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Monkeying around Anthropocene: Patterns of human-nonhuman primates' interactions in Brazil

Vitória Fernandes Nunes[1*]; Priscila Macedo Lopes[2] and Renata Gonçalves Ferreira[3]

ABSTRACT

In Anthropocene, approximately 70% of all terrestrial ecosystems are highly modified by human activities and more than a half of all primate's species in the world are endangered. Here we present results of a systematic review on published articles with an Ethnoprimatology approach, aiming to assess the nationwide pattern and quality of proximity/interaction between human-nonhuman primates in Brazil, a country vulnerable to high deforestation rates while having the highest primate biodiversity in the world. The first article was published 29 years ago and add up to only 36 published articles until present time. Most studies were conducted in Atlantic forest, but higher number and diversity of interactions was described for Amazon. Sapajus, being a generalist and semi-terrestrial primate, was the most cited genus and had the greatest diversity of interactions, including garbage foraging and crop-raiding. Alouatta, the second most cite one, had more symbolic/mystic relationships. Some specialized or forest-specific primates are scarcely mentioned. Studies carried out in both rural and urban environment are almost equal in number but showed differences in types of interactions they describe: garbage foraging, crop-raiding by primates and food offering by humans happening in more urbanized areas and symbolic/mystic relationships and beliefs around nonhuman primates described in rural/indigenous settlements. We urge future studies to describe interactions and proximity carefully specifying the context where they occur. It is relevant to maintain the growing curve of Ethnoprimatological studies in Brazil as a way to aggregate information about different populations of species and help to base conservation strategies of co-existence.

Keywords: Ethnoprimatology; Human-Nonhuman Primate; Conservation.

1 Pós-Graduação em Meio Ambiente e Desenvolvimento – PRODEMA, Universidade Federal do Rio Grande do Norte, Natal, Rio Grande Do Norte, Brazil

2 Laboratório de Ecologia Humana, Departamento de Ecologia, Universidade Federal do Rio Grande do Norte, Natal, Rio Grande Do Norte, Brazil

3 CoLab – Individual Differences and Social Strategies Lab. Departamento de Psicobiologia, Universidade Federal do Rio Grande do Norte, Natal, Rio Grande Do Norte, Brazil

* Corresponding author ✉. E-mail address: FN (vivinunes@msn.com), PML (pmaccord@gmail.com), RGF (rgferreira@ymail.com)

SIGNIFICANCE STATEMENT

In Anthropocene, loss of habitat tends to approximate human and nonhuman primates, originating and/or intensifying interactions. Our manuscript reviews all existent published articles (up until the date) with an Ethnoprimatology approach in Brazil, a country with the highest primate biodiversity in the world and highly vulnerable to deforestation. Besides compiling useful information for Neotropical primate's conservation, our review is significant because we analyze and interpret variables that might be modulating interactions (i.e., type of human settlement where they occur) and offer recommendations for future cross-study comparisons. We believe our discussion is plausible for opening doors for subsequent Ethnoprimatology articles in Brazil and in other places around the world.

INTRODUCTION

Approximately 70% of all terrestrial ecosystems are highly modified by human activities (Newbold et al. 2015), especially due the excessive consumption of natural resources stimulated both by human population growth and by the change in the pattern of recent consumption (Driscoll et al. 2018). In this new geological era called Anthropocene (Lewis and Maslin 1964), the loss of biodiversity is one of the main consequences of the global environmental crisis, and Earth is heading to a sixth mass extinction (Ceballos et al. 2015).

However, not all species are equally vulnerable to extinction. Species with larger brain and body, lower fecundity, larger home range, arboreal, with narrower diet breadth, and lower population size are more vulnerable (Young et al. 2016). The 504 species of the Primate order fit most of these characteristics. Thus, 60% of all primate species are endangered and most of them (over 75%) are currently in population decline (Estrada et al. 2017; IUCN 2020). Large-scale agriculture, hunting and pet trade are listed as the main causes that disrupts and extinguishes populations (Estrada et al. 2017).

Concurrently, at least 30% of primate's species survive making persistent use of anthropogenic environments as supplementary habitat (Galán-Acedo et al. 2019). Biological characteristics of species and/or human's level of tolerance to them are discussed as factors which either facilitates or constraints the survivorship of primates in human altered landscapes (Fuentes 2012; Riley 2013; Schneider 2018).

Species with high aesthetic, economic or cultural value while alive and that do not exhibit aggressive behaviors in response to people tend to be less vulnerable to the proximity with humans (Humle and Hill 2016). For example, a Nigerian population of Sclater Monkeys (*Cercophitecus sclateri*) grew 36% because it inhabits a forest fragment considered sacred by the local belief system (Baker et al. 2018). Furthermore, species who do not compete with human resources also tend to be more resilient due to less potential conflicts. Conservation efforts are known to be more difficult when human communities undergo hostile interrelation, such as raiding of crops by wild primates (Naughton-Treves et al. 1998; Fuentes 2012), with killing of individuals as a way of reducing potential crop raiders (Sillero-Zubiri and Switzer 2001).

Nonetheless, since human settlements highly vary (i.e., places with different levels of urbanization), interactions of or proximity to certain species of primates may be more or less likely to occur depending on different types of anthropic environments. For example, terrestrial or semi-terrestrial primate's species are more resilient and prone to "monkey around" human settlements such as open areas, for locomotion and foraging (Galán-Acedo et al. 2019). On the other hand, an interaction between humans and a forest-specialist primate is unlikely in treeless areas such as highly urbanized cities, due their movement limitation that precludes them to be there in the first place. Could the "where" be the main underlying/-modulating factor of human-primate relationships in Anthropocene?

Studies in Ethnoprimatology have been building a robust and accurate methodology for examining these questions (Malone et al. 2014; Palmer and Malone 2018; Bezanson and Mcnamara 2019; Mcdonald et al. 2020). Yet, even though useful to mobilize stakeholders and more effective conservation approaches for site-specific situations (Malone et al. 2014), only 1,1% of all primatological literature between 2010 and 2016 used the term anywhere in their text (Mckinney and Dore 2018).

In this article we firstly assess the state of Ethnoprimatology in Brazil (evolution and geographic distribution over the years). Besides having the largest primate biodiversity on the planet (Estrada et al. 2018), Brazil's large territory and six different biomes are increasingly vulnerable to deforestation and habitat loss (Rajão et al. 2020). Since these factors eventually induce proximity between humans and wild primates (Fuentes 2012), we also aimed to further explore the correlation between different types of human and nonhuman primates' interactions and the type of environment in which they occur. We believe using Brazil as a model, this provides an opportunity to elucidate usability and importance of Ethnoprimatology studies for conservation strategies.

MATERIAL AND METHODS

We employed the PRISMA guidelines and model (Moher et al. 2009) for reviewing process. Searches were carried out for articles to date (2020) using the keywords (in Portuguese and English), inside the texts: [("Primates" OR "ethnoprimatology" OR "monkeys") AND ("ethno*" OR "crop raiding" OR "hunting" OR "symbolic" OR "human-primate") AND ("brazil")] in the following databases: 1) Scientific Electronic Library online (SciELO, www.scielo.org/php/index.php), 2) Google academic (Google Scholar, https://scholar.google.com.br) 3) Portal of journals of the Coordination for the Improvement of Higher Education Personnel (Capes, www.periodicos.capes.gov.br), 4) Scopus (www.scopus.com) and 5) Web of Science (webofknowledge.com). Although we did not include the keywords "Human perception" or "Environment perception" of Primates, articles with this approach/methodology were eventually included if they cited any of the searched keywords throughout their text. In a second step, we went through all the pages of results reading the article's title. When it was not clear or had not enough information (e.g., Articles with "Amazon Primates" on its title but that could not necessarily involve Brazilian Amazon), we read their abstracts. Once our goal was a systematic survey on specifically published Ethnoprimatological research in Brazil, we excluded articles of ethnozoology or ethnography encompassing other taxa, studies focused only either on species occurrence or on population's behavioral ecology in fragments and unpublished studies, such as master's dissertations and theses. We selected studies published in scientific journals or presented in scientific meetings, specifically concerned with primates and their direct interaction with humans and/or urban settlements. We also performed convenience samples ("opportunistic sampling") incorporating studies of interest that had not appeared in the searches but by chance appeared as reference in other articles.

The selected manuscripts were carefully read. All the cited human-nonhuman primates' interaction were reckoned and considered, regardless if it was the study's main goal/result or a simple event quoted throughout the discussion. We organized the article's data per cited primate species and its conservation status, locality of the study, state, biome, type of settlement and the type interaction. Species' nomenclature was reviewed and altered according to the latest taxonomic updates (IUCN 2020). The conservation status was extracted also from the International Union for Conservation of Nature (IUCN 2020). Biome was defined according to the locality studied based on biogeographical maps.

We classified the type of settlement by considering small municipalities with less than 10,000 inhabitants (according to Brazilian Institute of Geography and Statistics Foundation, IBGE) and indigenous tribes far from large urban centers as 'Rural' and large urban centers, such as capitals, as 'Urban'. Articles that did not cite primates at species level were included only by genera (e.g., *Sapajus* ssp). We included articles that did not specify the state or location of the study as "Unspecified".

For the descriptive analysis, we divided the total of citations per genus (e.g., number for *Alouatta* citations in all articles) by the total of citations (e.g., *Alouatta* + *Cebus* + *Sapajus*... etc.). Next, we conducted a Chi-square analyses to test the relationship between types of interaction and a) primate genus, b) species conservation status, c) Brazilian states, d) biomes and e) type of settlements (rural vs. urban). Articles that presented an "unspecified" state, biome or species could only be included in "e)". In these analyses, we excluded the primates with a sample size less than 2% of total to avoid statistical bias. Finally, we performed a Principal Component Analysis ('prcomp' script on Program R 2015) to detect trends (latent co-variances among variables) based on the pattern of co-citation grouped by genus.

RESULTS

Data-base search

The results from all searched keywords on all databases gave us 54049 results ($n = 8$ from opportunistic sampling, see AddFile 1, Supplementary Material). This elevated number is due mainly Google Scholar platform algorithm, which finds keywords within texts, references and in an isolated way (e.g., when we searched "Hunting + Primates" we found articles on general Hunting also, not necessarily of primates) (Beel and Gipp 2009). After employing exclusion criteria, our review resulted in 36 articles.

Quantitative review

Of the 36 articles found, 18 were published in Brazilian journals, 17 in international journals and 1 (one) corresponded to a paper presented at a congress (AddFile 2, Additional File). The first Ethnoprimatological study in Brazil was published 29 years ago (Peres 1991) and there is a slow increase in the publications in the area over the years, with a peak of studies in 2017 (Figure 1). The *Sapajus* and *Alouatta* genus are the most cited, mentioned, respectively, in 46% and 38% among the 36 articles found (Figure 2). No article cited the Genus *Callibela*, *Callimico*, *Mico* or *Leontopithecus*.

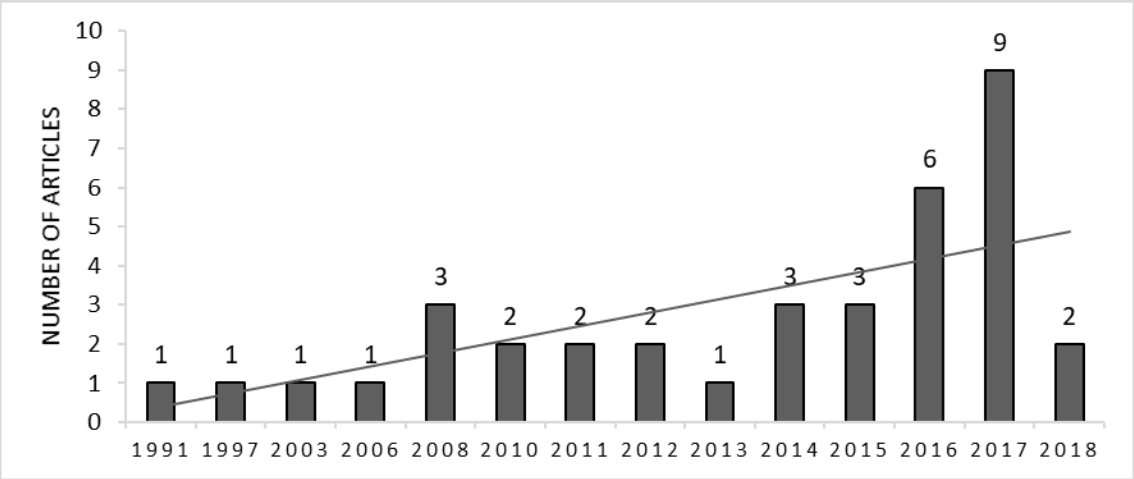

Figure 1. Total of Ethnoprimatological studies published in Brazil per year.

