; mid-sized species armed with some defense trait such as horns/antlers/tusks as moderate threat as 1; and megaherbivores, venomous reptiles, or large carnivores as 2 (Table 2) based on Hayward (2006) using Estes (1991).

Using the variables prey population abundance and prey species killed, we calculated the proportional abundance (p) and kills (r) for each species within the prey community at each site and then determined the Jacobs' selectivity index value for each species at each site. The Jacobs' index equation is $D = (r - p)/(r + p - 2rp)$ and results in a score ranging from –1 (total avoidance) to +1 (maximum preference). Jacobs' index diminishes the bias of rarer species by actively accounting for species rarity in relation to the total prey population at a given site and considering the heterogeneity of the confidence intervals (Jacobs, 1974). This metric also takes into consideration some of the other techniques, such as the forage ratio and Ivlev's electivity index (Ivlev, 1961), addressing the overstated accuracies in results presented, and is preferred in determining the prey preferences of large carnivores (Hayward et al., 2017). We quantified whether each prey species was significantly preferred or avoided with *t*-tests of the Jacobs' index values against zero (no preference or avoidance) where data were normally distributed, or a binomial (sign) test where they were not normally distributed. We also tested for preferred and accessible prey body mass (kg) ranges using breakpoints in segmented models in the *segmented* package of R (Muggeo, 2015) and evaluated preferences between continents using *t*-tests of the Jacobs' index values (D) on either side of the breakpoints (Clements et al., 2014). The line between breakpoints indicated the relationship of body mass (kg) influencing preference, with the steepest line showing the preferred range of prey body mass (Clements et al., 2014). We subsequently tested the degree of preference (D) of species either side of each breakpoint with a *t*-test. We also excluded the outlying largest megaherbivores from the dataset to test whether modern human hunter-gatherers exhibit linear increases in preference with increasing prey body mass, as exhibited by other apex carnivores (Hayward & Kerley, 2005). To determine the ideal prey body mass, we calculated the ratio of the body mass of humans (46.5 kg = 0.75 × 62 kg for adult women; Wadpole et al., 2012) to the body mass of their significantly preferred prey species (Hayward et al., 2012).

To determine the factors that affected modern hunter prey preferences, we used a linear model based on the global equation: Jacobs' Index preference value (D) ~ Body mass (kg) + Biome + Kill method + Continent + Threat + Prey arboreality [terrestrial (T) or arboreal (A)]. These were variables, extracted from the literature, determined by the selection process under optimal foraging theory: prey density, prey location within the environment, the type of biome prey were found, prey body mass, and tools used to hunt prey. We used the mean Jacobs' index value of species recorded from 3 or more sites in these models, and hence do not believe there are pseudoreplication issues with these data. We ran similar models (linear and segmented) using broader taxonomic groupings — both family and order — as the dependent variable, to gain a broader picture of the taxa targeted and their influence on preferences.

We used maximum likelihood methods to select the top 10 most supported models using Akaike's Information Criterion (Burnham and Anderson, 1998) and considered those with a ΔAIC value < 2 to be strongly supported (Akaike, 1974). We examined the most supported models for uninformative parameters (Leroux, 2019). The sum of the AIC weights (Table 3) determined the importance of each variable and the relationship between the main factors and hunter-gatherer prey preferences. We performed all analyses in R statistical software 1.42.1 (R Core Development Team, 2013) using the *MuMIn* (Barton, 2018) and *tidyverse* packages (Wickham, 2017).

Results

We compiled data from a total of 161 sites from 85 studies (Fig. 1; Table S1), describing a total of 504 terrestrial vertebrate prey species, including 372 mammals, 107 birds and 25 reptiles (ranging from 0.002 to 2495.3 kg) hunted by humans. We estimated Jacobs' selectivity index values (*D*) for 2,243 species/spatiotemporal records representing 504 species from 42 vertebrate orders based on a cumulative number of 799,072 killed individuals (median kills per study = 259). Overall, 39% of our data came from Africa, 34% from South America, 19% from Asia, 5% from North America, and 3% from Oceania. These data were collected from tropical (79%), temperate (19%), and boreal (2%) biomes.

Human hunter-gatherers significantly preferred species ranging in body mass from 17.4 to 535.0 kg with a mean ± SE of 128.5 kg ± 29.0 kg (Fig. 2a) such as sable antelope, Cape bushbuck, waterbuck, giant anteater, lowland tapir, bohor reedbuck, Peter's duiker, greater kudu, white-lipped peccary, collared peccary, and common eland (scientific names and full data in Table 2). The ratio of preferred prey to mean human body mass (46.5 kg) was 2.76:1. Conversely, significantly avoided species were those whose body mass ranged from 0.4 to 56.0 kg ($\overline{x}$ = 13.7 ± 2.4 kg; Table 2) including dogs, suni, Bornean orang-utan, golden-handed tamarin, saddle-back tamarin, and spiny rat.

The significantly preferred vertebrate families were Tayassuidae, Tapiridae, and Suidae. The significantly avoided families (from most to least avoided) were Odontophoridae, Megalonychidae, Psittacidae, Bucerotidae, Timaliidae, Elephantidae, Hominidae, Tinamidae, Psophiidae, Didelphidae, Pitheciidae, Sciuridae, Aotidae, Cebidae, Cracidae, Cercopithecidae, and Equidae (Table S2). The only taxonomic order that was significantly preferred was the Artiodactyla. Six avian orders were significantly avoided: Coraciiformes, Psittaciformes, Passeriformes, Tinamiformes, Gruiformes, and Galliformes. Five mammalian orders were also significantly avoided: Proboscidea, Marsupialia, Primates, Carnivora, and Rodentia (Table S3).

Hunter-gatherer prey preferences increased linearly with prey body mass when megaherbivores — African elephant, hippopotamus, and giraffe — were excluded, although the predictive ability was low (r^2 = 0.104, n = 168, p < 0.001; Fig. 2b).

The global segmented model for all study sites revealed only one breakpoint at 2.5 kg, which corresponds to a threshold represented by kinkajou, an arboreal procyonid, or larger (Fig. 3a). The 52 prey species weighing less than 2.5 kg were significantly avoided (*t* = -9.187 d.f. = 51, p <0.001), whereas the 126 species larger than 2.5 kg were killed in accordance with their availability within prey communities (*t* = -1.318, d.f. = 125, p = 0.189). Segmented models for Asia and South America revealed that hunter-gatherers preferentially pursued prey smaller than African hunter-gatherers (Fig. 3). African hunter-gatherers pursued species larger than steenbok (11 kg) according to their availability, and avoided smaller species (*t* = -0.16, d.f. = 40, p = 0.87; Fig. 3b). Asian hunter-gatherers hunted species larger than a banded leaf monkey (6.1 kg) according to their availability (*t* = -1.92, d.f. = 12, p = 0.08), and significantly avoided smaller species (*t* = -2.49, d.f. = 16, p = 0.02; Fig. 3c). South American hunter-gatherers killed smallerbodied species such as razor-billed curassow (2.9 kg) and larger in accordance with their availability (t = 0.72, d.f. = 30, p = 0.48), but significantly avoided species smaller than 2.9 kgs (t = -11.31, d.f. = 30, p < 0.001; Fig. 3d).

