STIGMA AND COMMODIFICATION IN WILDLIFE CONSUMPTION AND CRIME

By

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ABSTRACT

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The illegal wildlife trade is one of the largest global criminal enterprises and encompasses the poaching, trafficking, and consumption of live animals and animal parts for food, medicine, pets, and entertainment. Reduction in demand for wildlife products is essential for conservation of biodiversity but requires an understanding of how legal sanctions and extralegal sanctions such as social stigmatization impact demand for wildlife products. Proposed interventions to counter poaching include the legalization of products from farmed wildlife and the captive breeding of wildlife for entertainment purposes, both of which rely on the commodification of wildlife. While these interventions are intended to saturate demand and reduce poaching, they may decrease the stigma against wildlife consumption. However, analyses of the stigma effect have relied exclusively on economic modeling and have not directly measured how legalization and commodification affect wildlife consumption.

This dissertation employed three papers to examine how the commodification of wildlife in wildlife farming and wildlife tourism impact wildlife consumption. The first paper used interview data to examine how scientists calculate the harms and benefits of wildlife farming and how the impacts of wildlife farming are influenced by contextual factors such as cultural practices, type of use, species, and geographic locale. The second paper conducted an experimental vignette survey in Mainland China (N=1002) to explore empirically how legalization and wildlife farming affect demand for wildlife products from four species (tiger, bear, snake, and turtle). Wildlife consumption bans lowered acceptability, increased stigma, and amplified perceived legal deterrents to wildlife consumption. Legality yielded increased acceptability, expanded social approval, and decreased

perceptions of punishment for consumption. The third paper analyzed quantitative survey data (N=12,378) from twelve countries to examine the links between wildlife tourism participation and wildlife consumption. People who participated in entertainment-based wildlife tourism that featured captive wildlife, such as wildlife selfies, elephant riding, and wildlife circus shows, were more likely to consume wildlife and purchase wildlife products. This dissertation discusses the implications of these results for wildlife tourism policies, wildlife law, and wildlife crime prevention.

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INTRODUCTION

This dissertation examines two forms of wildlife commodification (wildlife tourism and wildlife farms) and the relationship between these practices and wildlife consumption and crime. Mixed-methods (interviews, analysis of a preexisting dataset, and an experimental vignette survey) were used to examine this topic from both a qualitative and quantitative perspective. This methodology also allowed for a combination of a broad geographic focus (the preexisting dataset included data from twelve countries across five continents) with the specificity of a single country (the experimental survey was conducted in China). China was selected due to the enormous scale of wildlife consumption, trade, and farming that occurs in this country (Zhang and Yin 2014). This allows for an in-depth analysis of wildlife consumption and stigma within one social context, as well as a comparison of geographic difference. This introduction will define terms central to the papers that follow.

The papers that compose this dissertation draw on various theoretical frameworks in their discussion of wildlife consumption and crime. Within the literature on wildlife crime, the papers incorporate concepts from critical criminology (the social construction of deviance and a harm-based approach to examining crime) as well as situational opportunity theories of crime. The social construction of deviance views the law as a reflection of social norms, and a harm-based perspective allows for the consideration of both *legal* and *illegal* harms. While certain treatment of wildlife may be legal within particular contexts, these activities can still harm wildlife, or violate what is known in critical criminology as species justice (Sollund 2013; Wyatt 2013). A harm-based approach allows for a critical examination of how certain wildlife practices are labeled deviant (or stigmatized) while other harms are deemed acceptable; this approach also includes analysis of both the legal and illegal wildlife trades, as both involve harms (Wyatt 2014). The first paper draws upon this tradition to examine how the stigmatization or promotion of wildlife farms (and the harms and benefits of

wildlife farms) are socially constructed, or dependent upon contextual factors such as cultural differences, species, type of use, and other considerations.

The third paper also draws upon a harm-based approach by examining "wildlife consumption" as a broad category (which includes both legal and illegal forms of consumption). However, the third paper also integrates concepts from situational opportunity theories of crime (Wilcox and Cullen 2018). This view of crime posits that wildlife crime (like other forms of crime) results from the intersection of a willing offender, a suitable target, and an absence of a capable guardian of the target; addressing one or more of these factors is key to situational crime prevention of wildlife crime (Lemieux 2014). These two theoretical traditions have unique contributions. While critical criminology helps question the meaning of "crime" and problematize potentially harmful yet legal behavior (e.g. some forms of wildlife consumption), situational crime prevention provides empirical tools for mitigating current crime. These traditions can be used in tandem to both broaden and address what is known as "wildlife crime."

This dissertation also draws upon the literature on stigma and stigmatization. It uses the influential definition of stigma offered by Stafford and Scott (1986) as a "characteristic of persons that is contrary to a norm of a social unit" (p. 80). These characteristics can include behaviors, beliefs, or personal attributes. A norm is a "shared belief that persons ought to behave in a certain way in certain circumstances" (Stafford and Scott 1986, p. 81). Two primary features of stigma are that it is relative (it differs across time, culture, etc.) and that it is collective (it operates at the level of the social unit) (Stafford and Scott 1986). The first benefit of this definition is that it links to the literature on the social construction of deviance through the common language of norms; deviance can be conceptualized as a norm violation (Stafford and Scott 1986). Second, it is value neutral in its approach to norms and norm violations (it does not view norms or stigma as inherently "good" or "bad").

The sociological tradition of scholarship on stigma began with Goffman's work on the topic (Goffman, 1963) and has been applied to a wide range of identities that impact life chances (Link and Phelan 2001). Goffman (1963) observed that stigma is a relationship between an attribute and a stereotype. This conceptualizes stigma as a mark (or attribute) that associates a person with undesirable characteristics. Work on stigma tends to be interdisciplinary, drawing on social psychology, anthropology, and political science as well as sociology. The benefit of the sociological approach is that it moves beyond a cognitive understanding of stigma to analyze how structural forces (e.g. the social processes or power relations that allow particular norms to dominate) contribute to or perpetuate stigma (Link and Phelan 2001).

However, perhaps influenced by the negative connotations of the term stereotype (part of Goffman's original definition), the sociological literature tends to assume that stigma is a "predicament or a dilemma" (Link and Phelan 2001, p. 379) that harms marginalized groups. However, there has been little analysis of how the process of stigmatization might protect powerless groups such as wildlife through upholding or creating norms against their exploitation. The first paper of this dissertation broadens the concept of stigma through an in-depth analysis of both the harms and benefits of stigma. The process of stigmatization is not inherently negative or positive; the first paper discusses how it can be both a tool of alienation but can also serve a protective function through tampering demand for wildlife products.

This dissertation looks at two forms of wildlife commodification: wildlife tourism and wildlife farms. Commodification is the capitalist process by which nature is transformed into a product for the purpose of sale in markets; this often creates a distance between the commodity and its social and ecological consequences (Paterson 2014). When nonhuman animals undergo commodification, they are treated as inputs in the process of commodity production; they are viewed as production devices, managed to maximize profit, and valued for their exchange-value

rather than intrinsic or moral value. However, as sentient creatures, animals retain their own needs; they can never be fully commodified. Thus, wildlife and other animals can be conceptualized as what Karl Polanyi termed fictitious commodities (Stuart and Gunderson 2018). From this perspective, endeavors to overcome incomplete commodification produces alienation and intense harm; the animal is alienated from his conspecifics, his natural behaviors, and from his own productive activity/product (Stuart and Gunderson 2018). This can occur even if the animal is alive, as in tourism (Schmidt-Burbach et al. 2015). For example, captive elephants commodified as tourist products are often isolated from other elephants and unable to express natural behaviors such as dust-bathing, social interaction, and movement; they are alienated from their own productive activities (walking, bathing, eating, etc.) as these are performed on tourists' schedules and often become detrimental to welfare (e.g. the elephant is forced to walk too much without rest in order to maximize the number of tourist rides and thus profit).

Concern over commodification is one of the defining differences between the environmental and animal rights perspectives on the wildlife trade. From an environmental perspective, commodification is not inherently problematic and new forms of commodification (such as the expansion of wildlife farming) have been proposed as supply-side solutions to species decimation (Wang et al. 2019). From an animal rights perspective (Wyatt 2014), commodification overlooks the animal suffering inherent in the wildlife trade and therefore violates what is known as species justice. Scholars within this tradition have also proposed that, through entrenching animals as mere resources, commodification can reduce the stigma against wildlife consumption.

Commodification informs how this dissertation conceptualizes "wildlife consumption." Consumption is not limited to food-based uses of wildlife but includes any interaction where a consumer is engaging with wildlife as a commodity. Live commodification occurs in tourism and the pet trade (e.g. paying to take a selfie with a wild tiger or buying a pet reptile). At other times, the

commodity is from a deceased animal and is consumed for medicine (e.g. tiger bone or bear bile), for ornamentation (e.g. ivory, snake leather), or for food (e.g. frogs, turtles). This broad definition of wildlife consumption is congruent with prior research on the wildlife trade (Zhang and Yin 2014) and acknowledges how the market continuously creates wildlife commodities and new ways of consuming wildlife. For example, the commodification of wild animals for selfies is a relatively new "tourism product" that has emerged from technological advances and social media (Rizzolo in press).

Wildlife farming is a broad term that encompasses a variety of contexts and species. The definition of wildlife farming used in this dissertation is based upon interview data with wildlife farm experts (described in paper one). Respondents defined wildlife farming as the commercial breeding of a wild, non-domesticated species. This definition includes three aspects: a) the commercial intent (the production of wildlife for sale), b) the breeding of a species, and c) the use of a "nontypical" wild species that is "beyond the traditional domestic animal."