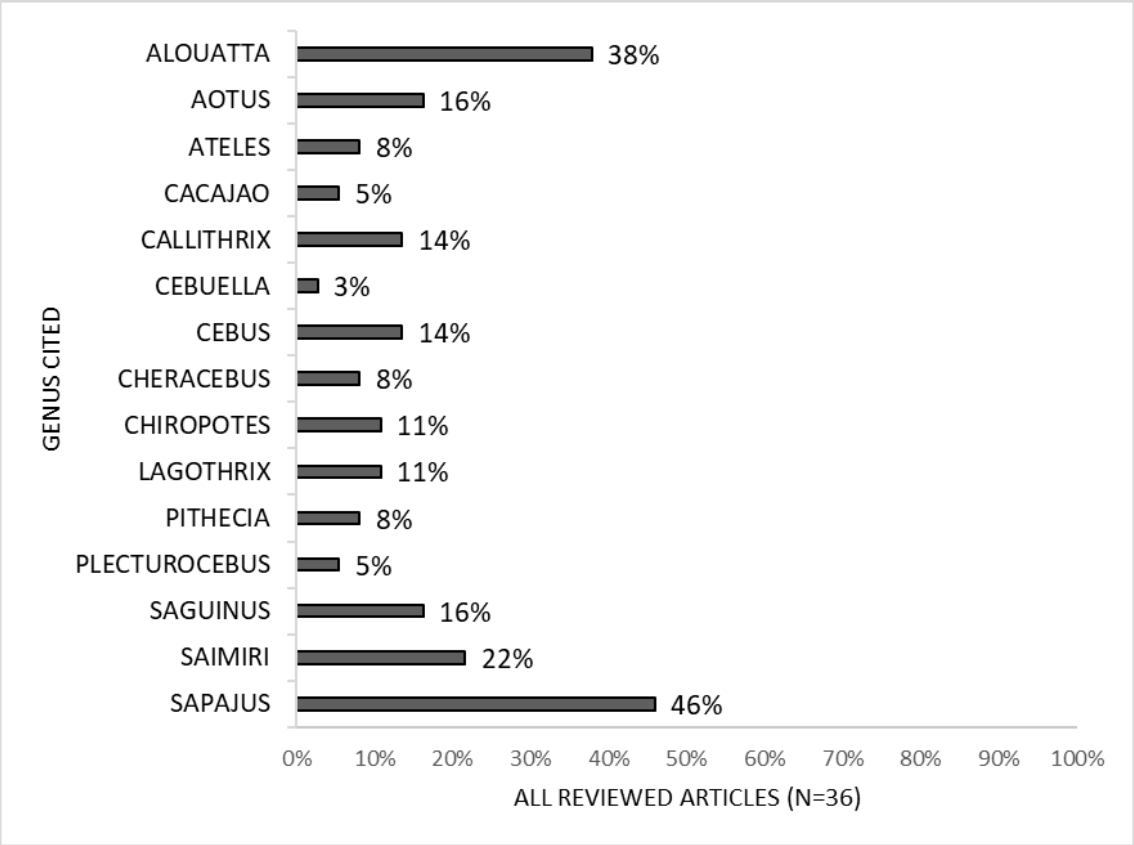

Figure 2. Relative citation of each primate genus in Ethnoprimatological articles carried out in Brazil.

The Atlantic Forest was the most studied biome ($n = 12$ articles). Only one article was found for Pampa and it involved specifically human perception of Primates and no direct interaction (Buss, Romanowski and Becker 2015). No study was found for Caatinga or Pantanal biomes. Three articles did not specify the location of human-nonhuman primate's interaction, only the state (Alves et al. 2012, 2016, 2017). Of all 27 Brazilian states, nine were identified as having none published Ethnoprimatological studies (See Add File 3 in Additional Files). Almost equal number of studies reported interactions in urban settlements (56%) and rural areas (44%).

The total of all different interactions between humans and Brazilian primates cited in the 36 articles was $n = 171$. A major portion ($n = 120$) was de-

scribed specifically for the Amazon Biome versus only 12 for Cerrado and 11 for the Atlantic Forest. It shall be highlighted that only two articles by the same author were responsible for 101 from those 120 cited interactions (Cormier 2003; Cormier and Cormier 2006) (See Add File 4 in Additional Files).

We distinguished 12 (twelve) different types/-categories of human-primate interactions (See Table 1): Crop-raiding, Garbage foraging, Eating avoidance/Taboo (i.e. avoidance of hunting and consumption of certain primate species for reasons such as superstitious beliefs), Tourism, Home invasion, Hunting, Medicinal use, Mystical/religious/symbolic/ritualistic use, Pet, Food offering (i.e. citation of humans offering food to animals directly), Poaching (i.e. hunting activities for fun, specifically described as having no alimentary, medicinal or symbolic function) and Poisoning. Examples of how we detected types/categories of human-nonhuman primate interactions can be seen below (Table 1).

The most frequent cited/studied interaction is Hunting ($n = 64$ from 171 interactions, 64.37% of citations), followed by Mystical/Symbolic/Religious relationship ($n = 33$ from 171 interactions, 33.19%) and Medicinal use ($n = 21$, 21.12% of all interactions) (See Add File 3 in Supplementary material). Although *Alouatta* and *Sapajus* are the two most studied genera, *Sapajus* had a greater variety of interactions ($n = 11$ from 12 possible interactions) than *Alouatta* (with only 7).

With the Chi-squared analysis (Add File 5 in Supplementary Material), we found no significant correlation between the different types of interaction and genus of the primates ($\chi^2 = 110.475$, $P = 0.202$). However, analyses of adjusted residuals point to a tendency of higher frequency of Food Offering towards *Callitrichids* (AdjR = 3,0) and higher number of citations of Crop Invasion by *Sapajus* (AdjR = 3,2). The genus of *Cacajao, Cheracebus, Pithecia* and *Plecturocebus* were excluded from the Chi-square and PCA analyzes because they are rarely mentioned (> 2%).

Chi-square analyses show significant association between Types of interactions of human-nonhuman primates and 1) the conservation status of species ($\chi^2 = 94.248$, $P = 0.001$), 2) Brazilian Biomes ($\chi^2 = 141.167$, $P = 0.0014$) and furthermore, the context where the interactions occur: 3) Types of Human Settlement ($\chi^2 = 192.674$, $P = 0.001$).

Near-threatened conservation status are significant correlated with interactions of Food Offering, Garbage Foraging, Crop Raiding and Poisoning. These interactions are also correlated with Brazilian biome Cerrado. For other Brazilian Biomes, hunting-type interactions correlated with Amazon, and Poaching and Home Invasion are associated with Atlantic Forest biome (See Add File 5 Additional Files).

Where Interactions Occur

Callithrix is significantly more frequently described in urban environments (chi-squared test, $\chi^2 = 589,419$, $P < 0.001$, See Add File 5 in Additional Files). Further significant Chi-squared test between Types of Human settlement and interactions ($\chi^2 = 192.674$, $P = 0.001$) reveal that Food offering, Crop raiding, Garbage foraging and Poaching are significant correlated with urban areas, while Hunting and Poisoning interactions were correlated with a Rural type of settlement (shown in Figure 3).

Patterns of Context-dependent Interactions

PCA analysis reveals the 12 types of interactions can be grouped into two main factors (Add File 6 in Additional Files). The first factor encompassing interactions of Hunting, Pet, Medicinal, Mystical, Taboo and Tourism and in the second one, interactions of Food Offering, Crop Invasion, Garbage Foraging, Poaching, Poisoning and Home Invasion. Despite being almost equally cited in reviewed articles, *Sapajus* and *Alouatta* are in different components: *Sapajus* closer to the second axis and *Alouatta* in the first one (shown in Figure 4). The other primate's genera are less cited thus less sparse, forming a cluster. Overall, *Aotus, Saguinus, Chiropotes* and *Cebus* are grouped in the first factor and *Callithrix, Lagothrix, Saimiri* and *Ateles* on the second one along with *Sapajus*.

DISCUSSION

In this systematic review, we show that Ethnoprimatology in Brazil, as in the rest of the world (Riley 2018), is still a recent area of research. Thirty years after the publication of the first scientific paper, the total still sums only 36 published manuscripts. Despite that, 12 different types of human-nonhuman primate interactions could be discerned, and studies mentioned 15 from all 17 Brazilian primate genera (Estrada et al. 2018). The most cited ones are *Sapajus* and *Alouatta*. The largest number of published studies were conducted in the Atlantic Forest Biome, but the largest number of human-primate interactions was described in Amazon, specifically involving indigenous communities and data collected by the same author (Cormier 2003; Cormier and Cormier 2006).

Studies carried out in both Rural and Urban environment are almost equal in number but showed differences in types of interactions they describe. Although morphologically varied, which would induce multiple different human perceptions and use of them (Humle and Hill 2016), Brazilian primates are grouped in basically only two axes of human-

Table 1. Identified human-nonhuman interactions in Brazil and examples on how they were presented/cited in some of the reviewed articles.

Types/Categories identified	Example
CROP RAIDING	*"We developed a simple method of quantifying the economic costs of crop feeding (CCF) by brown howlers..."* (Chaves et al, 2017); *"The presence of capuchin monkeys was reported in 21 properties, and they raid maize crops in 71% of them."* (Rocha and Fortes 2015)
GARBAGE FORAGING	*"..., he said that in addition to going down from the trees they also search the garbage. "These monkeys are mutts. They mess up in the trash and drop everything!", ..."* (Silveira and Silva 2017). *"...for the more visitors were at the swimming pool the more food was present in the garbage bins, ..."*tralizar (Sabbatini et al. 2016)
EATING AVOIDANCE/TABOO	*"Howler monkeys (Alouatta) had a taboo or avoidance in seven of twelve groups (58%) ..."* (Cormier and Cormier 2006)
TOURISM	*"Despite the density variations of A. juara and S. macrocephalus on intense use trails, possibly indicating habituation of the groups on Ecotourism..."* (Paim et al. 2012)
HOME INVASION	*"Some marmosets have entered people's kitchens, service areas or even living rooms."* (Rodrigues and Martinez 2014)
HUNTING	*"The Guariba (Alouatta juara) and Cairara (Cebus unicolor) were the most representative species in number of hunted individuals,..."* (Nunes et al. 2017) *"Table 1 provides a list of ethnographic references to monkey hunting in Amazonia."* (Cormier and Cormier 2006)
MEDICINAL USE	*"Table 1. Primates used as remedies in traditional folk medicine."* (Alves, Souto and Barboza 2017)
MYSTICAL	*"Table 8.3 Primates used in magic-religious rituals or practices."* (Alves et al 2012)
PET	*"...we were able to confirm the fact that some people may hunt or have primates as pets, specifically the common marmoset."* (Torres et al. 2016)
FOOD OFFERING	*"Only 2.44% of the public provided food for the marmosets and these items were always sweet artificial products ($N = 5$) such as ice cream, popcorn, biscuits and sweets."* (Leite et al. 2011)
POACHING	*"... in several interviews there was mention of persecution and hunting of capuchin monkeys ..."* (Rocha and Fortes 2015)
POISONING	*"... and only 1% ($N = 1$) of the citations were of methods harmful to the monkeys (poisoning)."* (Spagnoletti et al. 2017)

nonhuman interactions. According to our analysis: 1) *Sapajus, Callithrix, Lagothrix, Saimiri* and *Ateles* are related to interactions such as Poaching, Garbage Foraging and Food Offering, which tends to happen in more urbanized areas, and 2) *Alouatta, Saguinus, Aotus, Chiropotes* and *Cebus* are related to Taboo/Eating Avoidance, Medicinal Use and Mystic/Symbolic relationships, formerly occurring in rural areas and indigenous territory. This is an evidence that besides modulated by human's perception and biological characteristics of species (Fuentes 2012; Riley 2013; Schneider 2018), patterns of interactions between human-nonhuman primates might be context-dependent.

