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Value orientations toward wild meat in Guyana are determined by gender, ethnicity, and location

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Introduction: Understanding what drives differences in values toward wild meat is important for developing legislation and behavioral change campaigns that promote sustainable use. Value orientations (VOs) underly behavior. VOs are influenced by personal (e.g., gender, generation), social (e.g., media, family), location (e.g., rural versus urban), and experience determinants. In Guyana, an ethnic diverse nation in South America, the national hunting laws have recently been instated. The wildlife management agency is rolling out a behavioral change campaign in collaboration with a sustainable use initiative. To support this campaign, we evaluated VOs toward wild meat across Guyana.

Methods: Applying Multiple Correspondence Analysis and generalized linear models to data from interviews, we examined location, personal, and societal determinants for their influence on these VOs and explored how VOs translated into behavior, specifically wild meat consumption frequency.

Results: Location (Indigenous and coastal: rural, town, urban), intertwined with ethnicity, and gender showed the strongest associations with variation in VOs. Respondents from Indigenous territories expressed mostly positive VOs compared to coastal Guyanese. Women expressed more neutral or negative, and more negative biocentric VOs compared to men, and this difference was largest among Indigenous but non-existent in urban sites. Negative anthropocentric VOs toward wild meat consistently grouped together and dominated among those not consuming wild meat. Highest consumption was seen among those expressing positive materialistic VOs. Positive anthropocentric VOs were associate with intermediate consumption frequencies and most typical for men. Those expressing negative values toward wild meat based on biocentric orientations toward wildlife consumed wild meat, but rarely.

Discussion: Our results direct behavioral change efforts to men on the coast who consume wild meat for enjoyment at bars, restaurants, or family events. Based on our study, positive messaging promoting the coexistence between consumption of mostly resilient species and caring about wildlife would be well-received to support sustainable use policies.

KEYWORDS

behavioral change, ethnicity, gender, indigenous, MCA, rural, urban, wild meat

1 Introduction

The hunting and consumption of species for wild meat are sensitive topics, as this has long been considered to stand in stark contrast with wildlife conservation because it has been a contributor to species declines worldwide (Brashares et al., 2004; Ripple et al., 2016; van Velden et al., 2018). At the same time, wild meat is known to be a healthy food source (Sarti et al., 2015) and continues to be an essential source of nutrition around the globe in communities relying on (partial) subsistence livelihoods due to limited cash income or market access (Bennett, 2002a; De Merode et al., 2004; Chaves et al., 2017; Nunes et al., 2019; van Vliet et al., 2019; Booth et al., 2021). Furthermore, wild meat is also considered an important part of many cultures and traditions, such as among many Amazonian Indigenous Peoples who assign special values to specific species and serve them during celebrations, or urban citizens in Vietnam who use wild meat at social gatherings (Nasi et al., 2011; van Vliet and Mbazza, 2011; Shairp et al., 2016; Chaves et al., 2019; Ingram et al., 2021).

Criminalization of wild meat may therefore not be effective (Davies, 2002; Bennett, 2011; Wilkie et al., 2011), particularly in association with weak enforcement (Parry et al., 2014), and this holds true even if alternative protein sources or alternative livelihoods to commercializing wild meat are available (Baía Júnior et al., 2010; de Melo et al., 2014; Roe et al., 2014; Kiffner et al., 2015). Moreover, it may not be desirable or feasible to end wild meat use in terms of food security or the habitat destruction that would be required to feed those currently living on wild meat (Nunes et al., 2019; Booth et al., 2021). Instead, the wild meat component of wildlife management requires looking beyond livelihoods and considering the full spectrum of values held by consumers, both for legislation and behavioral change campaigns (Manfredo, 2008; Brashares et al., 2014; van Vliet, 2018). Both should aim to develop innovative ways to achieve conservation targets within the existing value system rather than to impose western values (Bennett, 2002b; Rickenbach et al., 2017; van Vliet, 2018) or orchestrate shifts in values, which is a much longer-term process (Manfredo et al., 2017).

Behavioral change campaigns are increasingly incorporated in conservation projects (Drury, 2011; Saypanya et al., 2013;

Challender and MacMillan, 2014; Chaves et al., 2018; Wallen and Daut, 2018; Thomas-Walters et al., 2020). By incorporating insights from psychology and marketing, such campaigns can be powerful tools to promote public acceptance of wildlife legislation and management decisions (Toomey, 2023). The success of these campaigns relies in resonating with the values of its audience and different attitudes toward the use of wildlife require different messaging (Thomas-Walters et al., 2021). Furthermore, messaging should target well-defined audience, as among large audience, specific social norms and values are likely to differ (Toomey, 2023).