Wildlife farms are a subset both of supply-side conservation and of sustainable use more broadly. Supply-side conservation refers to practices meant to provide wildlife products in a more sustainable way (Phelps et al. 2014). This form of conservation usually involves the legalization of wildlife products; the idea is to saturate demand with legal (often farmed) wildlife in order to prevent poaching. This is distinct from demand reduction, which aims to reduce (rather than saturate) demand. Wildlife farms involve the legal production, trade, and consumption of live wildlife or wildlife products for food, medicine, pets, and ornamentation. Therefore, they are a form of "sustainable use" and are subject to the larger debates over that approach. While this debate is complex, a main argument for sustainable use is that is promotes livelihoods and economic incentives for conservation (Webb 2002). A counter-argument is that sustainable use in the context

of the wildlife trade both ignores the suffering and needs of nonhuman animals (this is the species justice critique, Wyatt 2014) and only serves to increase demand for wildlife products (Tensen 2016).

While the terms "wildlife farming" and "wildlife ranching" are sometimes used simultaneously, these production systems tend to be different. As Bulte and Damania (2005), note: "wildlife farming typically refers to intensive management and husbandry of wild stock and wildlife ranching usually refers to less-intensive management in semi-free ranching contexts" (p. 1224). Wildlife ranching is common on the African continent, but less so in China and Southeast Asia, where wildlife farming is widespread (Taylor et al. 2016; Brooks et al. 2010; Haitao et al. 2007). While production systems vary, "wildlife farming" is usually assigned that term due to its replication of the techniques used in intensive agriculture, such as a high density of animals in a small, closely managed space.

The species used in wildlife farming involve animals from every taxon (Tensen 2016). Birds are farmed for the pet trade, reptiles (turtles and snakes) for both food and pets, frogs and shrimp for food, porcupines for meat, crocodiles for their skin, bears for their bile and tigers for their bones (both used in Traditional Chinese Medicine). While most of these animals are killed prior to becoming commodities, some (often birds and reptiles) are traded live for the pet trade. Bears farmed for bile are kept alive for many years, often in cages where they can only move their head, with an open wound through which bile is procured, which causes severe pain (Kikuchi 2012). Unlike wildlife ranches, where wildlife sometimes have freedom of movement, many wildlife farms restrict animals' space and their expression of natural behaviors, particularly for large carnivores and migratory animals (Environmental Investigation Agency 2017; D'Cruze et al. 2015).

Like wildlife farming, "wildlife tourism" is a broad term that encompasses activities with diverse environmental and social impacts. Wildlife tourism includes varied activities: viewing wildlife in their natural environment, circus-type shows, transportation (e.g. elephant riding), hunting and

fishing, wildlife sanctuaries, and visits to zoos or aquariums (Newsome et al. 2005). A relatively new form of wildlife tourism is the selfie safari; this involves close contact with a captive or baited wild animal for the purpose of obtaining a selfie, a photograph in which the self is a primary focus (World Animal Protection 2017). Wildlife tourism is often defined along three dimensions. First, it can occur in captive, semi-captive, or wild environments (Tisdell and Wilson 2012). Second, wildlife tourism venues differ in the relative emphasis they place on conservation or entertainment (Shackley 1996; Fennell 2012). Third, wildlife tourism is often categorized as consumptive or non-consumptive, with non-consumptive wildlife tourism defined as human recreation that does not remove or permanently alter wildlife (Duffus and Dearden 1990).

Similar to wildlife farming, certain forms of wildlife tourism use captive wildlife for highly commercialized purposes. For example, elephant tourist camps in Thailand breed captive elephants for human entertainment and profit and claim that such commodification will reduce pressures on wild elephants, who are being poached to supply the tourist trade (Schmidt-Burbach 2017; Nijman 2014). Thailand is one of the epicenters for entertainment-based, captive wildlife tourism that uses endangered species, such as tigers and primates, for shows and selfies (Schmidt-Burbach et al. 2015). One of these most well-known venues, the Tiger Temple, has been accused of animal abuse and of laundering tiger parts into the illegal wildlife trade, and is also a site of conflictual cultural norms about the correct treatment of captive wildlife (Desai 2016; Cohen 2013).

The model of tourism exemplified by Thailand's Tiger Temple, which allows visitors to pose in proximity to wild animals for a photograph, is also expanding in other parts of the world, such as the Amazon (World Animal Protection 2017). The number of wildlife selfies on Instagram (one of the primary platforms for this form of photograph) rose 292% from 2014 to 2017, and over 40% of these selfies displayed a problematic level of proximity between the person and the wild animal (World Animal Protection 2017). The featured species included elephants, sloths, koalas, tigers,

lions, turtles, macaque monkeys, gibbons, orangutans, slow lorises, dolphins, snakes, anteaters, ocelots, toucans, and manatees, with most posts from Australia, the United States, the United Kingdom, Thailand, Indonesia, Canada, India, and Brazil (World Animal Protection 2017). As with wildlife farming, it is important to examine how the commodification of wildlife in tourism might affect wildlife consumption, and in particular to examine this new and understudied form of "selfie" wildlife tourism. This dissertation examines how both wildlife farms and wildlife tourism affect wildlife consumption.

CHAPTER 1: WILDLIFE FARMING, STIGMA AND HARM

Introduction

Wildlife farming, or the commercial breeding and legal sale of non-domesticated species, is both increasingly prevalent and persistently controversial. Some conservationists promote this practice as necessary to stem rampant poaching, while others argue that wildlife farming will decrease the stigma of wildlife consumption and thus increase demand for endangered species (Bulte and Damania 2005). While several papers provide useful frameworks for evaluating the conservation claims of wildlife farming (Phelps et al. 2013; Tensen 2016), these works focus on environmental impacts. However, the adoption or rejection of wildlife farms often depends upon considerations additional to conservation, such as livelihoods, animal welfare, and cultural practices. This paper uses qualitative interview data with key informants (scientific experts) to analyze a) the harms and benefits of wildlife farms and b) how the social construction of deviance influences the stigmatization or promotion of wildlife farms.

Given the cultural, legal, economic, and environmental complexities of this topic, a qualitative approach is useful for understanding the dynamics of wildlife farming and its impact on species, communities, and individual animals (Drury et al. 2011; Rust et al. 2017). However, there is a paucity of qualitative research on wildlife farms in the scientific literature. Further, given cross-cultural variation in the legal status of wildlife farms, and the tendency of crimes against wildlife to be invisible and/or institutionalized (Wyatt 2014) a harm-based approach allows for the more comprehensive analysis of the effects of wildlife farms. This perspective goes beyond the legalistic definition of crime to include detrimental impacts on wildlife that are permitted by law. Finally, prior work on wildlife farming has looked at wildlife farmers or the public but not at scientists themselves. This entails what Sandbrook et al. (2013) term "social science on conservation," as it examines how conservation functions as a social and political practice (p. 1488). Scientists have the power to shape

the contours of what is acceptable in wildlife policies (Feldpausch-Parker et al. 2017). Their perspective provides valuable insight into how the meanings of "harm" and "benefit" are constructed.

This paper analyzes interview data from eight scientists from a wide range of fields[1]. The scientists functioned as key informants (Marshall 1996). They were a source of expert information on the harms and benefits of wildlife farming and how the impacts of wildlife farming are influenced by contextual factors such as cultural practices, type of use, species, and geographic locale. After reviewing the pertinent literature on wildlife farms, stigma, and a harm-based approach to wildlife crime, this paper will describe the sample of scientists, how the scientists defined wildlife farming and its prevalence, the main harms and benefits of wildlife farms, and the core factors that influence the stigmatization or promotion of wildlife farms.

Literature Review

For many wildlife species, current rates of consumption are unsustainable (Zhang and Yin 2014) and regulatory and enforcement actions insufficient (Wong 2017). Some conservationists have proposed wildlife farming, or the commercial breeding and legal sale of non-domesticated species, as a potential tool for saturating the demand for wildlife products and reducing poaching. However, in order to improve species' conservation status, wildlife farming needs to meet various conditions that involve both biological characteristics of the species and the mechanisms of demand (Phelps et al. 2014). These requirements include the farmed product functioning as a substitute for the wild product, a lack of laundering (which occurs when wild-caught animals are falsely labeled as captive-bred), no restocking of the farmed stock with wild animals, farming being more cost-efficient than poaching, and demand remaining constant (Tensen 2016).

[1] The sample included respondents from both the social and biological sciences.

It is rare for these criteria to be met (Tensen 2016; Challender et al. 2019). Often, dual markets develop for wild-caught and farmed products (Phelps et al. 2014), as consumers tend to prefer and be willing to pay more for wild-caught wildlife (Hanley et al. 2018; Davis et al. 2016; Gratwicke et al. 2008). Legal wildlife farms can also launder animals for the illegal wildlife trade (Lyons and Natusch 2011). Particularly for species that don't breed well in captivity, such as bears, wildlife farms are often filled either partially or fully with wild-caught animals (Livingstone and Shepherd 2014). The risks of poaching continue to be low and the profits high, which threatens to undermine the legal trade (Gratwicke et al. 2008). However, wildlife farms also can provide likelihoods and/or sustenance to impoverished communities (Aust et al. 2017).