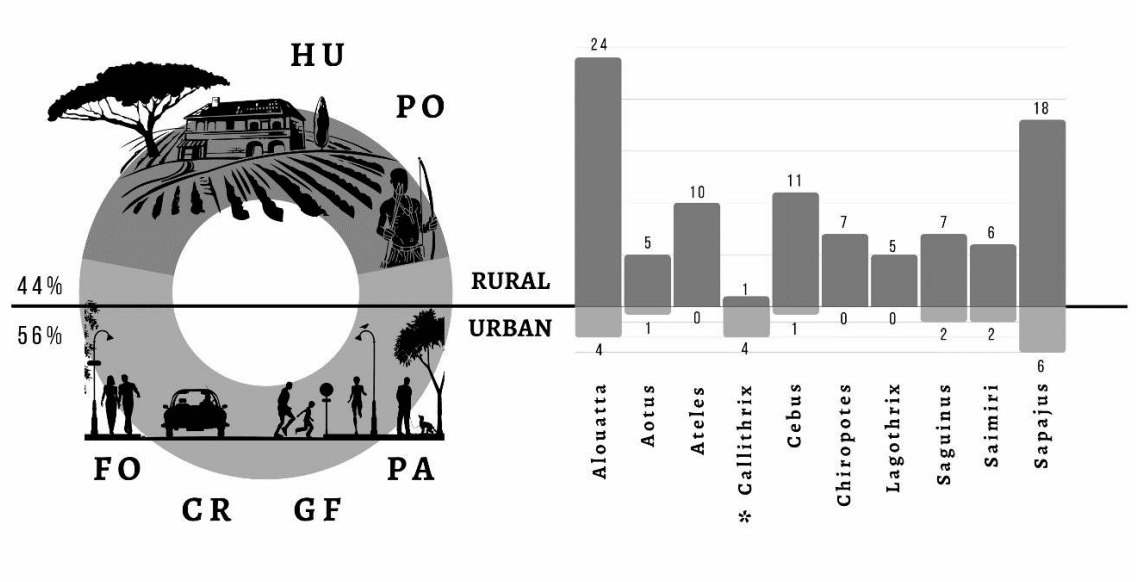

Figure 3. Illustration of found Chi-squared significant correlations: Between human settlements (Urban (56%) and Rural (44%), Genus of primates (*Alouatta, Aotus, Ateles, Callithrix, Cebus, Chiropotes, Lagothrix, Saguinus, Saimiri* and *Sapajus*) and six types of interactions. PO = Poisoning, FO = Food Offering, GF = Garbage Foraging, CR = Crop Raiding, HU = Hunting, PA = Poaching. **Callithrix* is significantly correlated with Urban settlement. Made on Canva website, based on Chi-squared results (Add File 5, Supplementary material).

For example, despite being the two most cited genus, interactions between *Sapajus, Alouatta* and humans take place in different contexts (rural x urban) and thus apparently differ on its aspects. *Alouatta* have more citations of interactions in a "symbolic" way such as Mystical beliefs and Taboo/Eating Avoidance. Those symbolic relationships seem to be particularly well-described for indigenous people (Cormier and Cormier 2006; Alves et al. 2012; Alves, Souto and Barboza 2016) and apparently absent in other human communities such as the ones in a more urbanized environment. Some of the reasons why hunting Howler monkeys for food is avoided/become a taboo are 1) Fear of Lethargy: a long due perception on their biological traits, such as being a slower animal in comparison to other species. Indigenous people avoid hunting/eating Howler monkeys because of the fear of acquiring their "laziness" (Urbani and Cormier 2014). 2) Taste: Howler monkeys' taste is not as good as other nonhuman primates' meat because they have a folivorous diet (Shepard 2002) and 3) Mystic/ritualistic reasons, such as considering howler monkeys as relatives, or fear of bad omen's (Urbani and Cormier 2014).

Those kinds of socialized norms and beliefs are known to often play a role in conservation by protecting species and natural places. In this context, current interactions of humans and Howler monkeys in Brazil at first doesn't seem to be a thread to species conservation. But the erosion of traditional beliefs and institutions have implications on this customary protection (Sasaki et al. 2010; Schneider 2018). A substantial part of the articles we found are describing human-nonhuman primate interactions in Cerrado and Amazon, worryingly, the two Brazilian biomes with higher number of deforested areas for soy and beef imports, where over 99% of it was done illegally (Annual Deforestation Report Mapbiomas 2019; da Cruz et al. 2020; Rajão et al. 2020). In indigenous reserves, higher deforestation rates can cause hunting of primates to go from sustainable to non-sustainable since it makes species either migrate towards the Indian Reserves (leading to a short-term rise in hunting game) or dwindle (Prado et al. 2012). In more urbanized areas, home range loss can cause species of primates to start invading farms/houses and/or raiding crops for subsistence (Fuentes 2012), and being viewed as pests have the most adverse effect on people's attitudes (Jones et al. 2008).

Genus such as *Sapajus* with generalist/opportunistic eating habits, more active and semi-terrestrial (Fragaszy et al. 2004) are known to be even more resilient to habitat disturbance than *Alouatta*, often having least-concern conservation status (Galán-Acedo et al. 2019). Nevertheless, this higher proximity means being exposed to other manifold threats, especially since they are not protected by any symbolic beliefs. We found *Sapajus* have the greatest diversity of interactions with humans of all other genera, including those in more urbanized settlements

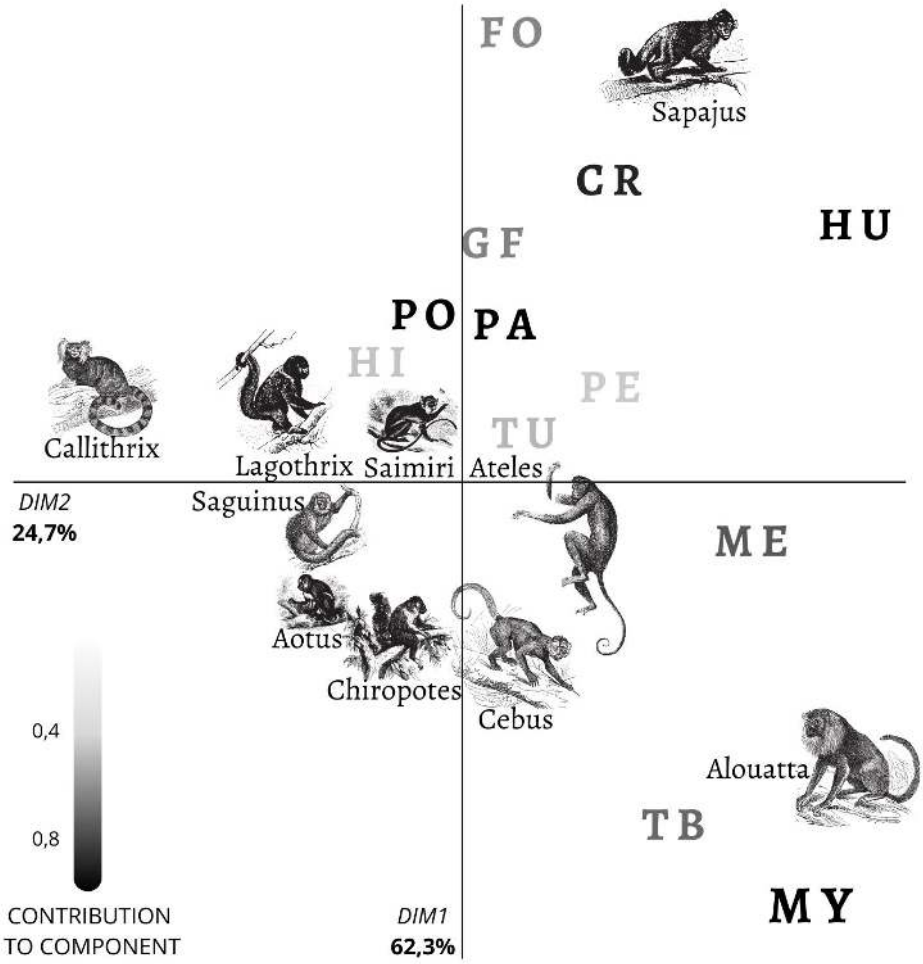

Figure 4. Biplot for Principal Component Analysis of the relationship between primate genus and types of interactions. PO = Poisoning, FO = Food Offering, GF = Garbage Foraging, CR = Crop Raiding, HU = Hunting, HI = Home Invasion, PA = Poaching, TU = Tourism, PE = Pet, ME = Medicinal, TB = Taboo, MY = Mystical/Symbolic. Made on Canva website, based on output from PCA Biplot on R Statistic (Add File 7, Additional Files).

(e.g., Garbage Foraging and Crop Invasion). Meaning they more often approach, survive and resist in human habitats making use of such environments as a possible and convenient source of food and a supplementary habitat (McKinney 2014) thus exposed to a wider range of possible interactions, including the ones that are negative.

Although not considered pests in Piauí, and poisoning events rarely mentioned (Spagnoletti et al. 2017), persecution, hunting and illegal pet trade of Capuchins were cited in several interviews in a study with communities around a Hydroelectric Power Plant on the Atlantic forest's portion of Rio Grande do Sul (Rocha and Fortes 2015). That shows even though people often tolerate proximity to capuchin monkeys, it may eventually involve some type of retaliation and it has been shown that fatal interactions can lead to the extermination of the local population and affect the species' conservation status (Hockings and Mclennan 2016).

In terms of retaliation, small-sized primates with non-threatening behavior/appearance have a higher likelihood of being viewed in a positive way by people (Humle and Hill 2016). For Brazilian primates, species of *Callithrix* genus appeared significantly more in Urban than Rural located studies and even though cited for Home invasion, it had no registered direct negative interactions with people (e.g., hunting). In contrast, the interactions involved Food offering and Pet keeping. Therefore, urban accidents of marmosets being run over by cars and attacked by domestic animals are pointed out (Rodrigues and Martinez 2014) and they are also the most found primate in Rescue and Rehabilitation Centers in Brazil, victims of illegal

pet trade (Levacov et al. 2007).

It can be concluded that human-nonhuman primate proximity does not always have to involve "antipathy" to be problematic, especially if in urbanized areas. In other words, biological characteristics of species and human's perception of them does influence/modulate their survival in Anthropocene during land-transformation and habitat loss, but environment's context represents the final stroke of population survival. Although urbanized fragments can provide enough food and resources for some primate populations, allowing them to persist in human-modified habitats (Corrêa et al. 2018; Galán-acedo et al. 2019), erosion of traditional beliefs and lack of general education are pitfalls. In times of yellow fever outbreak in Brazil, for example, a large number of howler monkeys on city fragments in Rio Grande do Sul state were persecuted, poisoned and killed for the mistaken fear of direct disease transmission (Bicca-Marques and Freitas 2010; Freitas 2011).

In this context, Ethnoprimatology has been a useful instrument to monitor communities' perceptions and proximity's context with primates (Voltolini et al. 2018), showing that Environment Education strategies are a very fundamental element in order to achieve conservation goals. A more detailed focus on whether the interactions varies in different contexts may offer important insights to management decisions. Alliances between conservation biologists, government agencies, informal institutions and holders of traditional beliefs and practices such as indigenous people must be considered important and acknowledged fairly.

For instance, a program to cover capuchin monkey's protection would need to consider introducing educational plans for rural populations on more advantageous methods to deter or control crop raiding or garbage foraging by wild populations, even if isn't generating direct conflict in some type of way. Changes in rainfall/seasons with further climate change might increase frequency and intensity of raiding of crops and other urban invasions (Lee and Priston 2005). Likewise, either reinstalling or sharing local symbolic beliefs with general population might be of value for Howler monkeys' conservation programs and *Callithrix* would benefit from campaigns against urban food offering and illegal pet trade.