Spearman's test revealed a strong positive correlation between prey body mass and threat variables (ρ=0.760, d.f. = 846, p < 0.001), which would suggest that the larger the prey, the more damage inflicted on the predator. Since these two variables are correlated, we ran separate linear models that determining that threat (w = 0.98) was slightly more important than body mass (w = 0.78) in prey selection. Prey that posed a threat category of 1 and 2 were more preferred than low threat (category 0) prey, which were avoided (Fig. 4). The most important variable that drove prey preferences in hunter-gatherers was a prey species' degree of arboreality or terrestriality (sum of Akaike's weight w = 1.00). Hunter-gatherers were most likely to avoid arboreal prey (t = -6.63, d.f. = 55, p < 0.001). Kill method was found to be an uninformative variable within the linear model (Table 3).

Discussion

Historically, human hunters are thought to have targeted larger herbivores, and this purported prey preference has been a prevalent concept associated with hominid evolution (Redford, 1992) and subsequent conquest of new land masses and impact on previously naïve faunas (Martin 1984). Our results quantify this with >799,000 kill records in 85 studies, showing that subsistence hunters over the past 36 years definitively prefer larger, more threatening herbivores, largely within the order Artiodactyla. This observation is reinforced by the stark contrast between the most significantly preferred species, that have a mean body mass of 128 ± 29 kg (the ideal prey body mass of modern hunter-gatherers), and the six avoided species with a mean body mass of 13.7 ± 2.4 kg. When exceptionally large, extant African megaherbivores are excluded (Fig. 2b), the right-skewed distribution of human prey preferences against prey body mass reveals that humans are apex predators, such as lions (*Panthera leo*) and tigers (*Panthera tigris*), increasingly preferring larger prey (Hayward et al., 2012; Hayward & Kerley, 2005). The preference for artiodactyls reinforces the view that humans have become major competitors of large carnivores (Treves & Naughton-Treves, 1999).

Optimal foraging theory suggests that preference is based on the energetic cost and risk of prey acquisition against the benefit of prey consumption, which coincides with the preferred artiodactyls, such as peccaries and antelopes. Our taxonomic order and family groupings indicate a clear, positive preference for ungulates (artiodactyls and perissodactyls) above a minimum size threshold. Large herbivores have long been hypothesized as preferred target prey for modern human hunter-gatherers (Reyna-Hurtado & Tanner, 2007), and our global review quantifies this for individual species (sable antelope, Cape bushbuck, waterbuck, lowland tapir, bohor reedbuck, Peter's duiker, greater kudu, and common eland), ranging in body mass from 17.4 kg to 535 kg. This result, surprisingly, reveals no clear, distinct body mass preference among modern human hunter-gatherers (Fig. 3) in contrast to other apex predators such as lions and tigers, which prefer prey 190-550 kg (Hayward & Kerley, 2005) and 60-250 kg (Hayward et al., 2012) respectively. This is likely because modern humans are adept at capturing all available prey (Fig. 3), distinguishing the risks between apex carnivores and humans for prey species, where all but the smallest species yield energetic benefits to humans when successfully hunted with non-specific methods, such as snares and traps (Lupo et al.,2020; Broughton et al., 2011).

Modern human hunter-gatherer prey preferences are impacted by the declines in the availability of desirable vertebrate prey populations worldwide (Díaz et al., 2019), such that they are now using technological advances in hunting methods to capture any available prey above a minimum selective threshold (2.5 kg globally; Fig. 3). Widespread depletion of large-bodied prey in Asia and South America is likely to drive the need to hunt any species that can be captured, irrespective of its optimality (Jerozolimski & Peres, 2003), whereas truly large-bodied prey species remain abundant only in parts of Africa and North America (Lindsey et al., 2017).

Predator-prey arms races mean large herbivores have often been selected for increased body mass, weapons and/or tough skin (Hopcraft et al., 2012). We suggest that modern hunter-gatherer prey preferences are most likely driven by species that can satisfy optimal foraging theory requirements, implementing multiple technologies (notably unselective snares used in conjunction with other hunting methods) to kill and consume them, especially in persistently overhunted areas across continents and biomes (Milner-Gulland et al., 2003). This diversity of hunting methods to capture all available prey may mean that modern human hunters are no longer constrained by morphology in what they can capture – instead utilizing and innovating technology to capture almost any species (Bowler et al., 2020).

A lack of desirable prey species available in hunting catchments may lead to greater amounts of energy expenditure associated with longer travel distances from households and camp sites (Wood & Gilby, 2019). Even after incurring energy expenditure from greater travel distances, central-place hunters may encounter prey with reduced body mass (Smith et al., 2018) and thereby reduced nutrition, as well as facing the overall loss of preferred game species (Maisels et al., 2001). Reducing the viability of modern hunter-gatherer livelihoods may lead to the erosion, and in some instances, extinction of ethno-cultural practices as these people are forced into other lifestyles. These alternative lifestyles often include integration into agricultural societies or urbanization. This, in turn, incentivizes land use change that ultimately depletes natural habitats and displaces prey populations, pushing them further away from their natural ranges or into fragmented habitats. Such scenarios may also invoke apparent competition dynamics that are deleterious to viability of prey species. That is, as hunter-gatherers are increasingly subsidized by domestic food resources, population densities may increase resulting in greater hunter pressure and depletion of natural prey species, even if per capita human consumption is lower. Indeed, recreational hunting can also take place as hunters move in from urban areas to undertake cultural hunting (Hayward, 2009). Although modern hunter-gatherers often prefer wild meat compared to domestic livestock (Bennett & Rao, 2002), the switch between the two may not be easy, despite being necessary for their survival when facing chronic wildlife declines.

Our study illustrates the important ecological roles humans play in predator-prey dynamics as central-place foraging apex predators with the ability to optimally forage upon all prey larger than 2.5 kg. Using prey preference information will enable us to predict the functional roles of both modern and extinct hunter-gatherer societies within the ecosystems we inhabit. This analysis thus provides novel insights into how the management of available wildlife resources can benefit modern hunter-gatherer livelihoods by ensuring that preferred prey resources can persist in the environment. Promoting appropriate game management efforts to increase or maintain the availability of wild prey populations has the potential to ensure the continuity of traditional lifestyles.

Conflict of Interests

To the best of our knowledge, there are no conflicting interests.

Informed Consent

This research did not have any active, live participants, animals or human, therefore no consent was required.

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Table 1. Assessed criteria of study sites and made assumptions for missing variables such as prey abundance, mass data, hunting methods, or exclusion of species.