It is important to examine how wildlife farming affects the social acceptability of consumption (known as the stigma effect), because this can determine whether wildlife farming meets or increases demand for wildlife products (Dutton et al. 2011; Dang Vu and Nielson 2018). The stigma effect is the notion that the legalization of a product can decrease stigma against its consumption, which in turn amplifies demand (Fischer 2004; Tensen 2016). An understanding of stigma is thus essential for analyzing the conservation impacts of wildlife farms. Further, the notion of stigma is useful for understanding cultural variability in the acceptability, legal status, and perceived impacts of wildlife farming.

One influential definition of stigma is a "characteristic of persons that is contrary to a norm of a social unit" (Stafford and Scott 1986, p. 80). The presence or absence of stigma around different forms of wildlife consumption is influenced by both the social construction of the commodity (the wildlife product) and the social construction of deviance. The economic value of wildlife products is inextricably linked to social valuation and perceptions. For example, cultural beliefs about the superiority of wild over captive-bred products exerts a heavy influence on the economics of the wildlife trade (van Uhm 2018).

Further, social norms shape the legal and extralegal (social) sanctions for wildlife consumption (or the lack thereof). Deviance can be defined as "acts, beliefs and characteristics that violate major social norms and [that are] disvalued and stigmatized" (Goode 2015, p. 4). What constitutes deviance is socially constructed and is informed by social norms about what is "right, good, and proper"; these norms often are congruent with beliefs or practices that support a particular way of life (Goode 2015, p. 5). In order to examine the stigma effect of wildlife farming, it is necessary to understand how different social norms shape the construction of stigma and deviance.

The social construction of deviance views the law as a reflection of social norms. Therefore, this paper uses a harm-based approach for its analysis of wildlife farms. A harm-based perspective allows for the consideration of both *legal* and *illegal* harms. This is important for two reasons. First, human treatment of wildlife exhibits extreme cross-cultural variability; a legal practice in one country might be classified as animal abuse in another. A focus on harm casts a broad net that can encompass diverse practices. Second, the notion of harm includes effects of wildlife farms on individual animals, or what is known in critical criminology as species justice (Sollund 2013; Wyatt 2013). Animal well-being/welfare within the wildlife trade is drastically understudied and requires more integration with the conservation literature (Baker et al. 2013). Wildlife farms can have severe and detrimental impacts on individual animals (IFAW 2007; Willcox et al. 2016), but these harms are often legal. A harm-based approach allows for a critical examination of how certain harms against wildlife are labeled deviant while other harms are deemed acceptable (Wyatt 2014).

Methods

This paper used in-depth, semi-structured key informant interviews with eight scientists to examine the research questions. Qualitative methods were chosen due to the complexity and novelty of the topic of wildlife farming as well as the importance of respondent-driven narratives in

examining the research questions. Wildlife farms are a relatively new phenomenon, and qualitative methods are particularly important in the exploratory phase of research (Drury et al. 2011). Qualitative methods focus on depth over breadth, are well-suited to the examination of complex processes, and can elicit insider information that could easily be missed by a pre-set quantitative research instrument (Drury et al. 2011; Rust et al. 2017).

A semi-structured interview format provides a general framework but also presents an opportunity for the respondents to generate new areas of inquiry, which is particularly important for an understudied topic such as wildlife farming (Drury et al. 2011; Rust et al. 2017). This research method also places an emphasis on the scientists' own discourse, or *how*, as well as what, content is expressed. Questions are intentionally open-ended so as to provide space for the respondents' individual interpretations of the research topic. This allows respondents to express uncertainty, complexity, and ambiguity (Drury et al. 2011; Rust et al. 2017). This is important given the intersection of the complex environmental, cultural, legal, and animal welfare aspects of wildlife farms.

Key informants are experts with access to specialized knowledge about a community and/or topic (Marshall 1996). Interviews with key informants are useful for accessing detailed information about new areas of inquiry. Key informants are identified based on their knowledge of the topic under study, are able to provide complex answers to open-ended questions, and are an important starting point for understanding the terrain of a new social issue (Elmendorf and Luloff 2001).

The interview questions were divided into three parts (Appendix A). The aim of the first section was to explore how each scientist approached the process of evaluating the harms and benefits of wildlife as well as conservation more broadly; the respondents were asked to define terms such as "conservation," "wildlife farming," and "correct treatment of wildlife." The second section asked about the potential harms of wildlife farming. The third section asked a series of questions

about the social construction of deviance and stigma as it pertains to wildlife farming. The aim of this final section was to understand the complex contextual variables (such as species, cultural attitudes, legal contexts, or environmental impacts) that influence the stigmatization or promotion of wildlife farming.

The sample was generated through Google Scholar, a leading platform for scientific discourse and exchange of scientific articles. This was used to generate a list of scientific experts on wildlife farms. The researcher searched for articles published in English from 2010 to 2019 under the search terms "wildlife farming", "bear farming", "tiger farming," "snake farming", and "turtle farming."[2] Search results that had not undergone peer-review (such as dissertations, news articles, book chapters, and NGO reports) were excluded from analysis. For all remaining results[3], the first author (or corresponding author, if different) was contacted through an emailed recruitment letter and (for non-responders), a follow-up reminder. Thirty-three academics were contacted and eight agreed to participate for a response rate of 24%. The sample was balanced in terms of gender (50% male and 50% female). IIRB approval was granted through Michigan State University (study number 00002854).

Although the sample size was small, the variability of the sampling frame was replicated in the sample. The researcher read all of the abstracts in the sampling frame to identify sources of variation and coded for relevant attributes. The abstracts differed in species of wildlife studied, academic discipline of the author, geographic focus, and orientation towards wildlife farming (some abstracts emphasized the harms of this practice while others focused on the benefits). The sampling frame, while small, replicated the variability of these relevant attributes. The experts had knowledge

[2] The use of species-specific search terms was to ensure that the broad term "wildlife farming" was not biased towards articles on mammals. However, the species-specific terms produced few results that met inclusion criteria. All of the authors in the final sample were found through the more general "wildlife farming" search term.
[3] From the first twenty pages of search results.

on a variety of farmed wildlife species from different geographic and ecological milieus (Table 1). The academic disciplines of the respondents were also varied and included economics, conservation social science, environmental governance, ecology, biology, and consumer behavior. Numerous respondents had conducted interdisciplinary research either individually or as part of a research team. The interviews generated robust data on *both* the harms and benefits of wildlife farms.

The purpose of these key informant interviews was to generate in-depth narratives from diverse expert voices that could generate preliminary information about the impacts of wildlife farms and thus inform further research on this topic. The rigor of qualitative research can be evaluated by its dependability, credibility, confirmability, and transferability (Moon et al. 2016). The author put in place the recommended safeguards to achieve these attributes, such as reflecting on her own potential biases, tailoring the questions to the experiences of the respondents, triangulating the data with other methods (the quantitative portion of this dissertation), and seeking clarification from respondents regarding her interpretations of their words (Moon et al. 2016).

Due to the geographic range of the participants (who were located in four continents: North America, Europe, Africa, and Asia), interviews were conducted through Skype audio. Skype allows interviews to be recorded and downloaded in a secure format. Skype audio was chosen over video in order to prevent bandwidth issues (some of the participants were in remote locations with a poor Internet connection) and to ensure consistency with how the participants interacted with the interviewer.[4] While audio/phone interviews can increase social desirability bias, especially in response to sensitive questions, and can alter self-reported behavior, they also allow for a greater geographic reach (Brewer et al. 2004; Knox and Burkard 2009). Audio interviews were deemed appropriate for this research since a) participants were asked about their research, not about

[4] Due to time differences of up to 12 hours between the interviewee and the interviewer, the interviewer sometimes conducted interviewees from work and sometimes from home; the audio format removed the potential influence of interviewer location.

personal behavior, and b) a wide geographic range was essential to the aims of this paper. All interviews were conducted, recorded (with permission from the respondents) and transcribed by the author for accuracy. Interviews were an average of 45 minutes (with a range of 30 to 60 minutes). Due to the relatively small number of interviews, the analysis was done by hand without the aid of software. The author read the transcripts multiple times, developed codes based on reappearing themes, then re-read each respondent's transcript to identify quotations representative of each code. Codes that could not be supported by quotations were eliminated, and codes with a high degree of overlap were consolidated into broader themes.

Results

Respondents were diverse in their expertise and geographic focus. Their work examined a wide range of species that encompassed both mammals and non-mammals in varied marine and terrestrial environments (Table 1.1). These species were farmed (or being considered for farming) for different reasons; while some were used for food, others were farmed for Traditional Chinese Medicine. Congruent with high rates of wildlife farming across China and Southeast Asia (Brooks et al. 2010; Haitao et al. 2007) the majority of respondents had expertise in this geographic reason. However, several respondents worked in other geographic contexts such as Africa and Oceania.

Table 1.1: Sample

Respondent	Wildlife Species of Expertise	Geographic Focus
1	Snake	Asia
2	Rhinoceros	Asia; Africa
3	Bear; Tiger	Asia
4	Numerous Fauna	Numerous Continents
5	Giant Cane Rat	Africa
6	Sea Turtle	Oceania
7	Numerous Flora and Fauna	Asia
8	Bear; Pangolin; Numerous Fauna	Asia

While all respondents defined conservation as a process that focused on species-level or population concerns (rather than individual animals), they emphasized different parts of this process

(Figure 1.1) and some did not identify as conservationists. Further, when asked how to determine the correct treatment of wildlife, or how to structure human-wildlife interaction, respondents mentioned a variety of factors other than conservation. These considerations included moral, animal welfare, cultural, economic, and criminal factors (Figure 1.2). All of the respondents mentioned at least two of these factors and discussed their efforts to simultaneously balance numerous, sometimes conflictual, priorities. As views of conservation and the correct treatment of wildlife inform how "harms" and "benefits" in wildlife farming are defined, the respondents addressed this question from various angles. This heterogeneity within the sample allowed for a rich examination of how different cultural contexts, approaches to conservation, and species differences impact the evaluation of wildlife farming.