Due low sampling and less information, it is unreliable addressing any directions for other primate genera. Although, it is important to note that a proximity to human communities implies a certain degree of habitat modification, and some specialized species are highly dependent on their habitat. The fact that some other primates such as *Cacajao* and *Plecturocebus* were less mentioned in articles might be related to behavioral specialization and endemism (Soini 1982; Barnett et al. 2013). Since there is no evidence of anthropic land use for at least 70% of the primates on Earth (Galán-Acedo et al. 2019) and consequently human-proximity the other Brazilian primate genus absent on our review (*Callibela, Callimico, Mico* and *Leontopithecus*) might fall under this case. But the fact that some of the reviewed articles cited hunting activities of *Pithecia vanzolinii* (Nunes et al. 2017), which has conservation status as "Data Deficient" (IUCN 2020) shows that while researchers may often lack information of species living in very remote areas and small populations, human communities sharing close territory with these species can be a convenient source of information. The use of indirect evidence (i.e. local's Traditional Ecological Knowledge) has proved to be a useful integrative research tool in primatology, especially when discovering a new species or the survival of one declared extinct (Rossi et al. 2018).

In view of increasing relaxation in environmental protection laws in Brazil and the consequent irregularity in general deforestation (Estrada et al. 2018; Artaxo 2019) critical assessment and incorporation of new approaches to biodiversity conservation is essential and somewhat an emergency (Bezanson and Mcnamara 2018; Estrada et al. 2018). Thus, disregarding the use of anthropic environments by primate species as well as species relationship and proximity with local human communities, when developing new strategies and projects of conservation, may handicap conservation strategies (Lee 2010) while also representing risks of emergence of new infectious diseases (Buss, Romanowski and Becker 2015; Garcia 2017; Roe et al. 2020).

However, cross-study comparisons must be done with care. For example, in this review we aimed to distinguish Poaching (i.e., for fun) from general Hunting (i.e., for food) whenever we could assess this information on studies, but few of them were specific. Such as, some mentioned "Medicinal use" of primates, what evidently implies "Hunting" in the first place. This may have caused a bias, especially on qualitative analysis. We suggest future studies to detail and distinguish occurrences carefully. If it is for food, for fun, for medicinal use, for religious ceremonies, for retaliation/protection purposes (e.g., crop raiding or home invasion), for pet trade and/or wildlife trafficking etc. In addition, when describing Symbolic/Mystic relationships, specify whether it involves direct or indirect use or perception of species. For example, if primates are protected by being considered sacred or if their body parts are used in rituals, which would also imply hunting. That would shed further light on contexts of human and nonhuman primate's different relationships, such whether conflict comes from a human's subsistence matter or only intolerance.

We also strongly advise future research to detail location of study at closer coordinates as possible, to facilitate future use and implementation of this information on national-wide conservation strategies. And perhaps serving on further analyses on types of interactions and biomes' fragmentation, urbanization level of human's settlement and overall context where they occur.

Very importantly, indigenous communities should be considered as a distinct group, as their use of and relationship with primates differ historical and traditionally from other human communities (Cormier and Cormier 2006). For example, the Guajá people hunt primates for food and take the young offspring as "pet gifts" for the children (Cormier 2003). Once pet, that individual primate automatically ceases to be seen as "Food" and becomes "Taboo". When they reach sexual maturity and runs away to the forest, it goes back to being vulnerable to hunting activities for food or medicinal use (Garcia 2018). Thus, since other human communities rarely have two or more discrepant types of relationship with the same species such as this, a valid cross-comparison with types of interactions that indigenous people have with primates is unlikely.

We believe apart from having fewer primate species in comparison to Amazon and Atlantic Forest biomes (Keirulff et al. 2007), the lack of Ethnoprimatology studies for Pantanal and Caatinga are overall symptomatic. There is a recurrent scientific low-priority and negligence for both biomes, where the same pattern was found, for example, in a review for Coleoptera Biodiversity and Ecological Restoration studies (Lewinsohn, Freitas and Prado 2005; Laurance and Garcia 2020). Coincidentally or not, Amazon Biome houses the largest extent of protected areas in contrast to others such Caatinga (with less than 4%), a fragile dry tropical whereas 50% of its territory has been neglected by biodiversity surveys (Santos et al. 2011; Oliveira et al. 2017). Hence, our review adds to one more example elucidating the urgency to fill research gaps in these biomes to better base national conservation strategies. Finally, it is relevant to note that since Ethnoprimatology is still a recent area of research, data of interest might have been left out of this review due lack of publishing, not-well defined key-words and unclear methodologies. Field primatologists, typically working with primates' species in fragments next to rural communities, often come across information that may represent a valuable for developing conservations strategies. Communities living close to wildlife are well placed, they are able to early detect and report and so help prevent biodiversity threats such as illegal trade. We suggest studies, even the ones focused on a more ecological or biogeographical approach, to make descriptions of human-primate interactions, while assuring enough signalization by using correct terms such as "Ethnoprimatology", "human-nonhuman primate" relationships or interactions.

CONCLUSION

In Brazil, studies published in scientific literature with a clear Ethnoprimatological approach are still scarce, only 36 up to 2020. There is a lack of published studies for two out of five Biomes of Brazil, Caatinga and Pantanal. According to our review and analysis, human-nonhuman primates' interactions in Brazil are context-dependent and follow a pattern that could be discerned into two axes. One involving interaction in more urbanized settlements and includes food offering by people and crop raiding and garbage foraging by primates. Those interactions may also involve some form of retaliation such as poisoning, eventual accidents with cars and domestic animals and illegal pet trade and keeping. The second one, in rural settlements, involving mystic and symbolic relationships. In other words, "Monkeying around" Anthropocene differ depending on primates' genus and types of human settlement. Maintain and explore the growing curve of Ethnoprimatological studies not only in Brazil but worldwide can aggregate information about causes and patterns and so consequences of each and individual human-nonhuman primates' proximity. Thus, help better base successful conservation strategies.

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DATA AVAILABILITY

The data used to support the findings of this study are available through open-data in the supplementary material.

CONFLICT OF INTEREST

The authors have no conflicts of interest to declare.

CONTRIBUTION STATEMENT

Conceived of the presented idea: VFN, RGF, PMC
Carried out the data gathering: VFN

Carried out the data analysis: VFN
Wrote the first draft of the manuscript: VFN, RGF, PMC
Review and final write of the manuscript: VFN, RGF
Supervision: VFN, RGF, PMC

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Additional Files

Add File 1. Keywords/Results found per Searchbase.

Order of search		Platform				
Search dates MM/DD/YEAR	**Keywords**	**Scielo**	**Google Schoolar**	**Periódicos CAPES**	**SCOPUS**	**Web of Science**
04/20/2020 – 04/30/2020	etnoprimatologia; brasil	1	46	3	0	1
	ethnoprimatology; brazil	1	456	20	5	1
Read		1	46	1	0	0
06/02/2020	ethno*; primates; brazil	4	2040	0	8	9
	etno*; primatas; brasil	0	0	0	0	0
Read		0	5	0	3	0
06/10/2020	hunting; primates; brazil	3	14900	0	41	30
	caça; primatas; macacos; brasil	1	6408	0	0	0
Read		0	18	0	0	0
06/10/2020	crop raiding; primates; brazil	0	2220	0	1	1
	invasão; primatas; brasil	0	0	0	0	0
Read		0	3	0	0	0
06/10/2020	symbolic; primates; brazil	0	19300	0	0	0
	simbolismo; primatas; brasil	0	1070	0	0	0
Read		0	0	0	0	0
06/10/2020	human-primate interaction; brazil	0	7200	0	1	11
	relação humanos macacos; brasil	7	252	0	0	0
Read		0	3	0	0	0
Opportunistic sampling		**8**				
Total fully read		**56**				
Total incorporated in review		**36**				

Add File 2. Articles Reviewed.

Year	Reference	Type	Journal	Environment
2006	Cornier 2006	Article	Ecological and Environmental Anthropology	Rural
2014	Albuquerque and Oliveira 2014	Article	A Primatologia no Brasil	Urban
2016	Rapchan 2016	Article	Iluminuras	Urban
2018	Garcia 2018	Article	Revista do Instituto de Estudos Brasileiros	Rural
2017	de Ameida 2017	Article	Revista Biociências	Urban
2014	Suzin 2014	Annal	III Encontro de iniciação Científica da Unila	Urban
2015	Buss 2015	Article	Revista Biociências	Urban
2015	Rocha 2015	Article	Ambiente e Sociedade	Rural
2003	Cornier 2003	Chapter	Journal of the Society for the Anthropology of Lowland South America	Rural
2017	Spagnoletti 2017	Article	International Journal of Primatology	Rural
2017	Suzin 2017	Article	International Journal of Primatology	Urban
2017	Batista 2017	Article	Ethnoscientia	Rural
2016	Torres 2016	Article	Folia Primatologica	Rural
2008	Sabbatini 2008	Article	Brazilian Journal of Biology	Urban
2008	de Freitas 2008	Article	Revista Brasileira de Zoologia	Urban
2016	Chaves 2016	Article	International Journal of Primatology	Urban
2016	Rapchan and Neves 2016	Article	Teoria e Cultura	Rural
2016	Waller et al. 2016	Chapter	Ethoprimatology: Primate Conservation in the 21st century	unspecified
2012	Alves et al. 2012	Article	Animals in Traditional Folk Medicine	unspecified
2018	Filho et al. 2018	Article	Ethnobiology and Conservation	Rural
2017	Santos et al. 2017	Article	Neotropical Primates	Urban
2010	Saito et al. 2010	Article	Sociedade & Natureza	Urban
2006	Sabbatini 2006	Article	Applied Animal Behavior	Urban
2017	Silveira 2017	Article	Horizontes Antropológicos	Urban
2008	Freitas et al. 2008	Article	Revista Brasileira de Zoologia	Urban
2010	Jerusalinsky et al. 2010	Article	Iheringia, Sér. Zoologia	Urban
2012	Paim et al. 2012	Article	Uakari	Rural
2017	Araújo and Liesenfeld 2017	Article	Biodiversidade Brasileira	Urban
2017	Nunes et al. 2017	Article	Biodiversidade Brasileira	Rural
1991	Peres 1991	Article	Oryx	Rural
2011	Brasileiro et al. 2011	Article	Rev. eletrônica Mestr. Educ. Ambient	Urban
2017	Alves and Barboza 2017	Chapter	The International Encyclopedia of Primatology	unspecified
2015	Teixeira et al. 2015	Article	Wildlife Research	Urban
2013	Gordo et al. 2013	Chapter	Primates in Fragments: Complexity and Resilience, Developments in Primatology: Progress and Prospects	Urban
1997	Peres 1997	Article	Folia Primatologica	Rural
2011	Leite et al. 2011	Article	Applied Animal Behavior	Urban
2014	Rodrigues and Martinez 2014	Article	Wildlife Biology	Urban

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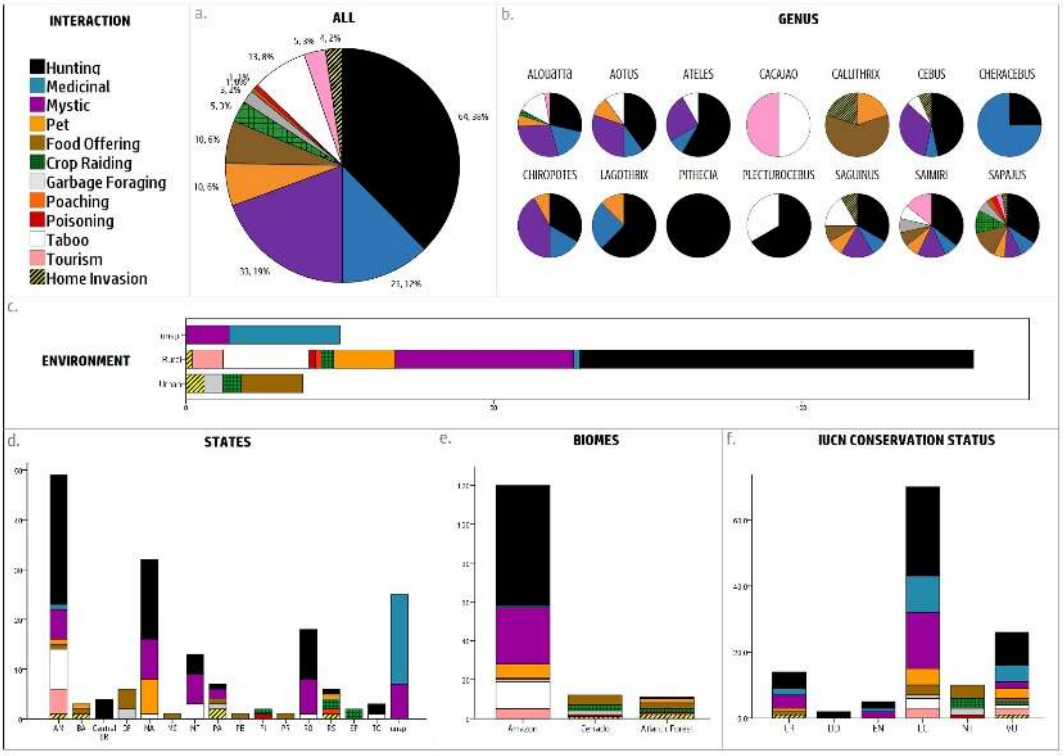


Add File 3. Quantitative. (a) Total percentage found for each type of interaction. (b) Total percentage found for each type of interaction per Genus of Primate. (c) Interactions by type of Environment/Human settlement. (d) Interactions distribution by States of Brazil. (e) Interactions distribution by Biomes of Brazil. (f) Interactions distribution by IUCN Conservation Status of Primates.