Country	Site(s)	Assumption	Source
Botswana	Okavango Delta Kalahari	Aerial census of Botswana- dry season 2012 prey density of *Struthio camelus* and *Hippopotamus amphibius*.	(Liebenberg, 2006)
Canada	Ontario	*Anser caerulescens* abundance (Cooch et al., 1989).	(Prevett et al., 1983)
Democratic Republic of Congo	Ituri Forest	Common names based on IUCN Red List Data. Primates not included because netting was the hunting strategy and nets don't catch arboreal primates.	(Hart & Hart, 1986) (Wilkie et al., 1998)
Madagascar	Makira Forest	(Redford & Robinson, 1991) Maximum Production Equation was used in Table 1 from which data were extrapolated.	(Golden, 2009)
Malaysia	Maliau Basin Site B, D, E	Abundance data for all species (Fitzmaurice, 2014 #559)	(Brodie et al., 2015)
Mexico	Campeche Quintana Roo	Abundance data- *Mazama spp.*, *Tayassu spp.*, and *Tapirus spp.* (Reyna-Hurtado & Tanner, 2007)	(Escamilla et al., 2000)
	X-Hazil Sur	Abundance data for all species (Escamilla et al., 2000)	(Jorgenson, 1998)
Nicaragua	Arang Dak Suma Pipi	Abundance data -*Myrmecophaga tridactyla*, *Dasypus spp.*, *Cebus spp.*, *Nasua nasua*, *Panthera once*, *Ateles spp.*, *Cuniculus spp.*, and *Testudines* (Williams-Guillen et al., 2006)	(Koster, 2008)
Paraguay	Mbaracayu Reserve	Abundance data (Hill & Padwe, 2000).	(Hill et al., 1997)
Peru	Pacaya- Samiria National Reserve	Abundance & mass averaged for *Cebus spp.*, *Ateles spp.*, and *Dasyprocta spp*. (Robinson & Redford, 1986)	(Begazo & Bodmer, 1998) (Leeuwenberg & Robinson, 2000) (Redford & Robinson, 1987)
Peru	Yavari Miri Tahuayo	Mass data (Robinson & Redford, 1986). Abundance data (Leeuwenberg et al., 2000).	(Bodmer et al., 1997)
United States of	Alaska: Yukon Drainage	Abundance data- *Anseriformes* (Service, 2018 #1141) *Alces alces* (Wells, 2018), *Falcipennis canadensis*,	(White et al., 2010, 2012)

America	Haine Baranof Island	*Lagopus lagopus*, and *Lepus spp.* (Carroll & Merizon, 2017), 2 bear species (Lowell, 2014 #1142) Dall sheep (Battle & Stantorf, 2018).	
Zimbabwe	Save Valley Conservancy	Illegal hunting. Snares and dogs as a hunting method.	(Lindsey et al., 2011)
	Gonarezhou National Park	Abundance data from (Dunham, 2016 #1124) for *Sylvicapra grimmia*, *Hippopotamus amphibious*, *Phacochoerus aethiopicus*, and *Raphicerus campestris.*	(Gandiwa et al., 2013)

Table 2. This table shows the data used for the study. Species (including scientific name) hunted, body mass, proportions of abundance and kills, continent, habitat, and threat posed to hunters were collected from 85 studies.

Species	**Scientific Name**	**Body Mass (kg)**	**Jacobs Index (*D*)**	**Abundance (*p*)**	**Kills (*r*)**	**n**	**Sign test**	***t*-test**	**p**	**Threat**	**Habitat**	**Continent**
Acouchi, Green	*Myoprocta pratti*	1.6	-0.24 ± 0.04	14.3 ± 3.3	11.3 ± 2.3	3	0.25		0.07	0	Tropical Forest	South America
Acouchi, Red	*Myoprocta acouchy*	1	-0.36 ± 0.19	0 ± 0.3	3.2 ± 1	12		-2.13	0.09	0	Tropical Forest	South America
Agouti, Black	*Dasyprocta fuliginosa*	4.6	-0.3 ± 0.16	6.6 ± 1.3	7.1 ± 1.6	14		-0.02	0.08	0	Tropical Forest	South America
Agouti, Central American	*Dasyprocta punctata*	4	0.2 ± 0.14	8.9 ± 1.9	12.2 ± 4.6	11		2.19	0.18	0	Tropical Forest	South America
Agouti, Red-rumped	*Dasyprocta leporina*	3.9	0.41 ± 0.23	0 ± 1.7	20.3 ± 8.4	9	0.18		0.13	0	Tropical Forest	South America
Amazon, Southern	*Amazona farinosa*	0.7	-0.84 ±	8.3 ± 1.7	1 ± 0.4	5	0.0		0.002	0	Tropical	South Ameri

Mealy			0.12				6				Forest	ca
Anoa	*Bubalus depressicornis*	232	0.29 ± 0.41	0.7 ± 0.3	3.7 ± 1.8	4	0.663		0.53	2	Tropical Forest	Asia
Anteater, Giant	*Myrmecophaga tridactyla*	27.4	0.74 ± 0.06	0 ± 0.4	2.3 ± 2.4	7	0.002		<0.001	1	Tropical Forest	South America
Antelope, Pygmy	*Neotragus batsei*	3.6	0.03 ± 0.23	2.7 ± 1.4	2.6	7	1.00		0.89	0	Tropical Forest	Africa
Antelope, Roan	*Hippotragus equinus*	195	0.38 ± 0.13	0 ± 0.8	2.3 ± 1.1	8	0.29		0.05	1	Savannah	Africa
Antelope, Sable	*Hippotragus niger*	172.3	0.54 ± 0.1	0 ± 0.6	6.2 ± 0.7	13		2.43	<0.001	1	Savannah	Africa
Armadillo, Giant	*Priodontes maximus*	36.7	0.49 ± 0.19	0 ± 0.05	6.7 ± 0.4	6	0.69		0.16	0	Tropical Forest	South America
Armadillo, Greater long-nosed	*Dasypus kappleri*	3.5	0.05 ± 0.12	0 ± 0.6	5 ± 0.6	3	0.25		0.06	0	Tropical Forest	South America
Armadillo, Nine-Banded	*Dasypus novemcinctus*	2.9	-0.14 ± 0.13	0 ± 1.8	9.9	18		-0.85	0.41	0	Tropical Forest	South America
Babbler, Short-Tailed	*Trichastoma malaccense*	0.002	-0.62 ± 0.38	3.4 ± 2.2	10	3	1.00		0.24	0	Tropical Forest	Asia
Baboon, Yellow	*Papio cynocephalus*	17.5	0.3 ± 0.2	0 ± 2.2	2.9 ± 1.2	7	0.45		0.29	1	Savannah	Africa
Badger, Honey	*Mellivora capensis*	9	-0.65 ± 0.25	0 ± 0.02	0.1 ± 0.7	3	1.00		0.21	1	Savannah	Africa
Barbet	*Capitonidae*	0.1	-0.5 ± 0.5	4.8 ± 1.6	20	3	1.00		0.42	0	Tropical Forest	Asia