Figure 1.1: Respondents' Definitions of Conservation

"The preservation of ecological integrity both in its optimal form and in varying *compromises associated with anthropogenic integrity*."

"*Preservation* of natural resources."

"*Active management* that aims to preserve biodiversity and ecosystem functioning."

"Maintaining the environment or maintain any natural assets such that they are also available to *future generations*."

"Maintenance or improving of the *conservation status* of the species."

"Efforts to protect ecosystems and species but across a wide range of strategies…including *highly protectionist through to sustainable use*."

"Successful efforts to keep sustainable populations in a functioning role in *their native habitats*."

Figure 1.2: Respondents' Definitions of the Correct Treatment of Wildlife

Cultural Factors
"Strictly science-based but with some qualifications…different cultural perspectives have to be taken into consideration."

"They [some NGOs] only focus on conserving the rhino but for me, conserving the rhino and protecting the rhino is equally as important as the health of the local people."

"The term "correct" is fraught with complexity… when describing bear farming, the response is 'I can't understand how people over there can be so brutal to animals.' [There is] lack of recognition of the context. In Buddhism, the correct treatment of animals is simply to let them live a life and if that life is awful, they're still living a life… so that is correct treatment."

Moral/Animal Welfare Factors
"[We should] consider that animals also feel stress and pain; unfortunately our religion and culture have often taught us differently… [I] look at it from a moral point of view."

"Ideally I would like for individuals [individual turtles] not to suffer."

"Fair and ethical treatment of individuals [individual animals]."

Economic Factors
"I'm trained to look at animals as the path of productive capital that you maintain and harvest in order to generate income… For me it is important that the animal welfare is maintained but in the end it's the human being that needs some form of protein and then it depends upon whether the protein from animals, plants, or insects is socially and [its] connection with the price and areas of demand."

"I would consider the value of the industry…is it an industry that's employing a lot of people…is it a useful or a beneficial industry in any way or is it just breeding, hybridizing animals for designer pets or something like that."

Conservation Factors
"When I speak about the correct treatment of wildlife ideally, I'm speaking about what is good for the common good of the species. So that's why wildlife farming is internally a challenging topic for me…I'm willing to say: I don't agree personally that wildlife farming is correct morally but if I can see the evidence and the project is leading to an improved state for those animals in the wild then I'm willing to make that trade off."

"My first consideration would be the impacts on wild populations. And impacts on other species, such as prey and predator."

Criminal Factors
"I would consider the criminal element… involved in wildlife farming in some places there's a criminal element, an organized crime element."

Wildlife farming is a broad term that encompasses a variety of contexts and species. Most respondents defined it as the commercial breeding of a wild, non-domesticated species. This definition includes three aspects: a) commercial intent (the production of wildlife for sale), b) the breeding of a species, and c) the use of a "nontypical" wild species that is "beyond the traditional domestic animal." However, as discussed below, the label "wildlife farm" is sometimes misleadingly applied or withheld in order to gain social approval for the practices occurring at the facility. While wildlife farming is often perceived as applying only to fauna (animals), some respondents noted that the farming of wild flora (plants) is technically included under the term "wildlife." Further, wildlife farming intersects with numerous other fields other than conservation. Several of the respondents self-identified as experts not in wildlife farming but in adjacent fields such as wildlife domestication and consumer demand.

Respondents mentioned that it is important to differentiate wildlife farming from other forms of captive breeding. According to one scientist, "there are two kinds of captive breeding: conservation breeding and commercial breeding (or wildlife farming)." The commercial aspect of wildlife farming distinguishes it from other forms of captive breeding that have a more explicit conservation purpose, such as breeding animals for release into the wild or for the intent of genetic diversity. Another participant clarified that it's also important to distinguish between "open and closed-circuit systems" of captive breeding. This refers to, among other aspects, "where the primary stock comes from, and if it's continually enhanced with wild individuals or not." While some wildlife farms rely exclusively on captive breeding, others supplement, either initially or continually, their captive stock with wild animals. Other wildlife farms, such as bear bile farms, use all wild-caught animals because the conditions of use (space restrictions and poor welfare) prevent breeding. In the case of bear bile farms, the label "wildlife farm" is technically inaccurate but still widely used.

Numerous respondents concurred that wildlife farming is expanding overall. However, the prevalence of this practice depends upon species and country. As the farming of some species wanes, it emerges for others. One respondent noted that "certain animals will decrease in how much they're farmed (such as bears in some countries) but now you see a lot of porcupine farms." Another scientist mentioned that, due to social pressure and the ban on international trade in the species, there is only one sea turtle farm remaining (in the Cayman Islands). While wildlife farming in increasing in Asia, in other geographic contexts the scientists expected it to lessen over time. One respondent clarified that the increase in farmed wildlife includes species inaccurately labeled as captive-bred; he said that "the trade in species declared as captive bred is expanding but in parallel with that is laundering of wild-caught species being declared [as] captive-bred, that is also expanding."

The scientists used various factors to evaluate the harms and benefits of wildlife farms (Figure 1.3). All of the respondents mentioned the detrimental consequences of wildlife farms on animal welfare: signs of extreme stress, food deprivation/low-quality nutrition, dehydration, limited space sometimes to the point where the animal was unable to move, inability to engage in natural behaviors (such as migration or socialization), and the separation of mothers from their young. The scientists were not veterinarians but, as first-hand observers of wildlife farms who often worked in interdisciplinary teams with veterinarians, they all brought up animal welfare as a concern. One respondent who studied bear farms described bears in "tiny rusty cages" with a "catheter inserted in its gallbladder to remove bile, which absolutely shortens their life and I can imagine is painful and uncomfortable and gives them a plethora of diseases."

While much of the debate over welfare in wildlife farms is focused on mammals such as bears and tigers, respondents who studied reptiles also brought up animal welfare as a detrimental impact. A scientist who looked at sea turtle farms explained "the animals were biting each other all

the time, [and] they were quite stressed, [and] they weren't really able to show their natural behaviors. Those are all ways that you can say that animal welfare is being harmed. I'm sure there's different levels to that…. stress levels is probably a good indicator and they were physically attacking each other. There are people who say: 'well you also see that when you visit a cow farm' and that might be true, but that doesn't mean it's OK from an animal welfare perspective." Another scientist who studied snake farms mentioned welfare abuse that occurs because of the physical resilience of reptiles; although these animals can survive rough handling and long periods without food or water, "they are suffering as much [as mammals]."

The difficulty of balancing animal welfare with other concerns (such as likelihoods) was mentioned by several respondents. As one scientist noted: "I don't think anyone who would say we are going to produce wildlife of any sort would say that we can create enclosures that match wild conditions and some people might say that that's the only condition under which they would accept wildlife farming. I appreciate that the economics of it, and space and so on, make that fundamentally impossible. Like with most things, I suspect there's a compromise." However, some of the scientists (particularly those who focused on mammals), noted that the "scale of suffering" reached a point where animal welfare became a paramount factor. One scientist who visited bear farms said "I can't remove myself from evaluating it in the context of the welfare of the animals, which supersedes anything…for me the welfare dominates everything…I think people who can debate farming, particularly of these large carnivores, they don't see these terrible farms and they actively remove themselves from having to confront that."

Figure 1.3: Factors Used to Evaluate the Harms and Benefits of Wildlife Farms

Animal Welfare
Environmental Impacts
- Poaching
- Laundering
- Waste
- Genetics
- Land Management
- Climate Change

Sustenance
Commercialism
Scale
Demand
Consumer Preferences/Attitudes
Species Differences
Substitutability
Accessibility
Governance

The respondents emphasized the environmental harms (or in some cases, benefits) of wildlife farms. This first potential harm was poaching. The conservation claims of wildlife farms rest upon the assumption that legal, farmed products will provide a cheaper substitute to poached wildlife. However, numerous scientists mentioned that this is difficult to achieve because "wildlife farming involves a lot of costs; infrastructure, operating costs, regulatory and certification schemes, all involve a lot of costs, and on the contrary poaching involves low costs." One scientist noted that, even if wildlife farms lower the cost of wildlife products, this must be combined with higher risks for poachers or this will have counterproductive effects. Of crocodile farms he said: "crocodiles breed well in captivity… that's not the issue and it may have impacts on the price. But if there's no risk to the poacher, maybe the price has halved, but all that means is that the poacher now needs to get twice as many animals to continue his income. It doesn't matter how low the prices go [for farmed products], if there's no risk profit is still profit." A common comment was that "poaching continues as farming continues." However, it was mentioned that the relationship between wildlife farms and poaching is difficult to prove one way or another because of the complexities of the

wildlife trade. As one scientist replied: "That's one of the arguments that I hate: that farming will decrease poaching. It's used for example in China because there are legal farms in China and the bear populations in China are apparently, we don't really know for sure, relatively stable; however, that does not take into account all the Chinese poachers coming into Southeast Asia or the tours (illegal wildlife tours going into Southeast Asia) or the international trade coming across."