Value orientations (VOs) are an individual's interpretation of a set of fundamental values, i.e., a directional pattern in basic values and beliefs. They are good predictors of attitudes, and those in turn predict behavioral intentions (Fulton et al., 1996). Several authors have provided structural approaches to wildlife value orientations (WVOs). They are generally divided into anthropocentric and biocentric WVOs or considered along a continuum of these extremes (Steel et al., 1994; Vaske and Donnelly, 1999). This was thought to be a simplistic view, and people more directly exposed to wildlife are thought to show more diversity in their value orientations (Manfredo and Fulton, 1997). Dayer et al. (2007) categorized WVOs into domination, materialism, concern for safety, scientific, respect, rational, spiritual, mutualism, caring, attraction/interest, and environmentalism, of which the last four could be categorized as biocentric and the others more anthropocentric. These can be applied to various contexts (Rickenbach et al., 2017; van Vliet et al., 2022a). van Vliet et al. (2022a) looked at value orientations toward wild meat in the Democratic Republic of Congo, using the word "nyama" to refer to wild meat. However, as the authors explained, "nyama" also refers to wildlife. As such, in their study, respondents interpreted the word "nyama" as referring to wild meat or wildlife indifferently. VOs toward wild meat (not wildlife), however, can be expected to divert from these categories proposed by Rickenbach et al. (2017) and van Vliet et al. (2022a), as a question on wild meat implies *de facto* a dead animal used for food or medicine and therefore implies a materialistic connection to wildlife.

VOs are influenced by socio-economic variables at the personal and social level (Manfredo, 2008; Manfredo et al., 2009). Deruiter & Donnelly (2002) proposed a four-dimensional framework of

“determinants of value orientations” toward wildlife: (1) socialization (childhood role models, social networks, media, and education), (2) experience (contact with the natural world), (3) personal characteristics (religion, gender, and generation), and (4) place (rural versus urban). Gifford and Nilsson (2014) divided 18 categories into social and personal contexts.

In Guyana, wildlife management legislation has recently been introduced¹. The history preceding this first legislation to manage hunting in Guyana is detailed in Paemelaere et al. (2022). The government has now taken an innovative approach by protecting most threatened species from any harm by law while not prohibiting the use of species that are currently commonly consumed, even if globally threatened. Instead, management plans are being developed for these and other commonly traded species to promote sustainable use. With the support of a sustainable use program, the government is developing behavioral change campaigns to support the new wildlife legislation. Here, we present research on wild meat value orientations to underpin these campaigns. Specifically, we looked at value orientations in relation to personal and social contexts and how they associate with wild meat consumption behavior.