Bat, Insular Fruit	*Pteropus tonganus*	0.6	0.15 ± 0.35	14 ± 6.2	16.3 ± 8.1	3	1.00		0.71	0	Tropical Forest	Oceania
Bear, Malayan Sun	*Helarctos malayanus*	53	-0.35 ± 0.25	4.7 ± 2.7	4.7 ± 1.1	6	0.69		0.21	2	Tropical Forest	Asia
Binturong	*Arctictis binturong*	20	0.26 ± 0.3	0 ± 0.6	3.9 ± 5.6	3	1.00		0.58	0	Tropical Forest	Asia
Buffalo, African Forest	*Syncerus caffer nanus*	237.5	-0.84 ± 0.16	1 ± 0.6	0.04 ± 1.8	4	0.13		0.01	2	Tropical Forest	Africa
Buffalo, Cape	*Syncerus caffer*	335.4	-0.29 ± 0.11	0 ± 4.5	10.5 ± 0.4	14		1.27	0.03	2	Savannah	Africa
Bulbul	*Pycnonotidae*	0.04	-0.64 ± 0.23	9 ± 0.6	3.9	3	0.25		0.11	0	Tropical Forest	Asia
Bushbuck, Cape	*Tragelaphus scriptus*	43.4	0.5 ± 0.16	0 ± 0.5	3.9 ± 0.6	13		2.86	0.01	2	Savannah	Africa
Capuchin, Brown	*Cebus apella*	3.2	[illegible] ± 0.13	16.3 ± 2.8	14.3 ± 3.7	25		-0.88	0.39	0	Tropical Forest	South America
Capuchin, Wedge-capped	*Cebus olivaceus*	4.5	-0.15 ± 0.3	0 ± 3.3	20 ± 0.9	5	1.00		0.75	0	Tropical Forest	South America
Capuchin, White-fronted	*Cebus albifrons*	4.2	-0.17 ± 0.14	3.5 ± 0.4	2.8 ± 2.9	14		0.32	0.23	0	Tropical Forest	South America
Capybara	*Hydrochaeris hydrochaeris*	34.9	-0.07 ± 0.16	0 ± 7.6	1.7 ± 0.8	4	1.00		0.84	0	Tropical Forest	South America
Caribou	*Rangifer tarandus*	150	-0.17 ± 0.59	39.6 ± 30.5	21.5 ± 3.1	3	1.00		0.81	1	Tundra	North America
Cat, Leopard	*Felis bengalensis*	4.7	0.1 ± 0.33	0 ± 0.4	3.4 ± 0.1	4	1.0		0.79	1	Tropical	Asia

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Chachalaca, Little	*Ortalis motmot*	0.5	-0.53 ± 0.35	0 ± 5.8	1.1 ± 0.8	4	0.63		0.34	0	Tropical Forest	South America
Chachalaca, Plain	*Ortalis vetula*	0.4	-0.3 ± 0.25	0 ± 8.1	11.9 ± 0.5	3	1.00		0.46	0	Tropical Forest	North America
Chevrotain, Lesser Malay	*Tragulus kanchil*	3.6	0.1 ± 0.21	0 ± 1	6.6 ± 8.8	8	1.00		0.69	0	Tropical Forest	Asia
Chevrotain, Water	*Hyemoschus aquaticus*	10.9	0.13 ± 0.24	0 ± 0.7	3.4 ± 8.5	6	1.00		0.65	0	Tropical Forest	Africa
Chimpanzee	*Pan troglodytes*	38.7	-0.57 ± 0.34	0.8 ± 0.3	0.5 ± 5.7	4	0.63		0.19	2	Tropical Forest	Africa
Civet, African Palm	*Nandinia binotata*	2.8	0.38 ± 0.24	0 ± 0.16	1.7	5	1.00		0.22	0	Savannah	Africa
Civet, Banded Palm	*Hemigalus derbyanus*	1.9	-0.02 ± 0.35	4.3 ± 1.2	6.1 ± 2	4	1.00		0.95	0	Tropical Forest	Asia
Civet, Malay	*Viverra tangalunga*	11	-0.31 ± 0.2	13.8 ± 3.8	6.9 ± 0.7	3	0.25		0.25	0	Tropical Forest	Asia
Civet, Masked Palm	*Paguma larvata*	4.5	-0.13 ± 0.2	2.6 ± 0.4	7.5 ± 0.9	12		-0.65	0.53	0	Tropical Forest	Asia
Civet, Small Indian	*Viverricula indica*	3	0.94 ± 0.03	0 ± 1	42 ± 0.2	3	0.25		0.001	0	Tropical Forest	Africa
Coati, South American	*Nasua nasua*	3.3	-0.26 ± 0.11	0 ± 1.5	6.2 ± 1.1	20		-1.87	0.08	0	Tropical Forest	South America
Colobus, Black	*Colobus satanas*	13	-0.11 ± 0.14	4.7 ± 1	4.6 ± 0.7	5	1.00		0.47	1	Tropical Forest	Africa

Colobus, Guereza	*Colobus guereza*	16.5	-0.39± 0.53	0 ± 2.7	1.4 ± 1.9	3	1.00		0.59	1	Tropical Forest	Africa
Colobus, Pennant's	*Procolabus pennantii*	7.9	-0.37 ± 0.24	0 ± 4.9	11.1 ± 2.9	6	0.69		0.21	1	Tropical Forest	Africa
Curassow, Black	*Crax alector*	3.3	-0.14 ± 0.27	0 ± 1	7.2 ± 9.6	6	1.00		0.65	0	Tropical Forest	South America
Curassow, Great	*Crax rubra*	3.2	0.27 ± 0.28	0 ± 1.1	5.9 ± 16.1	3	1.00		0.53	0	Tropical Forest	North America
Curassow, Nocturnal	*Nothocrax urumutum*	2.2	-0.63 ± 0.25	0 ± 0.21	0.7 ± 5.8	5	0.22		0.08	0	Tropical Forest	South America
Curassow, Razor-billed	*Mitu tuberosa*	2.9	0.28 ± 0.17	0 ± 1.4	5 ± 4.4	5	1.00		0.23	0	Tropical Forest	South America
Cuscus, Bear	*Ailurops ursinus*	3.5	0.56 ± 0.21	6.1 ± 2.3	22.5 ± 1.7	3	0.25		0.15	0	Tropical Forest	Asia
Cuscus, North-east	*Phalanger gymnotis*	3.1	-0.38 ± 0.51	10.7 ± 0.2	15 ± 3.5	3	1.00		0.63	0	Tropical Forest	Oceania
Deer, Barking	*Muntiacus muntjak*	15.75	-0.36 ± 0.17	13.6 ± 4.2	13.4 ± 1.7	12		-1.86	0.06	1	Tropical Forest	Asia
Deer, Grey Brocket	*Mazama gouazoubira*	17.22	0.14 ± 0.13	0 ± 3.1	4.6	23		0.96	0.35	1	Tropical Forest	South America
Deer, Red Brocket	*Mazama americana*	28.09	-0.03 ± 0.11	6.8 ± 1.5	9.5 ± 0.5	39		-0.24	0.81	1	Tropical Forest	South America
Deer, Sambar	*Cervus unicolor*	134	-0.18 ± 0.23	0 ± 2.1	6.1 ± 0.1	5		-0.73	0.51	1	Tropical Forest	Asia
Deer, White-	*Odocoileus*	46	0.06	0 ±	3.6 ±	6	1.		0.8	1	Tropic	North