Other environmental considerations include laundering, waste, genetic pollution, land management, and climate change. Laundering occurs when illegal, poached products are falsely declared as legal and captive-bred. Wildlife farms can open up a "channel for the laundering of illegally sourced animals into the international market; for example geckos are taken from the wild in Indonesia and laundered to the global market and declared as captive bred and they're not." The waste of wildlife farms can harm the local ecosystem; for example, frog farms in Thailand produce "massive amounts of waste because it's cheaper to produce them [frogs] en masse in very small enclosures." In contrast, snakes produce very little waste so "in China, snake farming is the only livestock activity that can be practiced on the edge of rivers because there's no waste." Genetic pollution can occur when farmed animals are released into the wild, either intentionally or accidentally. Wildlife farms often breed animals for traits favored by humans (e.g. docility, size, or color). rather than species health; this "selective breeding" can produce "hybridized taxa" which is problematic from a conservation standpoint. However, one scientist mentioned that snake farms can have positive environmental impacts. He noted that snake farmers promote "pesticide-free rodent management since they want non-poisoned rats to feed their snakes." Snake farms are also "amenable to climate change" because snakes can be raised in a relatively small area, require very little food inputs (snakes are "90% more efficient than warm-blooded animals like chickens or pigs"), and are tolerant of extreme weather events such as drought. The environmental harms and benefits of wildlife farms thus vary greatly depending upon the type of production and the species.

Since "wildlife farming" is a broad term, it encompasses both luxury products and sustenance-based or small-scale food production, which present vastly different contexts for determining harms and benefits. One respondent who studied the domestication of the giant cane rate in Cameroon noted that "the advantage of this animal is that, since it is small, it can be reared by farmers who are poor, who do not have a lot of capital to invest in stables and fences, or whatever you normally need to keep animals." Similarly, another scientist who researched snake farms emphasized how this species is uniquely suitable for small-scale farmers with limited resources, since snakes can be raised on a vertical plane and require minimal and sporadic food. This influenced how the respondents weighed the differential impacts of wildlife farms. As one interviewee said: "if you deal with poor farm families who endure every year, over parts of the year, devasting hunger, the question of whether to domesticate an animal or not is a question of whose welfare is more important, the person's welfare or the animal's welfare, and then if you can't satisfy both, I would say it's the human being that should be given advantage."

Scientists who researched sustenance-based wildlife farms and/or small-scale farms that produced wildlife for food tended to focus on the benefits of farming. In contrast, respondents who framed wildlife farms as commercial enterprises often emphasized harms. Numerous scientists viewed wildlife farms as primarily a profit-driven (rather than conservation-oriented) enterprise. One scientist noted that "[wildlife farming has] always been for maximum profit; it's never been for a conservation reason, as least for these large carnivores." Another said: "there are very few examples where farming has been used primarily as a conservation strategy versus as a commercial thing that may or may not have ancillary conservation benefits…the examples that I can think of that are actually conservation driven are sea turtles in the Caimans and it's been tried for orchids." Another scientist with expertise on sea turtle farms described how these facilities too became commercialized: "when this business was created in the 1960s, the initial rationale behind it was let's

try wildlife farming as a conservation tool… but as they kept doing it, you need to find money to run these things, and at the same time you realize the potential in terms of attracting people to go and visit [so now] it's more like a theme park along with a wildlife farming facility…it just developed that way because they need money."

The profit motive also shapes the impact of wildlife farms on animal welfare, particularly the volume of animals in a restricted space. For example, since sea turtles "take so long to grow and so long to be ready for slaughter, you have to have a lot in order to meet demand. You have to have a lot [of turtles] at the same time because you have different cohorts. And also of course these facilities are restrained by size"; this leads to extreme crowding and stress for the turtles. The profit motive can also lead to an expansion of demand. As one scientist said: "when it's profitable people will begin using these products in different forms or ways. So let's say tiger bone was once only used for back pain or whatever it was and now you have tiger wine which is supposed to cure cancer too… that's how the economy works, if there is a demand and it's readily available people will of course try to make more money out of it." When industries market new uses for the wildlife product, this impacts patterns of consumption.

A primary way through which the scientists conceptualized the harms and benefits of wildlife farming was the impact of this practice on demand for wildlife products. Surging demand for wildlife amidst an extinction crisis was seen as a primary driver of wildlife farms: "if you're going to supply demand purely by going out and shooting a bear, it's not going to work, because there's no bears left. Keeping them in captivity means you have a constant supply of bile." Some respondents mentioned the saturation of demand as a benefit of wildlife farms (specifically of snake farms).

Others noted that wildlife farms can increase demand. One scientist who researched bear farms noted, "demand is so rampant. These animals are gone so the only way to continue filling this demand is to have them in farms. So what that means is that you're fueling this demand, you're

continuing this demand…. when the [bear] farming started [in Vietnam], it became this huge fad so it absolutely increased demand. And that demand has maintained. I don't think it ever decreases demand." Another scientist agreed: "farming often increases demand… For example the Asiatic black bears in Korea… once the government legalized farming, the bears went extinct in Korea because of that." Tigers were mentioned as another example where farms have failed to decrease demand: "Tigers bred like flies in captivity and are still getting completely decimated in the wild in all of their range states so clearly the tiger farms in China haven't removed any of the demand for wild tiger."

However, several respondents mentioned that demand is nuanced and it is difficult to establish direct causation between wildlife farms and demand. As one scientist noted: "we don't know [the impact of wildlife farms on demand for wildlife products] because demand is so variable. Wildlife farming I think it can decrease demand for wild products if people are happy with substitution. However, I think it does normalize consumption of certain species, which increases demand. But I think it can probably increase demand for the farmed one rather than the wild one…but we also know, and again it depends on the product, if things are rare, they're going to also be increased demand for them in certain communities." Demand for wildlife products is complex and informed by numerous variables, which include consumer preferences and attitudes, species differences, substitutability, and accessibility. In addition to considering demand more broadly, the scientists examined each of these factors.

One mechanism through which wildlife farms influence demand is the enhanced accessibility of wildlife products. If farms lower prices, this can broaden the consumer base. As one scientist noted, "wildlife farming could also decrease prices and then it would become available to a larger group of people. With high prices most people simply couldn't afford these luxury products." Another concurred: "now there's a whole new market available, so demand has gone up." When endangered

animals are farmed, the volume of products increases, and so can demand; "some of these animal products were very rare in the past and now that they're being bred on a large scale more people have access to them, and that already could increase demand." Wildlife farms also make procuring wildlife products easier. One scientist said that, at least for wild animals, "it's been a challenge for someone to poach them… when you remove the farms you remove the easy accessibility and you add in all those challenges."

Numerous scientists looked at the impact of wildlife farms on demand in terms of preferences. This included analyzing "if having something [legal and farmed] available was changing people's attitudes towards the wild or farmed turtle meat or if they were still interested in buying illegal meat." Another scientist noted that, "I think the perception that consuming or purchasing from a farm is not detrimental to wild populations is probably the biggest threat posed by the captive breeding industry." While wildlife farms are intended to shift preferences towards more sustainable options, they can also yield greenwashing, or the false presentation of wildlife products as environmentally beneficial.

The effects of wildlife farms on demand are also species-specific. For some species, such as snakes, "[farming has] saturated demand… supply outstrips demand massively in the snake trade." However, snakes are resilient to "high levels of harvest" while other species such as turtles take years to breed and mature. Species differences sometimes produce radically different results. As one scientist explained: "For crocodiles, farming has been legalized for many years and it has relieved the poaching crisis in some countries, not all countries. For crocodiles the demand is just focused on meat and skin, so the demand has not increased, so I think the crocodile farms have helped relieve the poaching crisis in some countries, but I think for other species it is a quite different. Bear farming has been legalized for quite a long time but bear farming has not contributed to reducing poaching of bears from the wild. For bears there is one market for legal products and one market

for illegal products. In Thailand, Laos, and Vietnam, there is a preference for products from wild bears. So the promotion of bear farming hasn't reduced the demand for products from wild bears. Farming bears is not a solution to the poaching crisis. And has negatively affected the welfare of bears." Wildlife farms can produce differential results due to biological characteristics of the species, such as time to maturity, ability to breed in captivity, and resilience to harvest. At other times, as evidenced by the contrast between crocodiles and bears, it is substitutability (or lack thereof) that produces variable outcomes.

Substitutability occurs when one product forms a replacement for another product within the market. The impact of wildlife farms on depend depends upon whether they can provide an alternative (or substitute) for poached wildlife; "if they [consumers] prefer horn from farmed rhinos, then farming rhinos can be a solution, but if more of them prefer horn from wild rhinos, then farming rhinos might not be a solution." A primary obstacle to substitutability is consumer preference for wild products. "If you can give consumers something that they want that's a legal, sustainable alternative then there's no economic or psychological reason that they shouldn't accept it. Unfortunately, we know that for a number of species, both because of the rarity effect and because of perceived differences, and in some cases because of real differences, their preference is for wild [animals]." This can lead to parallel markets for the farmed product and the wild product. For example, in the case of turtle consumption, "there is a group of people who prefer to get turtle from the wild, because they say it's so much tastier, and it's healthier, and the flavor is different and so on." The strength of this preference for wild turtles is such that captive-bred turtles were poached from the wildlife farm and falsely labeled as wild-caught.

For some species, such as snakes, the market for wild-caught animals "is a much smaller market and it does not represent a threat to wild populations." However, for other species, these markets for wild and farmed products are "often not even competitive, meaning that these are often parallel,

separate markets, so for these species poaching will often increase." In this case, wildlife farms can create an additional market (for the farmed product) that does not mitigate the original demand for wild-caught animals; multiple scientists mentioned that this has occurred in the case of bears. Yet the markets for farmed and wild products often interact as they "often operate together: [they are sold in the] same markets, same restaurants, [by the same] traders." For some species, a lack of labeling leads to a single market; "as one scientist noted of giant cane rats: "they don't put a label on it they just put the animal on the table…you don't see if it was from the wild or reared in the back garden."