2 Methods

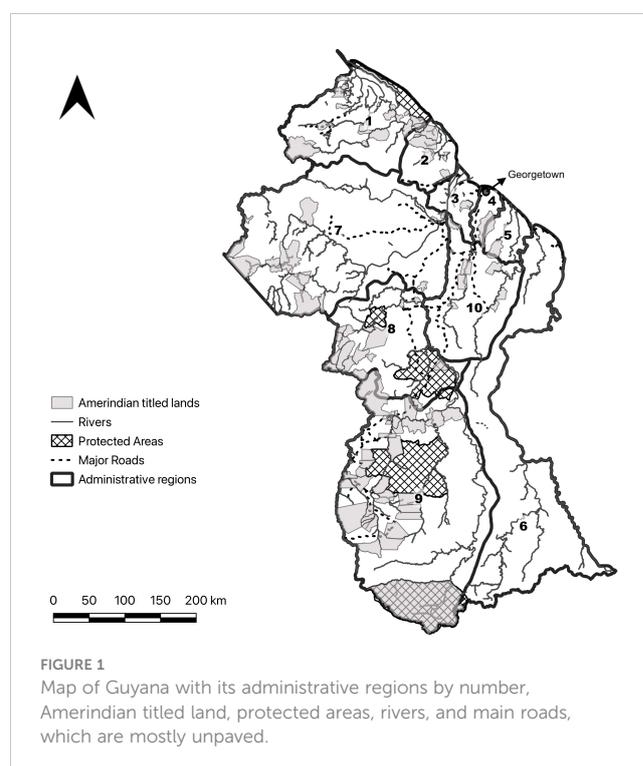
2.1 Study site

Guyana is situated in northern South America, between Venezuela, Brazil, and Suriname and bordering the Atlantic Ocean. Its citizens are concentrated in the capital Georgetown and other urban centers, towns, and villages along the coast and consist mainly of people of East-Indian (40%), African (30%), and “mixed” (20%) descent. Caucasian, Latino, and Chinese ethnicities form a minority. The remainder of the country is referred to as “the interior”, which is largely covered in natural habitat of forest and savanna. This area is chiefly inhabited by different Indigenous Peoples (11% of citizens of Guyana) living on titled lands. Indigenous villages included in this study all had access to domestic meat sources through cattle and chicken rearing in the village or market access. Additionally, a few towns have developed to serve the mining and logging concessions, attracting not only citizens from all over Guyana but also foreigners (mostly Asians, some South Americans) contracted by the companies. These diverse ethnicities in Guyana include a wide variety of religions. Most are Hindu (25%) or Pentecostal (23%). Other religions include Anglican, Methodist, Roman Catholic, Jehovah Witness, Seventh Day Adventist, Muslim, and Rastafarian, all constituting between 1% and 6% of the population. Other types of Christians constitute another 20%, and 3% considers themselves atheists (Guyana Bureau of Statistics, 2016). Among Indigenous Peoples, most have converted to one of these religions, although some traditional practices have remained (Luzar and Frago, 2013). There are no

paved roads in the interior, and a single unpaved road bisects the country and connects the capital Georgetown with Brazil (Figure 1). Other roads serve logging and mining concessions and associated towns.

2.2 Data collection and analysis

Between October, 2020 and June, 2021, interviews were conducted across Guyana. The interviews were part of multiple initiatives to understand the use, trade, and livelihood importance of wild meat. The surveys were initially conducted in person. They started in Indigenous villages and an interior town. Within Indigenous territories, households were included based on their presence at the time of the visit and willingness to participate, targeting at least 10% of households. In the town, households were selected on a map on which we had assigned numbers to houses and used a random number generator for selection, also targeting 10%. When all household members were absent at the time of these visits, the household was revisited at a later time. At the start of the second initiative, due to national coronavirus disease, 2019 (COVID-19) restrictions, surveys had to be continued by telephone, for which we also used a random number generator to select phone numbers from the phone directory. The initial number of households selected corresponded with 1% of the households of the locations listed in the directory; however, many could not be reached. The persons conducting the interviews had all received the same training. We have no reason to believe that the medium for conducting the interviews affected the answers. Because wild meat sales and consumption had not been restricted in Guyana and its consumption occurred openly with sign boards at markets and



¹ <http://wildlife.gov.gy/wp-content/uploads/2019/08/Wildlife-Conservation-Management-Sustainable-Use-Regulations.pdf>

restaurants, wild meat use was not associated with crime, and we had no reason to assume people’s answers would be biased.

To avoid duplicates from the multiple initiatives, we excluded interviews of persons who had previously participated in a similar survey, which was one of the questions. We also excluded interviews where the interviewee had skipped many questions or provided contradicting answers, e.g., stating that they eat meat once a month but wild meat weekly. Interviews of people not permanently residing in Guyana (foreign born or temporary residents) were also excluded. We removed 80 interviews and used a total of 890 surveys from Regions 2, 3, 4, 5, 6, 9, and 10. Regions 1, 7, and 8 could not be reached due to remoteness and limited phone access (Figure 1).

We collected geographic data and demographic data on living location (categorized into urban, town, rural, and Indigenous territory), gender, age, religion, self-identified ethnicity, and wealth (home ownership and motorized transportation availability; Supplementary Table S1). The wealth score ranged from 0 to 2: 0, no ownership of a home or motorized transportation; 1, home ownership or motorized transportation; 2, both home ownership and motorized transportation (Table 1). We asked interviewees about frequency of meat and wild meat consumption, the value they associated with wild meat (VOs), and whether they consumed it or not. Some responses were highly specific, whereas others, such as “dislike”, were broad. Based on a subsample of responses and the description of the value orientations provided by respondents, we built a categorization of VOs into negative, neutral, or positive VOs (Table 2), which reflected the level of attachment to wild meat. Negative value orientations represented dislike for wild meat either

TABLE 2 Values associated with wild meat.

Value direction	Value description	Value orientation (“short term to present VO in analysis”)
NEGATIVE	Unnecessary	Anthropocentric—negative (“NPersonal”)
	Wrong	
	Religious prohibitions	
	Health concern	
	Dislike	Biocentric (“Concern4Wildlife”)
NEUTRAL	Childhood: Not raised consuming	(“NotRaised”)
	Unavailable	(“Unavailable”)
	Neutral/Personal choice	(“Neutral”)
POSITIVE	Culture and Tradition	Materialistic (“Puse”)
	Source of income	
	Food source	
	Free food source	Anthropocentric—positive (“PJoy”)
	Natural and healthy	
	Enjoyment/Joy	
	Variety/Exotic	
Taste		

The central column lists the individual orientations based on the responses. To the left, we divided them into negative, neutral, and positive values. To the right, we re-categorized them based on aggregation in the analysis.