Add File 4. Review Data. Legend (C.V. = Conservation Status, P.T. = Population Trend (D = Decreasing, U = Unknown, S = Stable), IC = Indigenous Community, State = S (CB = Central Brazil, U = Unspecifie), Biome = B (A = Amazônia, C = Cerrado, MA = Mata Atlântica, P = Pampa, PA = Paulo Afonso, U = Unspecified), ENVIR. = Environment)

FAMILY	SPECIES	CS	P.T.	INTERACTION/ RELATIONSHIP	S	B	CITY/IC/ MUNICIPALITY	REFERENCE	YEAR	ENVIR.
Atelidae	*Alouatta belzebul*	VU	D	Hunting	MA	A	Guajá	Cornier	2006	Rural
Atelidae	*Alouatta belzebul*	VU	D	Rural Proximity	MA	A	Guajá	Cornier	2006	Rural
Atelidae	*Alouatta belzebul*	VU	D	Mystic/Folklore/ Magic/Religion/ Ritual	MA	A	Guajá	Cornier	2006	Rural
Atelidae	*Alouatta belzebul*	VU	D	Pet	MA	A	Guajá	Garcia	2018	Rural
Atelidae	*Alouatta belzebul*	VU	D	Mystic/Folklore/ Magic/Religion/ Ritual	MA	A	Guajá	Garcia	2018	Rural
Atelidae	*Alouatta belzebul*	VU	D	Hunting	MA	A	Guajá	Garcia	2018	Rural
Atelidae	*Alouatta belzebul*	VU	D	Pet	MA	A	Guajá	Cornier	2003	Rural
Atelidae	*Alouatta belzebul*	VU	D	Rural Proximity	MA	A	Guajá	Cornier	2003	Rural
Atelidae	*Alouatta belzebul*	VU	D	Hunting	MA	A	Guajá	Cornier	2003	Rural
Atelidae	*Alouatta belzebul*	VU	D	Rural Proximity	PB	MA	Lerolândia	Torres	2016	Rural
Atelidae	*Alouatta belzebul*	VU	D	Medicinal	U	U	U	Alves et al	2012	U
Atelidae	*Alouatta guariba*	VU	D	Medicinal	U	U	U	Alves et al	2012	U
Atelidae	*Alouatta guariba*	VU	D	Medicinal	U	U	U	Alves & Barboza	2017	U
Atelidae	*Alouatta guariba clamitans*	VU	D	Urban Proximity	SP	MA	Taubaté	de Almeida e Silva	2017	Urban
Atelidae	*Alouatta guariba clamitans*	VU	D	Urban Proximity	RS	P	Parque Estadual de Itapuã	Buss	2015	Urban
Atelidae	*Alouatta guariba clamitans*	VU	D	Crop raiding	RS	MA	Porto Alegre	Chaves	2016	Urban
Atelidae	*Alouatta guariba clamitans*	VU	D	Urban Proximity	RS	MA	Porto Alegre	Chaves	2016	Urban
Atelidae	*Alouatta guariba clamitans*	VU	D	Urban Proximity	RS	MA	Porto Alegre	Jerusalinsky et al	2010	Urban
Atelidae	*Alouatta juara*	LC	D	Tourism	AM	A	Uakari Lodge (Mamirauá)	Paim et al	2012	Rural
Atelidae	*Alouatta juara*	LC	D	Hunting	AM	A	Vale do Juruá	Nunes et al	2017	Rural
Atelidae	*Alouatta juara*	LC	D	Rural Proximity	AM	A	Vale do Juruá	Nunes et al	2017	Rural
Atelidae	*Alouatta juara*	LC	D	Rural Proximity	AM	A	Uakari Lodge (Mamirauá)	Paim et al	2012	Rural
Atelidae	*Alouatta nigerrima*	LC	D	Medicinal	U	U	U	Alves et al	2012	U
Atelidae	*Alouatta seniculus*	LC	D	Hunting	AM	A	Matis	Cornier	2006	Rural
Atelidae	*Alouatta seniculus*	LC	D	Rural Proximity	AM	A	Matis	Cornier	2006	Rural
Atelidae	*Alouatta seniculus*	LC	D	Hunting	CB	A	Waimiri Atroari	Cornier	2006	Rural

Atelidae	*Alouatta seniculus*	LC	D	Rural Proximity	CB	A	Waimiri Atroari	Cornier	2006	Rural
Atelidae	*Alouatta seniculus*	LC	D	Hunting	RO	A	Wapishana	Cornier	2006	Rural
Atelidae	*Alouatta seniculus*	LC	D	Rural Proximity	RO	A	Wapishana	Cornier	2006	Rural
Atelidae	*Alouatta seniculus*	LC	D	Mystic/Folklore/ Magic/Religion/ Ritual	AM	A	Yanomami	Cornier	2006	Rural
Atelidae	*Alouatta seniculus*	LC	D	Rural Proximity	AM	A	Yanomami	Cornier	2006	Rural
Atelidae	*Alouatta seniculus*	LC	D	Mystic/Folklore/ Magic/Religion/ Ritual	RO	A	Yanomami	Cornier	2006	Rural
Atelidae	*Alouatta seniculus*	LC	D	Medicinal	U	U	U	Alves et al	2012	U
Atelidae	*Alouatta seniculus*	LC	D	Medicinal	U	U	U	Alves & Barboza	2017	U
Atelidae	*Alouatta* sp.			Hunting	TO	A	Tapirapé	Cornier	2006	Rural
Atelidae	*Alouatta* sp.			Rural Proximity	TO	A	Tapirapé	Cornier	2006	Rural
Atelidae	*Alouatta* sp.			Hunting	MT	A	Tapirapé	Cornier	2006	Rural
Atelidae	*Alouatta* sp.			Rural Proximity	MT	A	Tapirapé	Cornier	2006	Rural
Atelidae	*Alouatta* sp.			Taboo/Eating avoidance	AM	A	Desana	Cornier	2006	Rural
Atelidae	*Alouatta* sp.			Rural Proximity	AM	A	Desana	Cornier	2006	Rural
Atelidae	*Alouatta* sp.			Taboo/Eating avoidance	AM	A	Matses	Cornier	2006	Rural
Atelidae	*Alouatta* sp.			Rural Proximity	AM	A	Matses	Cornier	2006	Rural
Atelidae	*Alouatta* sp.			Taboo/Eating avoidance	MT	A	Suyá	Cornier	2006	Rural
Atelidae	*Alouatta* sp.			Rural Proximity	MT	A	Suyá	Cornier	2006	Rural
Atelidae	*Alouatta* sp.			Taboo/Eating avoidance	TO	A	Tapirapé	Cornier	2006	Rural
Atelidae	*Alouatta* sp.			Rural Proximity	TO	A	Tapirapé	Cornier	2006	Rural
Atelidae	*Alouatta* sp.			Taboo/Eating avoidance	MT	A	Tapirapé	Cornier	2006	Rural
Atelidae	*Alouatta* sp.			Rural Proximity	MT	A	Tapirapé	Cornier	2006	Rural
Atelidae	*Alouatta* sp.			Mystic/Folklore/ Magic/Religion/ Ritual	MT	A	Juruna (Yudjá)	Cornier	2006	Rural
Atelidae	*Alouatta* sp.			Rural Proximity	MT	A	Juruna (Yudjá)	Cornier	2006	Rural
Atelidae	*Alouatta* sp.			Mystic/Folklore/ Magic/Religion/ Ritual	PA	A	Munducurú	Cornier	2006	Rural
Atelidae	*Alouatta* sp.			Rural Proximity	PA	A	Munducurú	Cornier	2006	Rural
Atelidae	*Alouatta* sp.			Mystic/Folklore/ Magic/Religion/ Ritual	AM	A	Munducurú	Cornier	2006	Rural
Atelidae	*Alouatta* sp.			Rural Proximity	AM	A	Munducurú	Cornier	2006	Rural
Atelidae	*Alouatta* sp.			Mystic/Folklore/ Magic/Religion/ Ritual	MT	A	Munducurú	Cornier	2006	Rural
Atelidae	*Alouatta* sp.			Rural Proximity	MT	A	Munducurú	Cornier	2006	Rural

Atelidae	*Alouatta* sp.			Mystic/Folklore/ Magic/Religion/ Ritual	MT	A	Xikrin	Cornier	2006	Rural
Atelidae	*Alouatta* sp.			Rural Proximity	MT	A	Xikrin	Cornier	2006	Rural
Atelidae	*Alouatta* sp.			Mystic/Folklore/ Magic/Religion/ Ritual	PA	A	Xikrin	Cornier	2006	Rural
Atelidae	*Alouatta* sp.			Rural Proximity	PA	A	Xikrin	Cornier	2006	Rural
Atelidae	*Alouatta* sp.			Hunting	AM	A	Central Amazonia	Peres	1997	Rural
Atelidae	*Alouatta ululata*	EN	D	Rural Proximity	PI	C	Castelo do Piaui e Valença do Piauí	Filho et al	2018	Rural
Atelidae	*Alouatta ululata*	EN	D	Rural Proximity	CE	MA	Serra da Ibiapaba Environmental Protection Area e Serra da Meruoca Environmental Protection area			
Aotidae	*Aotus azarae*	LC	D	Medicinal	U	U	U	Alves & Barboza	2017	U
Atelidae	*Ateles belzebuth*	EN	D	Medicinal	U	U	U	Alves & Barboza	2017	U
Aotidae	*Aotus azarae*	LC	D	Hunting	MA	A	Guajá	Cornier	2006	Rural
Aotidae	*Aotus azarae*	LC	D	Rural Proximity	MA	A	Guajá	Cornier	2006	Rural
Aotidae	*Aotus azarae*	LC	D	Mystic/Folklore/ Magic/Religion/ Ritual	MA	A	Guajá	Cornier	2006	Rural
Aotidae	*Aotus azarae*	LC	D	Pet	MA	A	Guajá	Cornier	2003	Rural
Aotidae	*Aotus azarae*	LC	D	Rural Proximity	MA	A	Guajá	Cornier	2003	Rural
Aotidae	*Aotus azarae*	LC	D	Hunting	MA	A	Guajá	Cornier	2003	Rural
Aotidae	*Aotus azarae*	LC	D	Mystic/Folklore/ Magic/Religion/ Ritual	U	U	U	Alves et al	2016	U
Aotidae	*Aotus nigriceps*	LC	U	Urban Proximity	AC	A	Cruzeiro do Sul	Araújo & Liesenfeld	2017	Urban
Aotidae	*Aotus nigriceps*	LC	U	Hunting	AM	A	Vale do Juruá	Nunes et al	2017	Rural
Aotidae	*Aotus nigriceps*	LC	U	Rural Proximity	AM	A	Vale do Juruá	Nunes et al	2017	Rural
Aotidae	*Aotus* sp.			Hunting	AM	A	Matis	Cornier	2006	Rural
Aotidae	*Aotus* sp.			Rural Proximity	AM	A	Matis	Cornier	2006	Rural
Aotidae	*Aotus sp.*			Taboo/Eating avoidance	AM	A	Desana	Cornier	2006	Rural
Aotidae	*Aotus sp.*			Mystic/Folklore/ Magic/Religion/ Ritual	MT	A	Juruna (Yudjá)	Cornier	2006	Rural
Aotidae	*Aotus sp.*			Rural proximity	MT	A	Juruna (Yudjá)	Cornier	2006	Rural
Atelidae	*Ateles belzebuth*	EN	D	Mystic/Folklore/ Magic/Religion/ Ritual	AM	A	Yanomami	Cornier	2006	Rural