The impact of wildlife farms on demand is influenced by governance; good governance is "not only a prerequisite, it's the prerequisite [for wildlife farms to have benefits]." "In order for farming to have a conservation benefit it goes far beyond just choosing a species that breeds like a rabbit in captivity. There has to be very strict laws and enforcement in place to prevent continual hunting or poaching of the wild populations. There has to be traceability to ensure that the retailers and consumers can ensure that the product they're buying is from the farm and not wild."

Even when parallel markets of farmed and wild products occur, good governance can help prevent poaching. For example, salmon farms have led to "a massive increase in [farmed salmon] consumption from the United States but we haven't, including because of good governance, we haven't seen an increase in demand for wild salmon. Or we have seen an increase in demand for wild [salmon] but we've controlled it because we have a decently good regulatory system and strong enforcement." According to one scientist, snake farms in Asia are also "quite well-regulated."

However, when strong governance is absent, wildlife farms can have counterproductive effects on wild populations. In Southeast Asia, where wildlife farms are prevalent, "the governments don't always have that much power" and/or conservation regulations are not adequately enforced. Numerous respondents mentioned species where captive breeding has helped wild populations in

countries with strong governance but has failed to protect wild animals in Southeast Asia. One scientist discussed crocodile farming: "in Australia that's had a bit of success; in Southeast Asia farming has not been helpful for wild crocodile populations…… in fact in Southeast Asia I can't think of one example that has helped wild populations." Another example is Indonesian cockatoos. These birds "are bred in captivity in the US and the US trade in cockatoos is now almost completely relying on locally bred birds so there's no negative impact [from the US pet trade] on Indonesia's populations anymore but cockatoos are still poached in huge numbers in Indonesia and laundered through countries like the Solomon Islands and other countries to support demand in countries that don't have strict legislation like the US does."

Good governance of wildlife farms requires resources to differentiate between farmed and poached products. As one scientist noted, when "there's a legal source of animals that makes it really challenging to arrest someone that might have an illegal wild turtle because we can't really tell which is which by looking at it. And I think that's quite a normal concern to have. What they are trying to do in the Cayman Islands they are trying to make sure that every time you buy legal turtle it comes in a certified bag with a lock or something like that. And you have to keep it closed until you cook it or eat it."

Numerous respondents discussed the current lack of good governance in wildlife farms and the resultant laundering (the false presentation of poached animals as legally farmed). However, they differed in their interpretation of laundering. Some construed laundering as primarily a governance issue. One respondent said: "I can think of lots of examples of laundering. Now does the fact that there's laundering does that mean that wildlife farming cannot reduce wild demand; no, it means that there's poor governance. Just like, we have taxes to collect in Indonesia and a lot of people either pay bribes or don't get collection of taxes, they get around it, and happens in the States, does

that mean that collecting taxes is automatically bad? Not it means that there's a governance failure around it." Other scientists viewed laundering as endemic to legal wildlife farms.

Thus far, this paper has analyzed how scientists construct the harms and benefits of wildlife farms. Next, it examines how the social construction of deviance influences the stigmatization or promotion of wildlife farms. The harms and benefits discussed above are interpreted and acted upon within complex cultural, economic, and political contexts, all of which influence the construction of stigma.

Stigma itself can have both limiting and protective effects on wildlife. A few respondents mentioned the harmful effects of stigma within the conservation community. One noted that "there is a huge stigma or misperception that just because it's [the animal's] wild it must be endangered," which restrains promotion of wildlife farms. Another scientist said that, within the conservation community, sustainable use is stigmatized by some and animal welfare/rights is stigmatized by others; this can limit discussions of tools to protect wildlife, which can harm conservation.

However, the scientists also noticed the benefits of stigma. One remarked on how bans can create a protective stigma: "there was a huge stigma on elephant ivory but then it started to become legal again and I think people saw it as elephants are doing just fine and that stigma of using ivory has actually decreased and elephants are now killed in the tens of thousands again." Others noted that stigma can create limits to consumption that help keep it within sustainable limits: "when you're speaking about wildlife consumption, I think it's good to have some barriers about what's OK to do and what's not OK because otherwise it creates so much demand that you can't sustainably meet that demand. So in a way it's good that [in the Cayman Islands], they still see sea turtle, even if it's farmed, as something that is consumed occasionally, because if they wanted to consume sea turtle every day, that's completely unsustainable." In discussing stigma, the interviewees mentioned numerous factors that influence the stigmatization or promotion of wildlife farms: cultural

differences in wildlife use, the label "wildlife farm," demand reduction efforts, consumer knowledge and motivations, what the stigma is attached to, and geopolitical factors (Figure 1.4).

Figure 1.4: Factors that Influence the Stigmatization or Promotion of Wildlife Farms

The "wildlife farm" label
What is the stigma attached to?
- Species
- Type of production

Cultural differences in wildlife use
- Attitudes/norms
- Traditions
- Heterogenous or homogenous societies

Consumer typology
Geopolitical factors
- International or domestic consumption
- Politics
- Tourism

Demand reduction efforts

The label of "wildlife farm" itself can affect how a facility is perceived. Sometimes, this term is applied even though the "farm" relies solely on wild-caught animals. Discussing bear bile farms, one scientist emphasized that: "bear farms don't breed bears; the bears are not going to ever breed in the cages they're in… many of them can't even stand up, let alone breed. Some of them are kept in metal suits so they can't move; they can move their head and that's it. We visited every one of them…there's not one bear farm in Southeast Asia that breeds bears." In this case, the label "farm" can be seen as an attempt to legitimize these facilities.

In other contexts, the phrase "wildlife farm" is purposefully omitted in order to prevent social disapproval. In the case of a sea turtle farm in the Cayman Islands: "Before, the name of the facility was the Cayman Sea Turtle Farm or something like that but eventually due to marketing they changed the name so now there's a name like Cayman Islands Water Something…it doesn't say anything about farming…so sometimes people go there on boat cruises or something like that and they don't really realize it's a wildlife farming facility as well…. and what they find a bit strange is

that if they visit the restaurant, they serve a turtle burger and I think that probably raises some questions and then they realize "oh yes they are farming turtles.' But it's not in the name anymore. And that's all due to the business side and knowing that if people see very quickly that it's wildlife farming facility, they may be a bit put off."

The wildlife farm label can also be greenwashed: promoted as conservation-friendly when it's not: "a lot of importing countries like to say that they're importing captive-bred animals so that they don't have a negative impact on wild conservation. So the exporting countries pick up on that and say that all these animals that were wild last year are captive-bred this year and they basically change the wording on the paperwork and [then] the importing countries feel like they're doing something good." These examples all indicate how the label "wildlife farm" itself is subject to various social meanings, which in term influences the stigma (or lack thereof) of the practice of wildlife farming.

The process of stigmatization also depends upon what characteristic of wildlife consumption in particular the stigma is attached to. For some charismatic wildlife species, the stigmatization of wildlife farms reflects a broader social disapproval of use of that species. One scientist described the contrast in stigma for crocodile and turtle farms: "for example, crocodile farming, I haven't looked at the number but there are so many farms across the world and people don't really think twice if they're using crocodile skin shoes. Personally maybe I wouldn't use them but I think it's more mainstream that using anything turtle related…it's the stigma around some species. I think in people's minds it's OK to farm some species and not others and that makes a big contribution to why some species are on the increase and others aren't in terms of wildlife farming…sea turtles they are a very charismatic species that people are very fond about so there's a real emotional and cultural attachment to sea turtles so it's not something that people support. So it's [the turtle farm] is the last one and I would not expect to see other facilities starting sea turtle farming." Another respondent

noted: "People who consider tiger farming absolutely abhorrent will enjoy wild salmon or farmed salmon without giving it a second thought."

The stigma might also be attached to the type of production (farmed or wild-caught). "In countries where animal welfare and conservation is a higher social concern, they are worried about where they get their product from. For example, one watch company in Switzerland, they are very concerned about where their leather wristbands are coming from… they do not want illegally sourced or wild-caught snakeskin wristbands on their product."

When countries make a decision about whether or not to promote wildlife farms "it depends upon local attitudes and social norms." Cultural differences impact a variety of views, such as "views about what can and can't be eaten; welfare standards; what types [of production and consumption] are OK with which types of species; whether or not habitat and likelihood considerations should come into this." It is important to understand these cultural differences because "wildlife farming is happening in other cultural contexts… and it's going to happen in those other country's contexts because of sovereignty." The stigmatization or promotion of wildlife farms are "not endemic to production systems" but rather a reflection of "different [cultural] relationships to animals."

One area of cultural difference concerns which species are acceptable to consume. In Southeast Asia, wildlife consumption and wildlife farms are intertwined. One scientist noted: "If an animal is being consumed in Southeast Asia, it's 99% likely it's being farmed" as wildlife farms are "unfortunately very integrated into the legal wildlife trade there." Further, the consumption of numerous wildlife species are normalized. One respondent said that: "snakes, or at least reptiles, are as much a cultural norm in Asia as chickens or pigs in more temperate climates…this is a species that's been on the menu for millennia." Another scientist commented: "for most of the Western countries, the use of rhino horn is stigmatized but in Asian countries like China, Hong Kong, and Vietnam, the use of animals in traditional medicine has been there for thousands of years and it

doesn't have any stigma." He continued: "in some Asian countries, there's no stigma attached to the consumption of endangered wildlife products like tiger bone, rhino horn, or bear bile… they [consumers] only care about the price and the quality. The reason bear bile is a failure is that consumers believe that the quality of the bear bile from the farms is not very good. And the same for rhino. And the same for tiger. They don't care much about the farming; they just care about what they get in terms of the quality and the price." In this instance, the stigma is not attached to the species or production method, but to the market value of the product. The stigma resulted from the perceived inferiority of farmed wildlife products.