TABLE 1 Number of respondents per category of the variables.

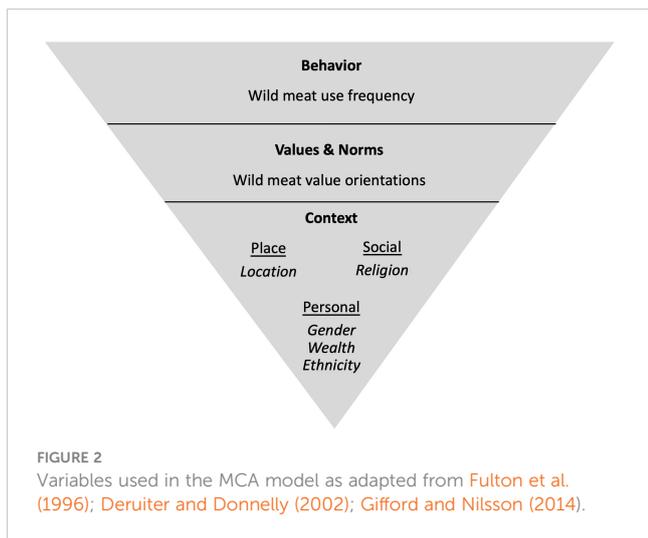
Variable	Category	Number of interviewees
Location	Indigenous	325
	Town	176
	Rural	193
	Urban	195
	(NA)	(1)
Gender	Female	370
	Male	517
	(NA)	(3)
Religion	Christian undefined	266
	Hindu	101
	Seventh Day Adventist	30
	Pentecostal	18
	Other	79
	(NA)	(396)
Ethnicity	Indigenous	334
	Afro-Guyanese	182
	Indo-Guyanese	134
	Mixed	169
	Other	3
	(NA)	(68)
Wealth	0	12
	1	368
	2	438
	(NA)	(72)

(NA) represents the number of respondents not providing an answer to the question.

because of religion, ethical reasons, concern for health, concern for wildlife, or the believe that consuming wild meat was unnecessary. Neutral VOs expressed no childhood attachment to wildlife or the fact that wild meat was unavailable and not part of their lives. Positive VOs expressed positive appreciation for wild meat in relation to taste, food, health, enjoyment, exotism, culture, and tradition or as source of income. We linked our categorization of VOs toward wild meat to the categorizations of VOs used for wildlife in the available literature (Dayer et al., 2007; van Vliet et al., 2022a) to show that these two categorizations are linked to one another as proposed in Table 2. Additional questions were asked for purposes beyond the scope of this paper, including species consumed. These data are not reported here but available from Paemelaere et al. (2022).

Based on the cognitive hierarchy of behavior (Fulton et al., 1996) and determinants from Deruiter and Donnelly (2002) and Gifford and Nilsson (2014), we considered location and social and personal determinants that could affect VOs and that in turn would affect attitudes and behavior (Figure 2). First, we looked for orientations by combining respondent characteristics with VOs and wild meat use frequency. Next, we explored VOs separately between the characteristics and behavior, respectively.

All statistics were run in R v.4.2.2 (R Core Team, 2022). We used Multiple Correspondence Analysis (MCA) to explore possible



associations between VOs, context variables, and wild meat use frequency in the FactoMineR ([Le et al., 2008](#)) and factoextra ([Kassambara and Mundt, 2020](#)) packages. We applied a chi-square test to confirm visually associated variables, removing the variables with the lowest contribution to the first two dimensions (closest to the origin of the x- and y-axes). For the negative anthropocentric, negative biocentric, materialistic, and positive anthropocentric value orientations, we also ran generalized linear models with binomial distribution including the variables location, gender, age, wealth, ethnicity, and religion with a stepwise backward selection process using a chi-square test with alpha=0.01. To test for multicollinearity, we used the “vif” function in the package “car” ([Fox and Weisberg, 2019](#)).

3 Results

Examples of answers from the respondents and their classification for the VOs are provided in [Table 3](#). Respondents typically related either one or more negative or one or more positive orientations, but 5% were ambivalent in their answers, which in nearly all cases involved being concerned for wildlife in addition to expressing positive VOs. Many felt neutral about wild meat (n=174; 20%). Concern for wildlife was mentioned by 12% of the respondents. Among negative VOs, the general “dislike” was most common; among positive VOs, these were wild meat as a food source and appreciation for its taste.