tailed	*virginianus*	.6 1	± 0.28	1.3	4.4		0 0		4		al Forest	Ameri ca
Dik-dik, Kirk's	*Madoqua kirkii*	5. 6	-0.23 ± 0.24	0 ± 0.02	2 ± 0.6	3	1. 0 0		0.6 2	0	Savan nah	Africa
Dog	*Canis familiaris*	20	-1 ± 0	0 ± 1.5	0 ± 0.2	3	0. 2 5		<0 .00 1	1	Tropic al Forest	Africa
Dove, Emerald	*Chalcophaps indica*	0. 12 5	-0.89 ± 0.11	1.9 ± 0.3	0.8 ± 0.3	4	0. 1 3		0.0 04	0	Tropic al Forest	Asia
Drill	*Mandrillus leucophaeus*	13 .2 3	0.23 ± 0.19	0 ± 0.3	3.7 ± 2	5	1. 0 0		0.3 7	2	Tropic al Forest	Africa
Duiker, Bay	*Cephalophus dorsalis*	17 .6 3	0.09 ± 0.13	4.4 ± 1.6	5.5	1 3		- 3. 77	0.4 7	1	Tropic al Forest	Africa
Duiker, Black-fronted	*Cephalophus nigrifrons*	13 .6 8	-0.45 ± 0.17	0 ± 0.3	0.8 ± 1.6	8	0. 2 9		0.0 4	1	Tropic al Forest	Africa
Duiker, Blue	*Cephalophus monticola*	6. 11	-0.01 ± 0.12	15.9 ± 3.4	16.6 ± 1.5	2 2		- 0. 16	0.8 8	1	Tropic al Forest	Africa
Duiker, Ogilby's	*Cephalophus ogilbyi*	18 .5	0.44 ± 0.20	2.7 ± 0.8	13.8 ± 0.1	4	0. 6 3		0.1 2	1	Tropic al Forest	Africa
Duiker, Peter's	*Cephalophus callipygus*	17 .3 6	0.39 ± 0.12	0 ± 3.1	13.9 ± 0.5	9	0. 0 4		0.0 1	1	Tropic al Forest	Africa
Duiker, Red	*Cephalophus natalensis*	12 .3 9	0.07 ± 0.17	0 ± 2	9.7 ± 0.2	1 4		4. 58	0.7 5	1	Savan nah	Africa
Duiker, White-bellied	*Cephalophus leucogaster*	16 .3 9	-0.39 ± 0.16	0 ± 0.5	1.8 ± 1.8	9	0. 1 8		0.0 5	1	Tropic al Forest	Africa
Duiker, Yellow-backed	*Cephalophus sylvicultor*	63 .6	-0.20 ±	1.1 ± 0.4	0.8 ± 0.2	1 3		0. 74	0.3 6	1	Tropic al	Africa

		5	0.21								Forest	
Eland, Common	*Taurotragus oryx*	535.26	0.26 ± 0.1	0 ± 0.7	3.2 ± 2.5	12		-5.93	0.04	2	Savannah	Africa
Elephant, African	*Loxodonta africana*	2495.3	-0.89 ± 0.03	0 ± 3.1	2.1 ± 1	12		-0.21	<0.001	2	Savannah	Africa
Fanaloka, Spotted	*Fossa fossana*	1.6	-0.55 ± 0.32	0 ± 12.8	3.4 ± 2	3	1.00		0.27	0	Tropical Forest	Africa
Flowerpecker, Scarlet-backed	*Dicaeum cruentatum*	0.01	-0.18 ± 0.47	8.1 ± 4.6	9.5	3	1.00		0.73	0	Tropical Forest	Asia
Fossa	*Cryptoprocta ferox*	7.7	0.13 ± 0.28	17.5 ± 8.9	13.1 ± 1.1	5	1.00		0.67	1	Tropical Forest	Africa
Gazelle, Grant's	*Gazella granti*	40	0.17 ± 0.05	0 ± 1	5 ± 1.2	4	0.63		0.13	1	Savannah	Africa
Gazelle, Thomson's	*Gazella thomsoni*	15	-0.05 ± 0.2[illegible]	0 ± 2	18.5 ± 3.8	4	0.63		0.89	1	Savannah	Africa
Genet	*Genetta servalina*	1.65	0.22 ± 0.02	0 ± 0.08	0.4 ± 1	3	0.25		0.03	1	Tropical Forest	Africa
Giraffe	*Giraffa camelopardalis*	906.1	-0.12 ± 0.25	3.7 ± 1.7	3.8 ± 14.2	7	1.00		0.63	2	Savannah	Africa
Goose, Canada	*Branta canadensis*	4.7	0.63 ± 0.16	14 ± 9	34.1 ± 0.3	3	0.25		0.06	0	Tundra	North America
Gorilla, Western	*Gorilla gorilla*	78.1	-0.72 ± 0.22	0.6 ± 0.4	0.04 ± 1.2	5	0.38		0.03	2	Tropical Forest	Africa
Guan, Marail	*Penelope marail*	1.7	-0.68 ± 0.1	0 ± 1.9	2.8 ± 1.8	7	0.13		0.002	0	Tropical Forest	South America