Cultural norms often yield attitudes towards wildlife that are counterintuitive to someone from another culture. One scientist described how Buddhism (a prominent religion in Southeast Asia) views the correct treatment of wildlife: "In Buddhism, the correct treatment of animals is simply to let them live a life and if that life is awful, they're still living a life… so that is correct treatment." In Laos, "people were overwhelmingly, 'oh I absolutely love bears, and I use bear bile.' It is hard for people in a Western context to understand but it makes perfect sense for them because they have always used the resources of the forest, and you can love a tree and cut it down."

When cultural traditions are tied to wildlife consumption, wildlife farms can be promoted as a mechanism to preserve those traditions. For turtle faming in the Cayman Islands: "the stories they [local people] told me is that initially in the Cayman Islands it wasn't easy to farm any other animals or fruits or anything like that and so they were using sea turtles as a very important source of protein. And so anyone who is very connected to the history of the Cayman Islands, and connected to the sea, they remain attached to that." As one scientist noted, when wildlife species used for cultural traditions are being decimated in the wild, "you can either destroy that tradition, you can let that species go to extinction and destroy that tradition also because there's nothing left, or you find an alternative, which sometimes is promoting use of other species, but wildlife farming kind of

emerges as a possibility there." He continued "it's much easier to produce than it is to change demand. And also when demand is culturally tied, there's perhaps very little desire to change demand. Part of what we do, who we are, what we want…It's very easy for the United States to ban ivory or to say we don't farm tigers, because there's not really any tradition of doing that, but decide that we are going to ban turkeys or deer hunting… then there are a lot of people that would have problems with that."

In heterogenous countries with diverse cultural traditions, the process of stigmatization or promotion of wildlife farms may look different than in more homogenous countries. One scientist said: "in Asia, there are some countries that are fairly homogenous (in Japan and South Korea people have fairly similar norms and beliefs) but other countries in Asia (such as China or Vietnam) are heterogenous and so there are different groups of people with very different social norms, values and beliefs. For example, in China, one group might think there's no problem, no stigma, with using tiger bone, but for other groups, such as young people, they might find a stigma. So the stigma depends upon the society. In a homogenous society, the stigma is general for the whole population but, in a heterogenous society, a stigma might only apply for a particular group of people."

Another respondent described the heterogeneous culture of the Cayman Islands, where the government has promoted turtle farms but where turtle consumption is highly stigmatized upon certain segments of the populace: "it's such a small island and you have so many nationalities there. You have a lot of Americans, British, Jamaicans, so people with many different perceptions about what's socially accepted in terms of turtle farms. But in terms of the government of course the government is Caymanian and they always thought this [turtle farming] was very important for them in terms of their identity as a country. The type of issues that were discussed if you were speaking with someone local or someone from the States or UK it was so different; it's like you were speaking almost about different topics. So it was someone local, especially someone older who was local, they

would speak about the history, they would speak about the cultural value, and even show you pictures of how it was back in the day and maybe even giving you recipes or telling you what restaurants you should go to get the best turtle… that's the type of things they were telling me. If you were speaking to a British citizen there, they were saying 'oh yes, it's awful, the animal welfare, I would never do that' and often they would say 'I don't even understand how someone would be willing to eat turtle'."

As demonstrated above, while stigmatization can occur at the societal level, it can also differ among segments of the population. Types of *motivation f*or wildlife use affect stigma creation. One scientist noted: "if people are doing it out of need, then stigmatize it all you want, it's probably not going to work. And if people are doing it because they're bad boys who don't really care what anybody thinks, you might actually increase their desire to do it, so I think that stigma's relationship to motivation is a little bit more complicated and has to be really targeted and tailored rather than some generic 'this is bad'." How the consumer relates to the product (is it necessary? Is the illegal aspect the main draw?) will impact both consumption patterns and efforts to increase stigma.

However, at times the lack of stigmatization around wildlife farms is due not to attitudes or cultural beliefs but to a dearth of awareness (in both producer and consumer countries) about the practice. In consumer countries "there's a real ignorance" of "believing that everything is captive bred and therefore feeling OK with buying wildlife products just because they're declared as captive bred. Or without understanding the consequences or the impacts of breeding that species on wild populations." In producer countries, "the first step [to stigmatization] is to make people aware of what's going on; that alone "can already establish a stigma because a lot of people don't have an opinion about these practices because they don't know much about it." When "people are not aware that the practice occurs in their country or don't care to know the extent of it," "governments make

the main decision" about the stigmatization or promotion of wildlife farms in their countries. Numerous geopolitical factors influence this choice.

The decision about whether or not to allow wildlife farms sits at the intersection of international and national forces. The wildlife trade is governed "by international agreements like CITES[5]; if a country is a signatory to one of those agreements, then they need to follow that; that decision is governed or met by the local government in terms of national laws and policies." However, the stigmatization of wildlife consumption can differ significantly between the international and national levels, which can create conflict over wildlife farms. The last sea turtle farm in the Cayman Islands illustrates this. "When the turtle farm was created, it was still legal to trade sea turtle internationally… but at the same time some very important international decisions were made regarding the international trade of sea turtles… so there was let's say a big fight because at that time the Cayman Turtle Farm was claiming that their turtles were completely bred within the Cayman Islands and that they weren't relying on wild animals anymore so they shouldn't be seen as a wild farming facility… it was saying that yes initially we took animals from the wild but now everything is bred locally… so it's almost like they wanted to see this as domestic and it's like selling cow there's no problem this is not wildlife. It's almost like they wanted to be seen as outside of those agreements [CITES] and [saying that] we can still do it." Once and awhile there are petitions about this and once in awhile when there are CITES meetings people still discuss this. But clearly there was a lot of government support locally within the Cayman Islands to have this as a legal activity." Local resistance to international agreements can lead to the promotion of wildlife farms for domestic consumption even when its stigmatized at the global level.

[5] CITES stands for the Convention on International Trade in Endangered Species of Wild Fauna and Flora. It is an international agreement between governments aimed at ensuring that the international trade of plants and animals does not threaten their survival.

Political influence or enmity between countries can also affect stigma. If wildlife farms are viewed as a success in one country, other countries can attempt to emulate them. For example, "in Vietnam, [bear bile] farming has been phased out but we are worried that if people argue that bear farming is working in China, then Vietnam might go back to legalizing bear farms." On the other hand, political animosity between powers can lead to a stigmatization of farmed wildlife products. In her discussion of bear bile farms, one scientist mentioned that "in Cambodia, there is a slight stigma because they don't really understand farming; so to them it's fake, it could be fake [bile]. And it's something Vietnamese and the Cambodians hate the Vietnamese. So I think in that sense it's a stigma. They're not particularly fond of the Chinese either and now the Chinese do stuff like that [farming wildlife] …that's probably why farmed bear bile hasn't become a thing in Cambodia, because they're so against the Vietnamese." While this stigma emerged due to conflict between human groups/countries rather than the production method used, or the treatment of wildlife, it still attached to the farmed wildlife product and affected its social acceptability. However, sometimes stigma affects consumption but not production. The same scientist continued: "the Vietnamese hate the Chinese and will not take Chinese bear bile in Vietnam. However, it goes the other way… one of the [Vietnamese] bear farmers I spoke with sends all his bear bile to China."

Since some wildlife farms also function as tourist attractions, tourism is another site for the intersection of international and national influence on stigma. One potential issue with wildlife farm tourism is that it could create more demand. For example, for the sea turtle farm in the Cayman Islands, "because it's such a touristic place, there were concerns about restaurants that were serving turtle meat to tourists, because they were saying that was creating more demand. Basically we have the turtle farm that is producing some meat for domestic use, and yes the tourists are doing it there so it's still domestic, but it's not like they're [the tourists are] doing it because of their cultural tradition it's just because they're trying something new… so you're increasing demand without really

needing to increase demand." However, tourism can also increase stigma of wildlife farms. Tourists may approach wildlife farms with different notions of appropriate wildlife treatment than the local population. To return to the Cayman turtle farm: "because people go and see pools with a number of animals, some of them showing stress and showing some of these bites, and I think that's why some of these issues [objections to the farm] come to be because it's a place where people go to visit and they see for themselves. Just by having that that's why people are aware of why it's not the best for the animals." As tourism involves both cross-cultural views on animals and access to wildlife farms, it can impact stigma.

Finally, the respondents mentioned deliberate efforts to target wildlife consumption through demand reduction campaigns. This process can be seen as an attempt to alter social preferences and practices. Much of wildlife consumption has a social component; for example, "bear bile is usually transmitted socially in terms of it's given to you by your friend or family member to treat some form of ailment." However, demand reduction must have cultural resonance in order to avoid counterproductive effects.