Wealth did not explain any of the variation and was removed from the variables (v-value: wealth0 = 0.67, wealth1=-3.72, wealth2 = 3.48). Because religion and ethnicity were closely associated [$X^2(df=65) = 371.73, p < 2.2e-16$], we continued with ethnicity alone, as this provided a stronger contribution to the first two dimensions. Furthermore, most Indigenous people lived in Indigenous villages, causing an association between location and ethnicity due to this particular group [$X^2(df=15) = 879.16, p < 2.2e-16$]. We ran the MCA with both variables together and separately.

Results were overall the same; the MCA with location and gender resulted in the highest contributions to the variation in the data in the first two dimension.

The MCA with respondent characteristics explained 27.5% of the difference with the first two dimensions (F1 = 17.5%, F2 = 10%). Location contributed the most to this dimension (v-value: Indigenous territory=-25.7, Rural=13.0, Town=8.5, and Urban=8.8), followed by gender (v-value: Male=-22.0 and Female=22.0). Looking at the VOs and wild meat frequency, the first two dimensions MCA explained 23.6% of the variation, and the biggest contrast was found between those never consuming and those consuming (v-value: Never=-24.7, Rare=-0.2, Yearly=7.8, Monthly=12.9, Weekly=10.7, Multiple times a week = 1.7, and Daily=4.0). When we looked at the VOs by combining behavior and respondent characteristics, excluding the respondent characteristics that did not contribute to explaining variation as explained above, the first two dimensions of the MCA explained 24.3% of the variations ([Figure 3](#)).

The linear models showed that negative anthropogenic VOs (Npersonal) were significantly associated with gender and location ([Table 4](#)). Women were more likely than men to express these VOs, as were citizens of rural sites compared to those of urban sites. None of the explanatory variables were significant for negative biocentric VOs. Positive materialistic and anthropogenic VOs were both predicted by gender, with men more likely to associate positive VOs with wild meat than women. We plotted the four VOs against the most important explanatory variables gender and location to visualize these results ([Figure 4](#)).

TABLE 3 Quotes from respondents to the question how they feel about wild meat and their categorization as value orientations.

Quotes	Value orientations
“If the people can eat fish and wild meat more than beef and chicken, the people will all be healthier, and our elders won’t be having sicknesses like diabetes and cancer”	Natural and healthy
“[Wild meat] is the Amerindian way of life. When the people used to eat only wild meat, our elders never had sicknesses like diabetes”	Culture and tradition; Natural and healthy
“Hunting helps save money. [Wild meat] is all natural and that makes it healthy”	Free food source; Natural and healthy
“[Wild meat] is healthy, but the people need to let [wildlife] live.”	Natural and healthy; Concern for wildlife
“According to my faith, eating wild meat is not good”	Religious prohibitions
“It is a unique experience”	Variety/Exotic
“Eating wild meat is not a good idea because many times when vendors sell it, it is left exposed to various factors, which is dangerous”	Health concern
“It is a personal choice whether or not to consume wild meat”	Neutral

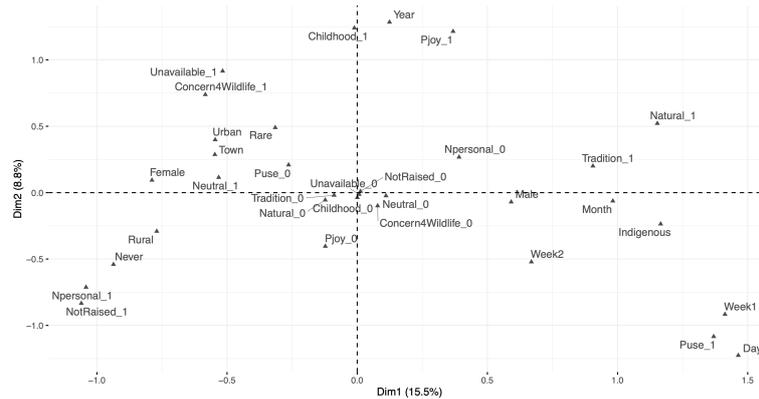


FIGURE 3 MCA with respondent characteristics, wild meat frequency, and the value orientations. Terms are explained in Table 1.

4 Discussion

We evaluated wild meat VOs across Guyana, examining location, personal, and societal determinants for their influence on these VOs, and further exploring how the VOs translated into behavior, specifically frequency of wild meat consumption. We detected a very wide range of VOs associated with wild meat, falling into positive, negative, and more neutral appreciations toward wild meat. We found that mostly men and Indigenous People expressed positive VOs, whereas women and rural citizens were more inclined to negative or neutral VOs. A positive materialistic VO associated with a high consumption frequency of wild meat, whereas respondents with other positive VOs consumed wild meat less frequently. Monthly consumption was associated with tradition and considering wild meat to be healthy and natural.