Guan, Spix's	*Penelope jacquacu*	0.8	-0.32 ± 0.23	8.7 ± 3.1	7.5 ± 1.6	8	0.73		0.21	0	Tropical Forest	South America
Guenon, Crested Mona	*Cercopithecus pogonias*	2	-0.72 ±0.09	-0.08 ±0.02	-0.02 ±0.01	8	0.01		<0.001	1	Tropical Forest	Africa
Guenon, Mona	*Cercopithecus mona*	5.7	-0.08 ± 0.2	10.2 ± 4	13.3 ± 4.1	6	0.69		0.73	1	Tropical Forest	Africa
Guenon, Moustached	*Cercopithecus cephus*	5.1	-0.59 ± 0.19	14.9 ± 5	4.5 ± 2.7	5	0.06		0.0[illegible]	1	Tropical Forest	Africa
Guenon, Preuss'	*Cercopithecus preussi*	8.6	-0.26 ± 0.11	1.5 ± 0.5	1.1 ± 1.8	4		2.34	0.11	1	Tropical Forest	Africa
Guenon, Red-eared	*Cercopithecus erythrotis*	3.8	-0.16 ± 0.14	13 ± 4.8	10 ± [illegible].3	7	0.45		0.29	1	Tropical Forest	Africa
Guenon, White-nosed	*Cercopithecus nictitans*	7.8	-0.29 ± [illegible]	[illegible].8 ± 5.2	14.5 ± 2.3	11		1.44	0.10	1	Tropical Forest	Africa
Hartebeest, Red	*Alcelaphus buselaphus*	94.5	-0.[illegible] ± 0.16	9.2 ± 4.5	4.7 ± 0.5	12		2.30	0.84	1	Savannah	Africa
Hippopotamus	*Hippopotamus amphibius*	1050	-0.07± 0.12	0 ± 1	2.3± 0.7	8	0.73		0.65	2	Savannah	Africa
Hog, Red River	*Potamochoerus porcus*	60.7	0.3 ± 0.12	0 ± 0.4	2.3 ± 1.9	14		1.84	0.09	1	Savannah	Africa
Hornbill, Red-knobbed	*Aceros cassidix*	3.1	-0.64 ± 0.36	15.9 ± 11.1	6.3 ± 0.9	3	1.00		0.21	0	Tropical Forest	Asia
Impala	*Aepyceros melampus*	39.7	-0.002 ± 0.12	0 ± 3.9	14.1 ± 5.5	14		-1.90	0.99	1	Savannah	Africa
Jaguar	*Panthera*	57	-0.02	0 ± 1	0.95	8	1.		0.9	2	Tropic	South

	onca	.1	± 0.26		± 1		00		5		al Forest	America
Kinkajou	*Potos flavus*	2.5	-0.46 ± 0.17	0 ± 0.7	1.3 ± 6.2	11		-1.83	0.04	0	Tropical Forest	South America
Klipspringer	*Oreotragus oreotragus*	12	0.43 ± 0.16	0 ± 0.01	1.3 ± 1.7	3	0.25		0.26	1	Savannah	Africa
Kudu, Greater	*Tragelaphus strepsiceros*	150.4	0.39 ± 0.15	0 ± 0.7	5.3 ± 0.8	13		5.[illegible]3	0.03	2	Savannah	Africa
Kudu, Lesser	*Tragelaphus imberbis*	70	-0.19 ± 0.33	0 ± 0.1	2.15 ± 0.5	5	1.00		0.67	1	Savannah	Africa
Macaque, Crested Black	*Macaca nigra*	4.1	-0.24 ± 0.41	65.2 ± 10.9	51	3	1.00		0.62	1	Tropical Forest	Asia
Macaque, Long-tailed	*Macaca fascicularis*	2	-0.59 ± 0.4[illegible]	[illegible] ± 1.2	10 ± 0.2	3	1.00		0.28	0	Tropical Forest	Asia
Macaque, Pig-tailed	*Macaca nemestrina*	13.6	[illegible]0.4 ± 0.[illegible]	7.1 ± 2.2	6.2 ± 2.2	7	0.13		0.12	1	Tropical Forest	Asia
Mangabey, Grey-Cheeked	*Cercopithecus albigena*	3.[illegible]	-0.43 ± 0.34	5.8 ± 2.6	2.3 ± 2.9	3	1.00		0.33	1	Tropical Forest	Africa
Mongoose, Long-nosed	*Herpestes naso*	3.6	-0.26 ± 0.23	0 ± 0.3	2.1 ± 3.2	3	1.00		0.51	0	Tropical Forest	Africa
Monkey, Banded Leaf	*Presbytis melalophos cruciger*	6.4	0.13 ± 0.15	10.6 ± 4.6	12.5 ± 0.5	3	1.00		0.46	1	Tropical Forest	Asia
Monkey, Black Spider	*Ateles paniscus*	8.2	0.17 ± 0.28	0 ± 1.25	9.8 ± 0.5	9	0.51		0.61	1	Tropical Forest	South America
Monkey, Common	*Lagothrix lagotricha*	9.3	0.1 ± 0.14	0 ± 2.2	9.3 ± 1.8	12		-24	0.05	1	Tropical	South Ameri

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Monkey, Dusky Titi	*Callicebus moloch*	1.1	-0.39 ± 0.2	3.7 ± 0.9	2.4 ± 0.8	6		-0.04	0.97	0	Tropical Forest	South America
Monkey, Guyanan Red Howler	*Alouatta macconnelli*	6.8	-0.01 ± 0.27	0 ± 1.3	8.7 ± 12.9	13		-0.95	0.97	1	Tropical Forest	South America
Monkey, Red-faced Spider	*Ateles paniscus*	1	-0.08 ± 0.27	6.3 ± 1.7	5.4 ± 1.9	10		-2.73	0.02	0	Tropical Forest	South America
Monkey, Spix's Night	*Aotus vociferans*	0.9	-0.5 ± 0.17	0 ± 1.4	2 ± 0.4	7	0.13		0.22	0	Tropical Forest	South America
Monkey, Squirrel	*Saimiri sciureus*	0.8	-0.55 ± 0.24	0 ± 3.9	1.9 ± 3.7	22		-0.16	0.88	0	Tropical Forest	South America
Monkey, Venezuelan Red Howler	*Alouatta seniculus*	6.5	-0.02 ± 0.12	0.6 ± 1.6	6.5 ± 0.8	4	0.63		0.54	1	Tropical Forest	South America
Monkey, White-bellied spider	*Ateles belzebuth*	8.3	-0.23 ± 0.33	0 ± 2	9.2 ± 1	5	0.38		0.15	1	Tropical Forest	South America
Monkey, White-fronted Leaf	*Presbytis frontata*	7.4	-0.51 ± 0.29	7.2 ± 2.1	10.7 ± 0.3	5	1.00		0.28	1	Tropical Forest	Asia
Ocelot	*Felis pardalis*	11.1	-0.41 ± 0.23	0 ± 0.3	0.5 ± 0.5	6	0.03		<0.001	1	Tropical Forest	South America
Opossum, Common	*Didelphis marsupialis*	1.3	-0.91 ± 0.06	0 ± 0.8	0.4 ± 0.3	3	0.25		<0.001	0	Tropical Forest	South America
Orangutan	*Pongo pygmaeus*	56	-1 ± 0	0.8 ± 0.01	0	3	0.25		0.09	2	Tropical Forest	Asia
Oribi	*Ourebia ourebi*	14	0.71 ±	0 ± 0.01	2.2 ± 1.2	3	1.0		0.99	1	Savannah	Africa