Atelidae	*Ateles belzebuth*	EN	D	Rural Proximity	AM	A	Yanomami	Cornier	2006	Rural
Atelidae	*Ateles belzebuth*	EN	D	Mystic/Folklore/ Magic/Religion/ Ritual	RO	A	Yanomami	Cornier	2006	Rural
Atelidae	*Ateles belzebuth*	EN	D	Rural Proximity	RO	A	Yanomami	Cornier	2006	Rural
Atelidae	*Ateles chamek*	EN	D	Hunting	AM	A	Matses	Cornier	2006	Rural
Atelidae	*Ateles chamek*	EN	D	Rural Proximity	AM	A	Matses	Cornier	2006	Rural
Atelidae	*Ateles chamek*	EN	D	Hunting	AM	A	Vale do Juruá	Nunes et al	2017	Rural
Atelidae	*Ateles chamek*	EN	D	Rural Proximity	AM	A	Vale do Juruá	Nunes et al	2017	Rural
Atelidae	*Ateles paniscus*	VU	D	Hunting	AM	A	Matis	Cornier	2006	Rural
Atelidae	*Ateles paniscus*	VU	D	Rural Proximity	AM	A	Matis	Cornier	2006	Rural
Atelidae	*Ateles paniscus*	VU	D	Hunting	CB	A	Waimiri Atroari	Cornier	2006	Rural
Atelidae	*Ateles paniscus*	VU	D	Rural Proximity	CB	A	Waimiri Atroari	Cornier	2006	Rural
Atelidae	*Ateles paniscus*	VU	D	Hunting	RO	A	Wapishana	Cornier	2006	Rural
Atelidae	*Ateles paniscus*	VU	D	Rural Proximity	RO	A	Wapishana	Cornier	2006	Rural
Atelidae	*Ateles paniscus*	VU	D	Taboo/Eating avoidance	RO	A	Wapishana	Cornier	2006	Rural
Atelidae	*Ateles sp.*			Hunting	MT	A	Juruna (Yudjá)	Cornier	2006	Rural
Atelidae	*Ateles sp.*			Rural Proximity	MT	A	Juruna (Yudjá)	Cornier	2006	Rural
Atelidae	*Ateles sp.*			Hunting	AM	A	Makuna	Cornier	2006	Rural
Atelidae	*Ateles sp.*			Rural Proximity	AM	A	Makuna	Cornier	2006	Rural
Atelidae	*Ateles sp.*			Mystic/Folklore/ Magic/Religion/ Ritual	RO	A	Warí	Cornier	2006	Rural
Atelidae	*Ateles sp.*			Rural Proximity	RO	A	Warí	Cornier	2006	Rural
Pitheciidae	*Cacajao sp.*			Taboo/Eating avoidance	AM	A	Matses	Cornier	2006	Rural
Pitheciidae	*Cacajao sp.*			Rural Proximity	AM	A	Matses	Cornier	2006	Rural
Pitheciidae	*Cacajao calvus calvus*	VU	D	Tourism	AM	A	Uakari Lodge (Mamirauá)	Paim et al	2012	Rural
Pitheciidae	*Cacajao calvus calvus*	VU	D	Rural Proximity	AM	A	Uakari Lodge (Mamirauá)	Paim et al	2012	Rural
Pitheciidae	*Plecturocebus moloch*	LC	U	Hunting	AM	A	Matis	Cornier	2006	Rural
Pitheciidae	*Plecturocebus moloch*	LC	U	Taboo/Eating avoidance	AM	A	Matis	Cornier	2006	Rural
Pitheciidae	*Plecturocebus moloch*	LC	U	Rural Proximity	AM	A	Matis	Cornier	2006	Rural
Pitheciidae	*Plecturocebus sp.*			Hunting	AM	A	Makuna	Cornier	2006	Rural
Pitheciidae	*Plecturocebus sp.*			Rural Proximity	AM	A	Makuna	Cornier	2006	Rural
Pitheciidae	*Cheracebus torquatus*	LC	U	Hunting	AM	A	Maku	Cornier	2006	Rural
Pitheciidae	*Cheracebus torquatus*	LC	U	Rural Proximity	AM	A	Maku	Cornier	2006	Rural
Pitheciidae	*Cheracebus torquatus*	LC	U	Mystic/Folklore/ Magic/Religion/ Ritual	AM	A	Yanomami	Cornier	2006	Rural

Pitheciidae	*Cheracebus torquatus*	LC	U	Rural Proximity	AM	A	Yanomami	Cornier	2006	Rural
Pitheciidae	*Cheracebus torquatus*	LC	U	Mystic/Folklore/ Magic/Religion/ Ritual	RO	A	Yanomami	Cornier	2006	Rural
Pitheciidae	*Cheracebus torquatus*	LC	U	Rural Proximity	RO	A	Yanomami	Cornier	2006	Rural
Pitheciidae	*Cheracebus torquatus*	LC	U	Mystic/Folklore/ Magic/Religion/ Ritual	U	U	U	Alves et al	2016	U
Pitheciidae	*Cheracebus torquatus*	LC	U	Medicinal	U	U	U	Alves & Barboza	2017	U
Calliitrichidae	*Callithrix jacchus*	LC	D	Urban Proximity	PE	MA	Parque Estadual Dois Irmãos	Albuquerque & Oliveira	2014	Urban
Calliitrichidae	*Callithrix jacchus*	LC	D	Food offering	PE	MA	Parque Estadual Dois Irmãos	Albuquerque & Oliveira	2014	Urban
Calliitrichidae	*Callithrix jacchus*	LC	D	Rural Proximity	PB	MA	Lerolândia	Torres	2016	Rural
Calliitrichidae	*Callithrix jacchus*	LC	D	Pet	PB	MA	Lerolândia	Torres	2016	Rural
Calliitrichidae	*Callithrix penicillata*	LC	D	Urban Proximity	MG	C	Belo Horizonte	Teixeira et al	2015	Urban
Calliitrichidae	*Callithrix penicillata*	LC	D	Urban Proximity	MG	C	Belo Horizonte	Leite et al	2011	Urban
Calliitrichidae	*Callithrix penicillata*	LC	D	Food offering	MG	C	Belo Horizonte	Leite et al	2011	Urban
Calliitrichidae	*Callithrix kuhlii*	VU	D	Urban Proximity	BA	MA	Ilhéus	Rodrigues & Martinez	2014	Urban
Calliitrichidae	*Callithrix kuhlii*	VU	D	Home Invasion	BA	MA	Ilhéus	Rodrigues & Martinez	2014	Urban
Calliitrichidae	*Callithrix kuhlii*	VU	D	Food offering	BA	MA	Ilhéus	Rodrigues & Martinez	2014	Urban
Calliitrichidae	*Cebuella niveiventris*	LC	S	Urban Proximity	AC	A	Cruzeiro do Sul	Araújo & Liesenfeld	2017	Urban
Cebidae	*Cebus albifrons*	LC	D	Mystic/Folklore/ Magic/Religion/ Ritual	AM	A	Yanomami	Cornier	2006	Rural
Cebidae	*Cebus albifrons*	LC	D	Rural Proximity	AM	A	Yanomami	Cornier	2006	Rural
Cebidae	*Cebus albifrons*	LC	D	Mystic/Folklore/ Magic/Religion/ Ritual	RO	A	Yanomami	Cornier	2006	Rural
Cebidae	*Cebus albifrons*	LC	D	Rural Proximity	RO	A	Yanomami	Cornier	2006	Rural
Cebidae	*Sapajus apella*	LC	D	Hunting	PA	A	Arara	Cornier	2006	Rural
Cebidae	*Sapajus apella*	LC	D	Rural Proximity	PA	A	Arara	Cornier	2006	Rural
Cebidae	*Sapajus apella*	LC	D	Hunting	MA	A	Guajá	Cornier	2006	Rural
Cebidae	*Sapajus apella*	LC	D	Rural Proximity	MA	A	Guajá	Cornier	2006	Rural
Cebidae	*Sapajus apella*	LC	D	Hunting	AM	A	Matis	Cornier	2006	Rural
Cebidae	*Sapajus apella*	LC	D	Rural Proximity	AM	A	Matis	Cornier	2006	Rural
Cebidae	*Sapajus apella*	LC	D	Hunting	CB	A	Waimiri Atroari	Cornier	2006	Rural

Cebidae	*Sapajus apella*	LC	D	Rural Proximity	CB	A	Waimiri Atroari	Cornier	2006	Rural
Cebidae	*Sapajus apella*	LC	D	Hunting	RO	A	Wapishana	Cornier	2006	Rural
Cebidae	*Sapajus apella*	LC	D	Rural Proximity	RO	A	Wapishana	Cornier	2006	Rural
Cebidae	*Sapajus apella*	LC	D	Mystic/Folklore/ Magic/Religion/ Ritual	MA	A	Guajá	Cornier	2006	Rural
Cebidae	*Sapajus apella*	LC	D	Pet	MA	A	Guajá	Cornier	2003	Rural
Cebidae	*Sapajus apella*	LC	D	Rural Proximity	MA	A	Guajá	Cornier	2003	Rural
Cebidae	*Sapajus apella*	LC	D	Hunting	MA	A	Guajá	Cornier	2003	Rural
Cebidae	*Sapajus apella*	LC	D	Medicinal	U	U	U	Alves et al	2012	U
Cebidae	*Sapajus apella*	LC	D	Medicinal	U	U	U	Alves & Barboza	2017	U
Cebidae	*Cebus kaapori*	CR	D	Hunting	MA	A	Guajá	Cornier	2006	Rural
Cebidae	*Cebus kaapori*	CR	D	Mystic/Folklore/ Magic/Religion/ Ritual	MA	A	Guajá	Cornier	2006	Rural
Cebidae	*Cebus kaapori*	CR	D	Rural Proximity	MA	A	Guajá	Cornier	2006	Rural
Cebidae	*Cebus kaapori*	CR	D	Mystic/Folklore/ Magic/Religion/ Ritual	U	U	U	Alves et al	2016	U
Cebidae	*Cebus kaapori*	CR	D	Medicinal	U	U	U	Alves & Barboza	2017	U
Cebidae	*Sapajus libidinosus*	NT	D	Crop raiding	SP	C	França	Freitas et al	2008	Urban
Cebidae	*Sapajus libidinosus*	NT	D	Urban Proximity	SP	C	França	Freitas et al	2008	Urban
Cebidae	*Sapajus libidinosus*	NT	D	Urban Proximity	DF	C	National Park of Brasilia	Brasileiro	2011	Urban
Cebidae	*Sapajus libidinosus*	NT	D	Food offering	DF	C	National Park of Brasilia	Brasileiro	2011	Urban
Cebidae	*Cebus castaneus*	LC	U	Hunting	RO	A	Wapishana	Cornier	2006	Rural
Cebidae	*Cebus castaneus*	LC	U	Rural Proximity	RO	A	Wapishana	Cornier	2006	Rural
Cebidae	*Cebus sp.*			Hunting	MT	A	Juruna (Yudjá)	Cornier	2006	Rural
Cebidae	*Cebus sp.*			Rural Proximity	MT	A	Juruna (Yudjá)	Cornier	2006	Rural
Cebidae	*Sapajus sp.*			Hunting	MA	A	Ka'apor	Cornier	2006	Rural
Cebidae	*Sapajus sp.*			Rural Proximity	MA	A	Ka'apor	Cornier	2006	Rural
Cebidae	*Sapajus sp.*			Hunting	TO	A	Tapirapé	Cornier	2006	Rural
Cebidae	*Sapajus sp.*			Rural Proximity	TO	A	Tapirapé	Cornier	2006	Rural
Cebidae	*Sapajus sp.*			Hunting	MT	A	Tapirapé	Cornier	2006	Rural
Cebidae	*Sapajus sp.*			Rural Proximity	MT	A	Tapirapé	Cornier	2006	Rural
Cebidae	*Cebus sp.*			Hunting	AM	A	Yanomami	Cornier	2006	Rural
Cebidae	*Cebus sp.*			Rural Proximity	AM	A	Yanomami	Cornier	2006	Rural
Cebidae	*Cebus sp.*			Hunting	RO	A	Yanomami	Cornier	2006	Rural
Cebidae	*Cebus sp.*			Rural Proximity	RO	A	Yanomami	Cornier	2006	Rural
Cebidae	*Cebus sp.*			Hunting	RO	A	Ye'kwana	Cornier	2006	Rural