Negative anthropocentric VOs were associated with zero consumption. All VOs of “dislike”, “health concern”, “religious reasons”, “wrong”, and “unnecessary” consistently grouped together, suggesting that there may be a religious undertone to expression of all of these VOs. The reason that religion did not strongly associate with any of these VOs may be because multiple religions prescribe specific food prohibitions (Richards-Greaves, 2013). Further research asking specifically about religious

prohibitions and how strictly those are followed would be needed. Although religious prohibitions can have a very strong influence on people’s behavior, in the long term, there is also a risk of erosion of such traditions (Norris and Inglehart, 2011; Luzar et al., 2012).

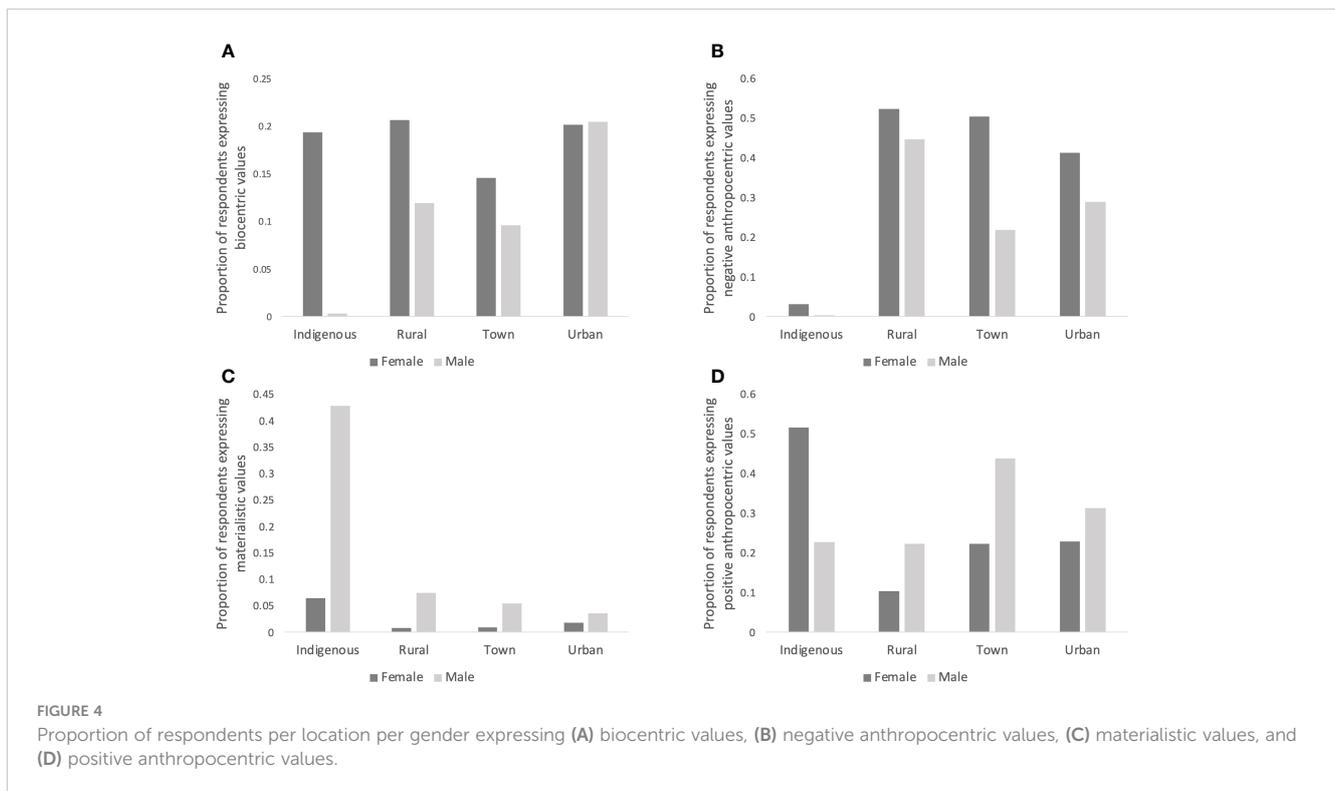
Positive VOs dominated among the Indigenous, assigning mostly materialistic VOs, tradition, and health. They were also the group with the highest frequency of wild meat consumption. A materialistic VO toward wildlife in general is typically seen among people that depend on it for their livelihood (Inglehart, 1997). Many Indigenous in Guyana still rely on wild meat as part of their livelihoods. Considering that they are a minority in Guyana, this is not a major concern for wildlife, and previous research has shown that hunting by Indigenous Peoples is mostly sustainable (Roopsind et al., 2017; Hallett et al., 2019), although local extinction may occur (Shaffer et al., 2017). This is likely due to the fact that their population size is small compared to the harvest zone, and human population densities of <math><1 \text{ km}^{-2}</math> are generally considered sustainable for subsistence use in tropical forests (Robinson and Bennett, 2000).