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Oxen, Musk	*Ovibos moschatus*	295	0.01 ± 0.45	15.2 ± 14.6	10.1 ± 0.7	25		0.58	0.57	2	Tundra	North America
Paca, Lowland	*Cuniculus paca*	7.1	0.07 ± 0.1	0 ± 2.2	11.5 ± 0.9	4	0.63		0.33	0	Tropical Forest	South America
Pangolin, African White-Bellied	*Manis tricuspis*	1.8	-0.32 ± 0.23	0 ± 0.5	1.6 ± 0.9	4	0.63		0.83	0	Tropical Forest	Africa
Pangolin, Sunda	*Manis javanica*	6.2	0.09 ± 0.29	0 ± 0.13	3.9 ± 0.4	49		3.85	<0.001	0	Tropical Forest	Asia
Peccary, Collared	*Pecari tajacu*	22.7	0.29 ± 0.07	0 ± 1.1	14.5 ± 0.6	20		3.20	0.005	1	Tropical Forest	South America
Peccary, White-lipped	*Tayassu pecari*	30.8	0.34 ± 0.1	0 ± 2.8	7.6 ± 0.8	8	0.73		0.82	1	Tropical Forest	South America
Pig, Bearded	*Sus barbatus*	115.8	-0.06 ± 0.25	12.7 ± 3.3	16.5 ± 5.9	4	0.63		0.16	1	Tropical Forest	Asia
Pig, Sulawesi	*Sus celebensis*	54	0.4 ± 0.2	12.9 ± 1.9	35.9 ± 0.7	3	1.00		0.90	1	Tropical Forest	Asia
Pig, Wild	*Sus scrofa*	54.7	-0.07 ± 0.32	0 ± 1.4	22.1 ± 1	11		-5.05	0.14	1	Tropical Forest	Asia
Porcupine, African Brush-tailed	*Atherurus africanus*	7.9	0.21 ± 0.09	0 ± 2.4	10.8 ± 0.1	3	1.00		0.96	0	Savannah	Africa
Porcupine, Long-tailed	*Trichys fasciculata*	2	0.03 ± 0.47	0 ± 10.7	6.2 ± 2	5	1.00		0.86	0	Tropical Forest	Asia
Porcupine, Thick-spined	*Hystrix crassispinis*	4	0.65 ± 0.05	0 ± 0.7	5.2 ± 6.8	3	0.25		0.01	0	Tropical Forest	Asia

Puma	*Felis concolor*	61.6	-0.72 ± 0.19	0 ± 0.1	0.3 ± 0.8	3	0.25		0.13	2	Tropical Forest	South America
Rabbit, Brazilian Forest	*Sylvilagus brasiliensis*	1	-0.07 ± 0.34	0 ± 0.3	0.5 ± 0.5	4	0.63		0.77	0	Tropical Forest	South America
Rat, Forest Giant Pouched	*Cricetomys emini*	2	-0.19 ± 0.16	0 ± 4.1	16.3 ± 3.5	7	1.00		0.45	0	Tropical Forest	Africa
Rat, Giant Pouched	*Cricetomys gambianus*	1.2	0.43 ± 0.21	8.8 ± 5.1	16.3	4	0.63		0.1[illegible]	0	Tropical Forest	Africa
Rat, Marsh cane	*Thryonomys swinderianus*	5.6	0.01 ± 0.36	2.6 ± 1.9	7.5 ± 0.5	6	1.00		0.99	0	Tropical Forest	Africa
Rat, Spiny	*Proechimys semispinosus*	0.5	-0.98 ± 0.02	10.9 ± 0.7	0.5	4	0.13		<0.001	0	Tropical Forest	South America
Reedbuck, Bohor	*Redunca redunca*	35.1	0.4 ± 0.2	0 ± 0.3	3.7 ± 0.6	13		2.18	0.05	1	Savannah	Africa
Saki, Bearded	*Chiropotes sagulatus*	2.9	[illegible]	0 ± 1.1	3.8 ± 0.1	3	0.25		0.13	0	Tropical Forest	South America
Saki, Monk	*Pithecia monachus*	2.3	-0.62 ± 0.12	5.6 ± 2	1.3 ± 1.3	11		1.58	0.001	0	Tropical Forest	South America
Saki, White-faced	*Pithecia pithecia*	1.9	-0.82 ± 0.13	0 ± 1	2.5 ± 6.5	3	0.25		0.04	0	Tropical Forest	South America
Sitatunga	*Tragelaphus spekei*	71.5	-0.45 ± 0.21	0 ± 0.3	1.7 ± 0.8	7	0.45		0.14	1	Savannah	Africa
Sloth, Hoffman's Two-toed	*Choloepus hoffmanni*	5.9	-0.85 ± 0.09	12.3 ± 3.5	1.2 ± 0.3	3	0.25		0.01	0	Tropical Forest	South America
Sloth, Pale-throated	*Bradypus tridactylus*	4.2	-0.87 ±	0 ± 6.5	1.7 ± 12.5	6	0.0		<0.00	0	Tropical	South Ameri

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Squirrel, Indian giant	*Ratufa indica*	2.4	-0.54 ± 0.29	11.6 ± 3.4	13 ± 6.1	5	0.38		0.14	0	Tropical Forest	Asia
Squirrel, Red-legged Sun	*Heliosciurus rufobrachium*	0.3	-0.83 ± 0.14	0 ± 0.7	1.9 ± 1.5	4	0.13		0.01	0	Tropical Forest	Africa
Squirrel, South American Red	*Sciurus spadiceus*	0.3	-0.67 ± 0.15	0 ± 0.1	4.2 ± 13.5	6	0.22		0.02	0	Tropical Forest	South America
Steenbok	*Raphicerus campestris*	11	-0.58 ± 0.28	0 ± 0.04	1.5 ± 0.2	4	0.63		0.26	1	Savannah	Africa
Suni	*Neotragus moschatus*	5	-1	0 ± 0.02	0.5 ± 4.8	3	0.25		<0.001	1	Savannah	Africa
Tamandua, Southern	*Tamandua tetradactyla*	4.7	-0.05 ± 0.22	0 ± 0.3	1.3 ± 9.2	5	1.00		0.91	1	Tropical Forest	South America
Tamarin, Golden-Handed	*Saguinus midas*	0.5	-1	0 ± 3.3	0.3 ± 1.6	5	0.06		<0.001	0	Tropical Forest	South America
Tamarin, Saddle-back	*Saguinus fuscicollis*	0.4	-0.99 ± 0.01	14.8 ± 4.8	0.1 ± 0.3	4	0.13		<0.001	0	Tropical Forest	South America
Tapir, Baird's	*Tapirus bairdii*	254	-0.32± 0.37	4.6 ± 1.7	2.8 ± 0.4	5	1.00		0.44	2	Tropical Forest	South America
Tapir, Lowland	*Tapirus terrestris*	153.4	0.43 ± 0.11	0 ± 0.7	5.6 ± 0.8	25		3.61	0.001	2	Tropical Forest	South America
Tayra	*Eira barbara*	4.8	-0.44 ± 0.21	0 ± 1.1	0.3 ± 0.8	4	1.00		0.23	0	Tropical Forest	South America
Tinamou, Brazilian	*Crypturellus strigulosus*	0.6	-0.86 ± 0.11	0 ± 0.8	7.8 ± 1.6	6	0.03		0.001	0	Tropical Forest	South America