Cebidae	*Cebus sp.*			Rural Proximity	RO	A	Ye'kwana	Cornier	2006	Rural
Cebidae	*Cebus sp.*			Taboo/Eating avoidance	AM	A	Matses	Cornier	2006	Rural
Cebidae	*Cebus sp.*			Rural Proximity	AM	A	Matses	Cornier	2006	Rural
Cebidae	*Sapajus sp.*			Mystic/Folklore/ Magic/Religion/ Ritual	MT	A	Kalapalo	Cornier	2006	Rural
Cebidae	*Sapajus sp.*			Rural Proximity	MT	A	Kalapalo	Cornier	2006	Rural
Cebidae	*Sapajus sp.*			Mystic/Folklore/ Magic/Religion/ Ritual	MT	A	Mechinaku	Cornier	2006	Rural
Cebidae	*Sapajus sp.*			Rural Proximity	MT	A	Mechinaku	Cornier	2006	Rural
Cebidae	*Cebus sp.*			Mystic/Folklore/ Magic/Religion/ Ritual	RO	A	Warí	Cornier	2006	Rural
Cebidae	*Cebus sp.*			Rural Proximity	RO	A	Warí	Cornier	2006	Rural
Cebidae	*Cebus* sp.			Urban Proximity	PA	C	Maringá	Rapchan	2016	Urban
Cebidae	*Cebus sp.*			Home Invasion	PA	C	Maringá	Rapchan	2016	Urban
Cebidae	*Cebus albifrons*	LC	D	Hunting	AM	A	Vale do Juruá	Nunes et al	2017	Rural
Cebidae	*Sapajus flavius*	CR	D	Poisoning	BA	PA	Rio São Francisco	Batista	2017	Rural
Cebidae	*Sapajus flavius*	CR	D	Rural Proximity	BA	PA	Rio São Francisco	Batista	2017	Rural
Cebidae	*Sapajus flavius*	CR	D	Pet	BA	PA	Rio São Francisco	Batista	2017	Rural
Cebidae	*Sapajus flavius*	CR	D	Hunting	BA	PA	Rio São Francisco	Batista	2017	Rural
Cebidae	*Cebus albifrons*	LC	D	Rural Proximity	AM	A	Vale do Juruá	Nunes et al	2017	Rural
Pitheciidae	*Chiropotes satanas*	CR	D	Hunting	MA	A	Guajá	Cornier	2006	Rural
Pitheciidae	*Chiropotes satanas*	CR	D	Rural Proximity	MA	A	Guajá	Cornier	2006	Rural
Pitheciidae	*Chiropotes satanas*	CR	D	Hunting	CB	A	Waimiri Atroari	Cornier	2006	Rural
Pitheciidae	*Chiropotes satanas*	CR	D	Rural Proximity	CB	A	Waimiri Atroari	Cornier	2006	Rural
Pitheciidae	*Chiropotes satanas*	CR	D	Hunting	RO	A	Wapishana	Cornier	2006	Rural
Pitheciidae	*Chiropotes satanas*	CR	D	Rural Proximity	RO	A	Wapishana	Cornier	2006	Rural
Pitheciidae	*Chiropotes satanas*	CR	D	Mystic/Folklore/ Magic/Religion/ Ritual	MA	A	Guajá	Cornier	2006	Rural
Pitheciidae	*Chiropotes satanas*	CR	D	Rural Proximity	MA	A	Guajá	Cornier	2006	Rural
Pitheciidae	*Chiropotes chiropotes*	LC	S	Mystic/Folklore/ Magic/Religion/ Ritual	AM	A	Yanomami	Cornier	2006	Rural
Pitheciidae	*Chiropotes chiropotes*	LC	S	Rural Proximity	AM	A	Yanomami	Cornier	2006	Rural

Pitheciidae	*Chiropotes chiropotes*	LC	S	Mystic/Folklore/ Magic/Religion/ Ritual	RO	A	Yanomami	Cornier	2006	Rural
Pitheciidae	*Chiropotes chiropotes*	LC	S	Rural Proximity	RO	A	Yanomami	Cornier	2006	Rural
Pitheciidae	*Chiropotes satanas*	CR	D	Pet	MA	A	Guajá	Cornier	2003	Rural
Pitheciidae	*Chiropotes satanas*	CR	D	Rural Proximity	MA	A	Guajá	Cornier	2003	Rural
Pitheciidae	*Chiropotes satanas*	CR	D	Hunting	MA	A	Guajá	Cornier	2003	Rural
Pitheciidae	*Chiropotes satanas*	CR	D	Mystic/Folklore/ Magic/Religion/ Ritual	U	U	U	Alves et al	2016	U
Pitheciidae	*Chiropotes chiropotes*	LC	S	Mystic/Folklore/ Magic/Religion/ Ritual	U	U	U	Alves et al	2012	U
Pitheciidae	*Chiropotes chiropotes*	LC	S	Medicinal	U	U	U	Alves & Barboza	2017	U
Pitheciidae	*Chiropotes satanas*	CR	D	Medicinal	U	U	U	Alves & Barboza	2017	U
Atelidae	*Lagothrix lagothricha*	VU	D	Hunting	AM	A	Maku	Cornier	2006	Rural
Atelidae	*Lagothrix lagothricha*	VU	D	Rural Proximity	AM	A	Maku	Cornier	2006	Rural
Atelidae	*Lagothrix sp.*			Hunting	AM	A	Makuna	Cornier	2006	Rural
Atelidae	*Lagothrix sp.*			Rural Proximity	AM	A	Makuna	Cornier	2006	Rural
Atelidae	*Lagothrix lagothricha*	VU	D	Hunting	AM	A	Matis	Cornier	2006	Rural
Atelidae	*Lagothrix lagothricha*	VU	D	Rural Proximity	AM	A	Matis	Cornier	2006	Rural
Atelidae	*Lagothrix lagothricha*	VU	D	Hunting	AM	A	Matses	Cornier	2006	Rural
Atelidae	*Lagothrix lagothricha*	VU	D	Rural Proximity	AM	A	Matses	Cornier	2006	Rural
Atelidae	*Lagothrix lagothricha*	VU	D	Medicinal	U	U	U	Alves et al	2012	U
Atelidae	*Lagothrix lagothricha*	VU	D	Hunting	AM	U	U	Peres	1991	Rural
Atelidae	*Lagothrix lagothricha*	VU	D	Rural Proximity	AM	U	U	Peres	1991	Rural
Atelidae	*Lagothrix lagothricha*	VU	D	Pet	AM	U	U	Peres	1991	Rural
Atelidae	*Lagothrix lagothricha*	VU	D	Medicinal	U	U	U	Alves & Barboza	2017	U
Cebidae	*Saguinus illigeri*	LC	D	Urban Proximity	AC	A	Cruzeiro do Sul	Araújo & Liesenfeld	2017	Urban
Pitheciidae	*Pithecia hirsuta*	DD	D	Hunting	AM	A	Matses	Cornier	2006	Rural
Pitheciidae	*Pithecia hirsuta*	DD	D	Rural Proximity	AM	A	Matses	Cornier	2006	Rural
Pitheciidae	*Pithecia pithecia*	LC	D	Hunting	RO	A	Wapishana	Cornier	2006	Rural
Pitheciidae	*Pithecia pithecia*	LC	D	Rural Proximity	RO	A	Wapishana	Cornier	2006	Rural
Pitheciidae	*Pithecia sp.*			Urban Proximity	AC	A	Cruzeiro do Sul	Araújo & Liesenfeld	2017	Urban
Pitheciidae	*Pithecia vanzolinii*	DD	D	Hunting	AM	A	Vale do Juruá	Nunes et al	2017	Rural
Pitheciidae	*Pithecia vanzolinii*	DD	D	Rural Proximity	AM	A	Vale do Juruá	Nunes et al	2017	Rural
Pitheciidae	*Plecturocebus cupreus*	LC	U	Urban Proximity	AC	A	Cruzeiro do Sul	Araújo & Liesenfeld	2017	Urban
Cebidae	*Saguinus midas*	LC	S	Hunting	MA	A	Guajá	Cornier	2006	Rural
Cebidae	*Saguinus midas*	LC	S	Rural Proximity	MA	A	Guajá	Cornier	2006	Rural
Cebidae	*Saguinus mystax*			Hunting	AM	A	Matis	Cornier	2006	Rural
Cebidae	*Saguinus mystax*			Rural Proximity	AM	A	Matis	Cornier	2006	Rural

Cebidae	*Saguinus midas*	LC	S	Hunting	RO	A	Wapishana	Cornier	2006	Rural
Cebidae	*Saguinus midas*	LC	S	Rural Proximity	RO	A	Wapishana	Cornier	2006	Rural
Cebidae	*Saguinus midas*	LC	S	Taboo/Eating avoidance	MA	A	Guajá	Cornier	2006	Rural
Cebidae	*Saguinus midas*	LC	S	Rural Proximity	MA	A	Guajá	Cornier	2006	Rural
Cebidae	*Saguinus mystax*			Taboo/Eating avoidance	AM	A	Matis	Cornier	2006	Rural
Cebidae	*Saguinus mystax*			Rural Proximity	AM	A	Matis	Cornier	2006	Rural
Cebidae	*Saguinus midas*	LC	S	Mystic/Folklore/ Magic/Religion/ Ritual	MA	A	Guajá	Cornier	2006	Rural
Cebidae	*Saguinus midas*	LC	S	Rural Proximity	MA	A	Guajá	Cornier	2006	Rural
Cebidae	*Saguinus midas*	LC	S	Pet	MA	A	Guajá	Cornier	2003	Rural
Cebidae	*Saguinus midas*	LC	S	Rural Proximity	MA	A	Guajá	Cornier	2003	Rural
Cebidae	*Saguinus midas*	LC	S	Hunting	MA	A	Guajá	Cornier	2003	Rural
Cebidae	*Saguinus midas*	LC	S	Mystic/Folklore/ Magic/Religion/ Ritual	U	U	U	Alves et al	2016	U
Cebidae	*Saguinus bicolor*	CR	D	Urban Proximity	AM	U	Manaus	Santos et al	2017	Urban
Cebidae	*Saguinus bicolor*	CR	D	Food offering	AM	U	Manaus	Santos et al	2017	Urban
Cebidae	*Saguinus bicolor*	CR	D	Home Invasion	AM	U	Manaus	Santos et al	2017	Urban
Cebidae	*Saguinus midas*	LC	S	Medicinal	U	U	U	Alves & Barboza	2017	U
Cebidae	*Saguinus bicolor*	CR	D	Urban Proximity	AM	U	Manaus	Gordo et al	2013	Urban
Cebidae	*Saimiri sciureus*	LC	D	Hunting	MA	A	Guajá	Cornier	2006	Rural
Cebidae	*Saimiri sciureus*	LC	D	Rural Proximity	MA	A	Guajá	Cornier	2006	Rural
Cebidae	*Saimiri sciureus*	LC	D	Hunting	AM	A	Matis	Cornier	2006	Rural
Cebidae	*Saimiri sciureus*	LC	D	Rural Proximity	AM	A	Matis	Cornier	2006	Rural
Cebidae	*Saimiri sciureus*	LC	D	Hunting	RO	A	Wapishana	Cornier	2006	Rural
Cebidae	*Saimiri sciureus*	LC	D	Rural Proximity	RO	A	Wapishana	Cornier	2006	Rural
Cebidae	*Saimiri sciureus*	LC	D	Taboo/Eating avoidance	AM	A	Matis	Cornier	2006	Rural
Cebidae	*Saimiri sciureus*	LC	D	Rural Proximity	AM	A	Matis	Cornier	2006	Rural
Cebidae	*Saimiri sciureus*	LC	D	Mystic/Folklore/ Magic/Religion/ Ritual	MA	A	Guajá	Cornier	2006	Rural
Cebidae	*Saimiri sciureus*	LC	D	Pet	MA	A	Guajá	Cornier	2003	Rural
Cebidae	*Saimiri sciureus*	LC	D	Hunting	MA	A	Guajá	Cornier	2003	Rural
Cebidae	*Saimiri sciureus*	LC	D	Rural Proximity	MA	A	Guajá	Cornier	2003	Rural
Cebidae	*Saimiri sciureus*	LC	D	Mystic/Folklore/ Magic/Religion/ Ritual	U	U	U	Alves et al	2016	U
Cebidae	*Saimiri sciureus*	LC	D	Urban Proximity	PA	A	Jardim Botânico Bosque Rodrigues Alves	Silveira	2017	Urban