Nevertheless, this also included an association with monetary value. Selling of wild meat by the Indigenous in the south of Guyana is mostly done occasionally and may be more common when extra cash is required, e.g., to buy supplies at the start of the school year (Paemelaere et al., 2022). Sales or barter of wild meat by Indigenous

TABLE 4 Results of the binomial regression models.

Variable dropped	Df	Negative anthropocentric		Materialistic		Positive anthropocentric	
		AIC	p-value	AIC	p-value	AIC	p-value
<none>		539.42		118.43		380.55	
Location	3	546.17	0.0052	113.12	0.8754	380.07	0.1375
Gender	1	546.59	0.0025	129.58	<0.0001	393.38	<0.0001
Ethnicity	5	532.27	0.7234	114.59	0.2905	375.17	0.4647
Religion	9	541.03	0.0205*	105.95	0.7868	381.20	0.0283*
Age	1	537.83	0.5233	116.94	0.4731	379.40	0.3570
Wealth	2	536.45	0.5967	116.86	0.2965	377.46	0.6363

Values significant at alpha=0.01 are in bold, those at alpha=0.05 are indicated with a *. The biocentric model was not included as no terms were significant.



Peoples typically occur within the village at prices similar to those of domestic meat sources, which may stem from traditional practices of sharing (Paemelaere et al., 2022). This could in part also be due to the challenges of access to large outside markets (Suárez et al., 2009; Carignano Torres et al., 2022). For Indigenous villages near the coast, however, more market opportunities exist (van Vliet et al., 2022b). Increased market access may reduce Indigenous consumption of wild meat but could also convert wild meat into a valuable good to sell to urban areas (Chaves et al., 2017; Carignano Torres et al., 2022), where the price received would be higher than what is charged within the village. Therefore, for the Indigenous audience, the availability of wildlife friendly livelihoods that can be sustained without external funding (Wicander and Coad, 2015) and promoting both the continued or renewed practice and national recognition of customary law, which promotes sustainable practices, are essential in preventing a damaging impact of the economic potential of wild meat in the future as connectivity between Indigenous and urban centers increases. In Indigenous communities where Customary Law may no longer be highly valued, as may be seen along the coast, additional campaigns to promote sustainable management of wildlife resources and associated sales of wild meat will have to be considered.

There was a clear location effect on positive versus negative VOs. Generally, respondents living in Indigenous territories expressed positive VOs, whereas others leaned toward negative VOs. Furthermore, opposite viewpoints on the health benefits of wild meat showed between the coastal and Indigenous population. Health concerns may be associated with religion, and although particularly Christian religions from the coastal population now also dominate at Indigenous locations, prescribing meat restrictions (Luzar et al., 2012), traditional values of hunting and wild meat may prevail. Differences in

interactions with wild meat between Indigenous and coastal citizens may also affect these opposite VOs, as this refers to the VO determinant “experience” (Manfredo and Fulton, 1997; Deruiter and Donnelly, 2002). Where Indigenous people hunt and process the wild meat within their family unit, coastal citizens obtain the meat mostly from third parties through gifts or purchase (Paemelaere et al., 2022). Wild meat is also not processed in approved facilities, as is the case for beef or chickens, which may further impact people’s perception of the health of wild meat.

Concern for wildlife showed a similar dichotomy; it was associated with the coastal population. The absence of a significant pattern of location context in the linear models may be due to these models omitting all missing values (when a question was not answered), which were more common among Indigenous respondents. Biocentric VOs of wildlife have been found to be stronger among urban compared to rural populations, women versus men, and younger versus older respondents (Kellert and Berry, 1987; Jones and Dunlap, 1992; Steel et al., 1994; Miller and McGee, 2000; Vaske et al., 2001; Rickenbach et al., 2017; van Vliet et al., 2022a). In Guyana, age did not affect any of the VOs. The contrast of more women expressing biocentric VOs was strongest in Indigenous sites and non-existent in the urban environment. Location context has been found to play a role in the gender dichotomy of a more materialistic viewpoint of men versus more biocentric viewpoint of women (Miller and McGee, 2000). Wild meat in Guyana is consumed more frequently by men than by women due to social aspects (Paemelaere et al., 2022). Here, the question arises whether less contact with wildlife and wild meat results in such biocentric value orientation, or vice versa.