Tinamou, Great	*Tinamus major*	1	-0.63 ± 0.08	0 ± 0.86	2.7	12		-2.16	<0.001	0	Tropical Forest	South America
Tinamou, White-throated	*Tinamus guttatus*	0.6	-0.77 ± 0.14	2.8 ± 0.5	0.7 ± 0.9	5	0.06		0.01	0	Tropical Forest	South America
Topi	*Damaliscus korrigum*	83.1	0.12 ± 0.12	0 ± 1.8	5.9 ± 0.3	9	1.00		0.40	1	Savannah	Africa
Tortoise, Red-footed	*Chelonoidis carbonaria*	4.5	0.5 ± 0.17	0 ± 2.6	8.9 ± 0.3	4	0.63		0.15	0	Tropical Forest	South America
Toucan, Cuvier's	*Ramphastos cuvieri*	0.8	-0.26 ± 0.31	10.5 ± 0.5	13.4	5	1.00		0.45	0	Tropical Forest	South America
Tree-Kangaroo, Grizzled	*Dendrolagus inustus*	14.8	-0.22 ± 0.24	3.6 ± 1.9	1.8 ± 4.6	3	1.00		0.46	0	Tropical Forest	Oceania
Trumpeter, Dark-winged	*Psophia viridis*	1.1	-0.75 ± 0.1[illegible]	0 ± 2.9	1.3 ± 1.5	3	0.25		0.08	0	Tropical Forest	South America
Trumpeter, Grey-winged	*Psophia crepitans*	10	-0.[illegible] ± 0.08	0 ± 0.8	3.2 ± 1.9	9	0.00		<0.001	0	Tropical Forest	South America
Turkey, Ocellated	*Agriocharis ocellata*	3.4	0.09 ± 0.34	1.8 ± 1	2 ± 3.6	3	1.00		0.82	0	Tropical Forest	North America
Vontsira, Broad-striped	*Galidictis fasciata*	0.6	-0.75 ± 0.17	11.1 ± 2.9	3.9 ± 0.1	4	0.13		0.02	0	Tropical Forest	Africa
Vontsira, Ring-tailed	*Galidia elegans*	0.8	0.66 ± 0.09	7.9 ± 2.6	29.3 ± 0.4	4	0.13		0.004	0	Tropical Forest	Africa
Wallaby, White-Striped	*Dorcopsis hageni*	5.5	-0.41 ± 0.05	12.3 ± 1.7	5.6 ± 1.3	3	0.25		0.01	0	Tropical Forest	Oceania
Warthog, Cape	*Phacochoeru*	76	0.36	0 ±	6 ±	1		-	0.0	1	Savan	Africa

	s aethiopicus	.8	± 0.16	0.9	1.7	1	2.36	5		nah	
Warthog, Common	*Phacochoerus africanus*	61.3	0.52 ± 0.1	4 ± 1.2	11.1 ± 1.4	5	0.06	0.01	1	Savannah	Africa
Waterbuck	*Kobus ellipsiprymnus*	227	0.44 ± 0.1	0 ± 0.4	4 ± 1.7	14	-2.50	0.001	2	Savannah	Africa
Wildebeest, Blue	*Connachaetes taurinus*	231.9	-0.34± 0.13	0 ± 8	7.6 ± 1.1	7	0.45	0.11	2	Savannah	Africa
Zebra, Plains	*Equus quagga*	264.2	-0.25 ± 0.06	0 ± 1.7	7.4± 0.9	13	-0.03	0.003	2	Savannah	Africa

Table 3. Top 10 model selection results of factors driving human prey preferences and variable importance (sum of the weights, w). AICc refers to Akaike's Information Criterion corrected for small sample size, and Weight refers to the relative likelihood of the model.

	Intercept	**Terrestrial/ Arboreal**	**Threat**	**Continent**	**Biome**	**Kill Method**	**d.f.**	**logLik**	**AICc**	**Δ**	**Weight**
25	-0.45624	+	+	NA	NA	NA	5	-84.964	180.291	0	0.383
27	-0.52332	+	+	+	NA	NA	9	-80.745	180.608	0.317	0.327
26	-0.34927	+	+	NA	+	NA	7	-83.762	182.211	1.92	0.147
28	-0.42611	+	+	+	+	NA	11	-79.527	182.715	2.425	0.114
9	-0.3549	+	NA	NA	NA	NA	3	-90.82	187.793	7.502	0.009

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10	-0.21318	+	NA	NA	+	NA	5	-89.021	188.405	8.115	0.007
31	-0.58577	+	+	+	NA	+	18	-74.412	189.324	9.033	0.004
11	-0.3182	+	NA	+	NA	NA	7	-87.74	190.167	9.876	0.003
29	-0.52235	+	+	NA	NA	+	14	-79.[illegible]4	190.573	10.282	0.002
32	-0.51169	+	+	+	+	+	20	-72.709	191.018	10.728	0.002
w:		1	0.98	0.45	0.27	0.01					
N containing model		16	16	16	16	16					

Fig. 1. Location of 161 sites for which data were available for analysis in this study. A majority of these sites occurred along the tropical forest biome (a sample size of 151 species). Savannah and boreal forest sites accounted for 36 and 4 species used in the analysis, respectively. Colours in the figure represent biome differences according to the WWF.

Figure 2. a) Scatterplot of Jacobs' prey selectivity index against $\log_{10}$ prey body mass with Lowess smoothed curve. Prey body mass importance weight was 0.94 from the Akaike's Informative Criterion. We derived 0.39 as the logarithmic mass value from the segmented model, whose breakpoint was 40.98. This value corresponds to a prey preference mass of 2.5 kg and larger. Any species lower than this threshold body mass are generally avoided. b) Prey preference relationship with prey body size, excluding the three largest terrestrial herbivores — giraffe, hippopotamus, and African elephant. The right skewed positioning of the line is comparable to large carnivores such as lions, indicating that human hunter-gatherers are apex predators. Linear regression equation and R^2-value are shown in bold letters.

Figure 3. Segmented models exhibiting the species mass rank (lowest to highest weighed species hunted) against the cumulative Jacobs' Index (D). Breakpoints are in each regression line to show where the

preferred prey mass starts. a) The global preference line is at 2.5 kg or about the mass of a kinkajou. b) African preferred prey are species above 11 kg (steenbok). c) Asian preferred prey items are above 6.1 kg (Sunda pangolin). d) South American prey items above 2.9 kg were preferred (bearded saki monkey).

Figure 4. These graphs represent the most important variables against preference (D). a) Variance in preference of arboreal and terrestrial species. This variable (T.A) was weighted 1.00 important in decision-making for preferred prey. There are reasons such as larger prey size, hunter locomotor skills, and more visibility for terrestrial species to account for being the more preferred category. b) The species threat level to hunters (Threat) was weighted 0.98 importance factor for influencing Jacobs' Index (D).