Cebidae	*Saimiri sciureus*	LC	D	Garbage foraging	PA	A	Jardim Botânico Bosque Rodrigues Alves	Silveira	2017	Urban
Cebidae	*Saimiri sciureus*	LC	D	Food offering	PA	A	Jardim Botânico Bosque Rodrigues Alves	Silveira	2017	Urban
Cebidae	*Saimiri vanzolinii*	VU	U	Tourism	AM	A	Uakari Lodge (Mamirauá)	Paim et al	2012	Rural
Cebidae	*Saimiri vanzolinii*	VU	U	Rural Proximity	AM	A	Uakari Lodge (Mamirauá)	Paim et al	2012	Rural
Cebidae	*Saimiri sciureus*	LC	D	Tourism	AM	A	Uakari Lodge (Mamirauá)	Paim et al	2012	Rural
Cebidae	*Saimiri boliviensis*	LC	D	Urban Proximity	AC	A	Cruzeiro do Sul	Araújo & Liesenfeld	2017	Urban
Cebidae	*Saimiri boliviensis*	LC	D	Hunting	AM	A	Vale do Juruá	Nunes et al	2017	Rural
Cebidae	*Saimiri sciureus*	LC	D	Medicinal	U	U	U	Alves & Barboza	2017	U
Cebidae	*Sapajus flavius*	EN	D	Rural Proximity	PB	MA	Lerolândia	Torres	2016	Rural
Cebidae	*Sapajus libidinosus*	NT	D	Crop raiding	PI	C	Gilbués	Spagnoletti	2017	rURAL
Cebidae	*Sapajus libidinosus*	NT	D	Poisoning	PI	C	Gilbués	Spagnoletti	2017	rURAL
Cebidae	*Sapajus libidinosus*	NT	D	Rural Proximity	PI	C	Gilbués	Spagnoletti	2017	rURAL
Cebidae	*Sapajus libidinosus*	NT	D	Urban Proximity	DF	C	National Park of Brasilia	Sabbatini	2008	Urban
Cebidae	*Sapajus libidinosus*	NT	D	Food offering	DF	C	National Park of Brasilia	Sabbatini	2008	Urban
Cebidae	*Sapajus libidinosus*	NT	D	Crop raiding	SP	C	França	de Freitas	2008	Urban
Cebidae	*Sapajus libidinosus*	NT	D	Rural Proximity	PI	C	Boa Vista Farm	Rapchan & Neves	2016	Rural
Cebidae	*Sapajus libidinosus*	NT	D	Urban Proximity	DF	C	National Park of Brasilia	Saito et al	2010	Urban
Cebidae	*Sapajus libidinosus*	NT	D	Food offering	DF	C	National Park of Brasilia	Saito et al	2010	Urban
Cebidae	*Sapajus libidinosus*	NT	D	Garbage foraging	DF	C	National Park of Brasilia	Saito et al	2010	Urban
Cebidae	*Sapajus libidinosus*	NT	D	Urban Proximity	DF	C	National Park of Brasilia	Sabbatini	2016	Urban
Cebidae	*Sapajus libidinosus*	NT	D	Food offering	DF	C	National Park of Brasilia	Sabbatini	2016	Urban
Cebidae	*Sapajus libidinosus*	NT	D	Garbage foraging	DF	C	National Park of Brasilia	Sabbatini	2016	Urban
Cebidae	*Sapajus apella*	LC	D	Tourism	AM	A	Uakari Lodge (Mamirauá)	Paim et al	2012	Rural

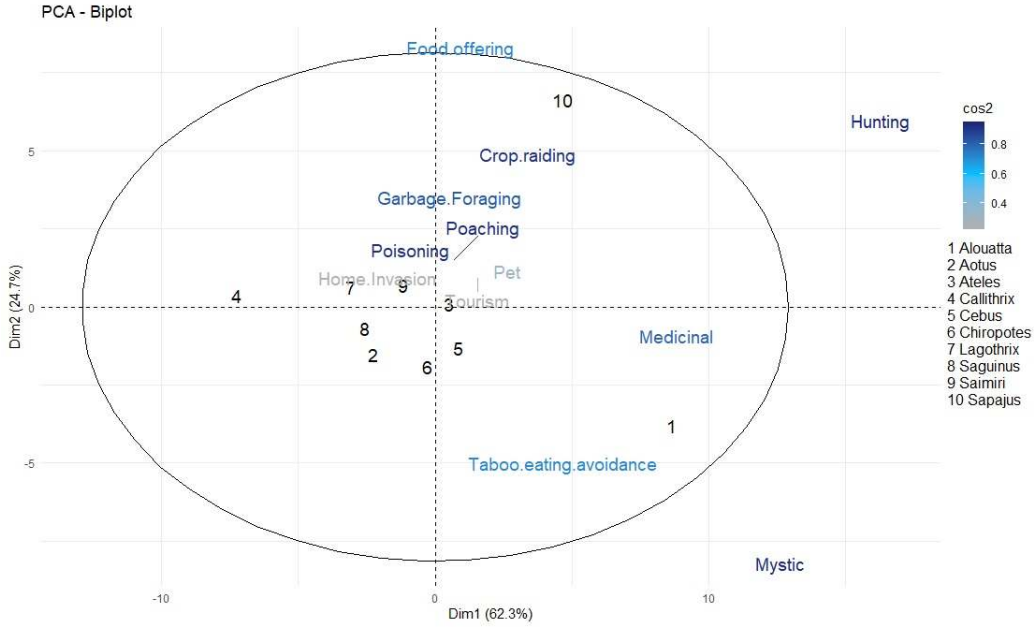
Cebidae	*Sapajus apella*	LC	D	Rural Proximity	AM	A	Uakari Lodge (Mamirauá)	Paim et al	2012	Rural
Cebidae	*Sapajus apella*	LC	D	Hunting	AM	A	Vale do Juruá	Nunes et al	2017	Rural
Cebidae	*Sapajus apella*	LC	D	Medicinal	AM	A	Vale do Juruá	Nunes et al	2017	Rural
Cebidae	*Sapajus apella*	LC	D	Rural Proximity	AM	A	Vale do Juruá	Nunes et al	2017	Rural
Cebidae	*Sapajus sp.*			Urban Proximity	PR	MA	Foz do Iguaçu	Suzin	2014	Urban
Cebidae	*Sapajus sp.*			Food offering	PR	MA	Foz do Iguaçu	Suzin	2014	Urban
Cebidae	*Sapajus sp.*			Rural Proximity	RS	MA	Hydroeletric power plant	Rocha	2015	Rural
Cebidae	*Sapajus sp.*			Crop raiding	RS	MA	Hydroeletric power plant	Rocha	2015	Rural
Cebidae	*Sapajus sp.*			Home Invasion	RS	MA	Hydroeletric power plant	Rocha	2015	Rural
Cebidae	*Sapajus sp.*			Hunting	RS	MA	Hydroeletric power plant	Rocha	2015	Rural
Cebidae	*Sapajus sp.*			Poaching	RS	MA	Hydroeletric power plant	Rocha	2015	Rural
Cebidae	*Sapajus sp.*			Pet	RS	MA	Hydroeletric power plant	Rocha	2015	Rural
Cebidae	*Sapajus sp.*			Hunting	MA	A	Guajá	Cornier	2003	Rural
Cebidae	*Sapajus sp.*			Rural Proximity	MA	A	Guajá	Cornier	2003	Rural
U	*U sp.*			Taboo/Eating avoidance	MT	A	Mekronoti	Cornier	2006	Rural

Add File 5. All chi-square results.

	GENUS	**STATUS**	**STATES**	**BIOMES**	**Human Settlement**
Hunting			Unespecified (-4,1)	Amazon (4,2) Cerrado (-3,2)	Urban (-4,1) Rural (4,1)
Medicinal			Unespecified(10,5)		
Mystic			MA (6,0)		
Pet			MA (4,3)		
Food Offering	Callithrix (5,0)	Near-Threatened (4,2)	DF (6,5) MG (4,0) PE (4,0) PR (4,0) PI (4,0)	Amazon (-6,1) Cerrado (5,3) Atlantic Forest (3,0)	Urban (8,5) Rural (-8,5)
Crop-Raiding	Sapajus (3,2)	Near-Threatened (5,1)	RS (4,5) SP (8,2)	Amazon (-5,2) Cerrado (4,2)	Urban (3,2) Rural (-3,2)
Garbage Foraging		Near-Threatened (3,8)	DF (6,0)	Cerrado (3,7)	Urban (4,5) Rural (-4,5)
Poaching			RS (5,3)	Atlantic Forest (3,5)	Urban (4,0) Rural (-4,0)
Poisoning		Near-Threatened (3,4)	PI (9,3)	Cerrado (3,3)	Rural (4,0)
Taboo					
Tourism			AM (3,6)		
Home Invasion			BA (3,2) PA (4,1)	Amazon (-4,0) Atlantic Forest (3,9)	
GENUS					*Callithrix* x Rural (-3,8)
Asymptotic Significance (2-sided) Chi-squared	0,202	0	0	0	0

Add File 6. PCA Genus x Interactions.

PCA Genus x Interactions COS2					
Interactions/Dimensions	Dim1	Dim2	Dim3	Dim4	Dim5
HUNTING	0.8379464145	0.11626991	0.04423623	2.978163e-04	0.0010705450
PET	0.2343946578	0.07409710	0.43276062	1.275476e-01	0.0832449577
MEDICINAL	0.7801944731	0.02036162	0.04918060	7.467078e-02	0.0660781748
MYSTIC	0.7026972117	0.24213607	0.01453994	3.906108e-02	0.0001688667
FOOD OFFERING	0.0007402746	0.72509012	0.24766817	1.414109e-02	0.0080485098
CROP RAIDING	0.3508843770	0.57217013	0.05246892	5.207204e-03	0.0079753594
GARBAGE FORAGING	0.1101274614	0.71248408	0.01351019	5.395801e-05	0.0012286502
POACHING	0.1716206079	0.76128962	0.01918365	2.146479e-02	0.0083714442
POISONING	0.1716206079	0.76128962	0.01918365	2.146479e-02	0.0083714442
TABOO	0.4144271277	0.30557338	0.05385769	9.948884e-02	0.1174204726
TOURISM	0.1636039174	0.05783252	0.04069750	1.015373e-01	0.0381095253
HOME INVASION	0.0154404117	0.20822742	0.10605695	1.432766e-01	0.2090257035



Add File 7. PCA Genus x Interactions Biplot Graph Output R Statistics.