Respondents with biocentric VOs still consumed wild meat, although infrequently (rare/yearly). Consuming wild meat and

caring about wildlife are thus not mutually exclusive, as has also been seen elsewhere (Nguyen and Jones, 2022; van Vliet et al., 2022a). Holding seemingly contradicting values may also be explained by cultural additivity, where people incorporate values and norms from multiple sources, such as religions or other value systems (Vuong et al., 2018). In this case, the mix of religions, ethnicities with their specific traditions, and growing conservation movements in Guyana may result in such additivity. Moreover, a continuum between anthropocentric and biocentric VOs was already described decades ago (Steel et al., 1994; Vaske and Donnelly, 1999) but appears to have been applied mostly in temperate environments. The finding that wild meat consumption and caring for wildlife can go hand in hand offers a unique opportunity for positive messaging in behavioral change campaigns around wild meat (van Vliet et al., 2022a), with a clear segment of “early adopters” that care about wildlife and may adjust their wild meat consumption accordingly, or would likely do so if the impact of their actions on wildlife is clear.

The group that may consume most of the wild meat on the coast are the ones with positive anthropocentric value orientations. Those associating wild meat with taste, exotic food, unique experience, and general enjoyment were also the group consuming wild meat a few times a year to a few times a month. For the coastal population, this was strongest among men, particularly for towns and urban sites. For Indigenous people, this VOs was expressed more by women, whereas men focused on the materialistic value.

With the coastal citizens being the largest population of Guyana, even when only approximately 60% consumes wild meat and this at a lower frequency compared to the Indigenous (Paemelaere et al., 2022), still an estimated 361 tons of wild meat are consumed annually on the coast (van Vliet et al., 2022b). The top five species consumed also include threatened species, such as tapir (*Tapirus terrestris*) and white lipped peccary (*Tayassu pecari*) (Paemelaere et al., 2022; van Vliet et al., 2022b). Such consumption patterns could put species at risk. Similarly, the highest risk of Indigenous contributing to species declines would be through trade to these coastal markets (van Vliet et al., 2022b). Behavioral change campaigns must therefore prioritize the coastal audience.

Specifically, these campaigns must focus on men on the coast who associate it with enjoyment, such as sharing at restaurants and rum shops or at family events. The campaigns should aim to build on messaging that shows coexistence between caring for wildlife and the joy of wild meat, particularly because the notion of sustainability already exists in this society, albeit still limited. Promoting a shift away from sensitive species to more resilient species that are well-liked, such as paca (*Cuniculus paca*) and deer (*Mazama americana*) (Parry et al., 2014) while also instilling values of sustainability and maintaining wild meat as an occasional unique experience would be well-received.

Our study showed how VOs can differ greatly across a nation based on personal and social context and go well beyond nutritional needs, emphasizing the importance of research to support behavioral change campaigns targeting a select audience with a specific set of norms and values (Toomey, 2023). Whereas legal frameworks are the same for all citizens, behavioral change campaigns have the opportunity to speak to the public with a consideration for their different values to reach a single goal.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

The studies involving humans were approved by ethics review board – Centre for International Forestry Research. The studies were conducted in accordance with the local legislation and institutional requirements. Written informed consent for participation was not required from the participants or the participants’ legal guardians/next of kin because participants were asked to provide verbal consent after the introduction of the project and before starting the interview. They were also informed that they could end the interview at any time or choose not to answer a question. No names of individuals were recorded (anonymous interviews).

Author contributions

EP: Conceptualization, Data curation, Formal analysis, Funding acquisition, Methodology, Project administration, Supervision, Writing – original draft. AP: Investigation, Methodology, Writing – review & editing. TW: Data curation, Investigation, Methodology, Supervision, Writing – review & editing. GA: Investigation, Methodology, Supervision, Writing – review & editing. MP: Data curation, Formal analysis, Investigation, Writing – review & editing. HY: Investigation, Project administration, Writing – review & editing. AK: Investigation, Writing – review & editing. JZ: Investigation, Writing – review & editing. NV: Conceptualization, Funding acquisition, Methodology, Project administration, Resources, Supervision, Writing – review & editing.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Supplementary material

The Supplementary Material for this article can be found online at: <https://www.frontiersin.org/articles/10.3389/fcosc.2024.1277599/full#supplementary-material>

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