One scientist discussed how stigmatization of consumers can actually prevent behavior change: "others think 'when I'm talking to consumers, I'm talking to a criminal' or something like that but for me I respect everybody; my role is to provide insights so that they can make decisions, so I respect everybody: even the people who use rhino horn, I want to find a solution for them, I want to find a solution to conserve the rhino…when conservation organizations address demand reduction, when they think about traditional medicine, they always think that the product has no benefits and that the consumer is stupid… but when you talk to local people, they feel insulted by some of these campaigns. For example the campaign that 'rhino horn is not medicine' has a lot of problems in Vietnam and has created objections from the local government…this doesn't take into account cultural differences, history, social aspects…they didn't talk to the local people or the

consumers or TCM practitioners, and that campaign did not have effects on consumers, and in some ways created outrage from the local people." Another respondent noted that "sometimes the message [about wildlife consumption] not only isn't culturally appropriate to what actually changes people's behavior, what they care about, but sometimes it's actively counterproductive…alienating people is generally not a great way to get them to change their behavior. In any sector. It leads people to double down." If stigmatization alienates consumers, and/or is not achieved through cultural resonance, it can increase the promotion of wildlife consumption and farms.

However, another scientist mentioned a demand reduction campaign around bear bile use in Cambodia that took these factors into account. She said: "Western medicine is very accessible in Cambodia. Our research shows that people strongly value Western medicine. We're going the route of emphasizing Western medicine. We're saying: 'trust a professional doctor, don't listen to the wrong advice.' That's our message. We're not saying anything bad about traditional medicine. We also don't mention that bears are declining because that doesn't seem to resonate and we don't mention welfare because that does not seem to resonate at all." While the aim of this campaign is to reduce the social acceptability and use of bear bile (both farmed and wild), it relied on culturally resonant messages and focused on promoting Western medicine rather than denigrating Traditional Chinese Medicine (TCM). Demand reduction campaigns intersect with many of the other factors mentioned (such as geopolitics, cultural attitudes towards animals, and consumer typology) to influence the stigmatization or promotion of wildlife farms.

Discussion

This paper has used qualitative interview data with scientists to analyze a) how scientists evaluate the harms and benefits of wildlife farms and b) how the social construction of deviance influences the stigmatization or promotion of wildlife farms. The results indicate that scientists evaluate the harms and benefits through a number of factors: animal welfare, environmental impacts

(on poaching, wildlife laundering, waste, genetics, land management, and climate change), sustenance, commercialism, scale, demand, consumer preferences, species differences, substitutability, accessibility, and governance. Numerous harms mentioned by the scientists (particularly animal welfare harms) are legal within their context, which illustrates how the harm-based approach can offer a broader consideration of impacts.

The harms and benefits discussed above are interpreted and acted upon within diverse cultural, economic, and political contexts, all of which influence the construction of stigma. Aspects that influence the process of stigmatization (or promotion) of wildlife farms include the social construction of the "wildlife farm" label, what characteristic of wildlife consumption the stigma is attached to, cultural differences in wildlife use, consumer typology, geopolitical factors, and demand reduction efforts.

The data presented in this paper enhances scientific knowledge of both the stigma effect and demand reduction campaigns. It is essential to examine how wildlife farming affects the social acceptability of consumption (known as the stigma effect), because this can determine whether wildlife farming saturates or amplifies demand for wildlife products (Dutton et al., 2011; Dang Vu and Nielson, 2018). In order to examine the stigma effect of wildlife farming, it is necessary to understand how different social norms shape the construction of stigma and deviance. This data has revealed how the social context affects everything from the meaning of "wildlife farm" to which species are acceptable to eat/farm to notions of proper treatment of animals. The results also indicated how stigma is sensitive to both regional and international geopolitics. Further, this paper has reinforced the importance of cultural resonance for demand reduction. The interviewees indicated that, if efforts to promote stigma are not adequately tailored to the cultural and social context (such as cultural traditions and motivations for use), then they can actually reinforce demand.

Conclusion

This paper has discussed how the notion of "stigma effect" must first take into account how stigma varies by social and cultural context. Stigma is not a singular entity but a multidimensional construct. It is important to understand how the process of stigmatization varies according to culture, type of use, species, and other contextual factors. This paper has provided detailed analysis of factors that impact the stigmatization or promotion of wildlife farms, which include cultural differences in wildlife use, species differences, geopolitical factors, and demand reduction efforts. Through interviews with experts on wildlife farms, and related topics such as wildlife domestication and consumer demand, this paper has offered a comprehensive analysis of the cultural, legal, economic, and environmental complexities of wildlife farms such that scientists and other stakeholders can understand the impact on this practice on species, communities, individual animals, and the wildlife trade both legal and illegal.

CHAPTER 2: WILDLIFE LEGALIZATION AND WILDLIFE FARMING

Introduction

The illegal wildlife trade is one of the largest global criminal enterprises and encompasses the poaching, trafficking, and consumption of live animals and animal parts for food, medicine, ornamentation, and entertainment (Rosen and Smith 2010). This trade perpetuates widespread animal suffering and threatens numerous species with extinction (Nellemann et al. 2014; Baker et al. 2013). For many species, current levels of wildlife consumption are unsustainable (Zhang and Yin 2014) and regulatory and enforcement actions inadequate (Wong 2017). While demand reduction is urgently needed, this process requires a congruence between interventions and the complex contextual and motivational factors that underlie wildlife product use (Dang and Nielsen 2018). This necessitates an understanding of both human behavior and methods of behavioral change (Zain 2012). However, in the context of the wildlife trade, rigorous models of human behavior and behavioral change are at the nascent stage. Conservation organizations, such as the World Wide Fund for Nature (WWF) and the International Union for the Conservation of Nature (IUCN), have begun to focus on behavior change, but application of behavior change models are not yet mainstream in wildlife trade research (Wallen and Daut 2018). At the same time, there are two ongoing debates in the conservation community about the dynamics of demand itself. The first issue refers to whether the legalization of wildlife products saturates or increases demand (Harvey 2016; 't Sas-Rolfes, 2016).

The second and related controversy concerns the introduction of legal products from farmed wildlife: wildlife bred and/or kept in captive conditions for the purpose of consumption. It is debated whether this practice can meet demand and thus reduce poaching or if it has either null or detrimental effects on demand (Kirkpatrick and Emerton 2010; Phelps et al. 2014; Challender and MacMillan 2014). Despite the primacy of these debates in conservation circles, there is a lack of

empirical evidence on how the legalization and farming of wildlife products affect demand. This paper uses an experimental vignette survey in Mainland China (N=1,002) to analyze how the variables of legalization and commodification affect the acceptability of, and perceived deterrents to, wildlife consumption. Vignettes are short scenarios which combine multiple variables experimentally altered by the researcher. Further, this paper examines how the impacts of legalization and commodification on wildlife consumption are affected by species taxon (mammal or non-mammal) and by type of use (use for Traditional Chinese Medicine versus non-medicinal uses such as food or ornamentation).

Literature Review

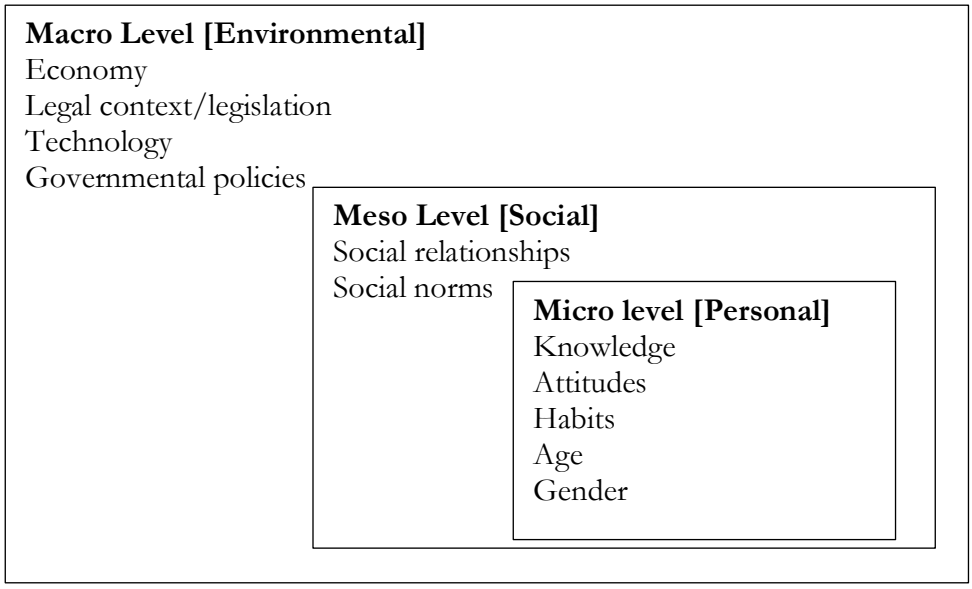
Human behavior and behavioral change are impacted by a variety of personal, social, and environmental factors; a systems approach that addresses factors at all three levels is most likely to yield effective behavioral change (Zain 2012). This paper uses a systems approach to analyze empirical data on how demographic indicators, social reactions to wildlife consumption, and legal and policy contexts affect demand for wildlife products from four species (tiger, bear, snake, and turtle) in China. It discusses how this information can be used to guide demand reduction interventions and environmental policies.

With continued demand for products from increasingly rare wildlife species, there has been a surge of interest in demand reduction interventions. Most of these campaigns are aimed at the Asian continent (Veríssimo and Wan 2019). In China, the commercial trade of live wildlife and wildlife products for traditional medicine, food, pets, and ornamentation threatens numerous species with extinction; demand for wildlife products has risen exponentially (Zhang et al. 2008). Surging demand for wildlife products from Chinese consumers has impacted both domestic and international markets (Meijer et al. 2018), but demand is segmented by factors such as age, gender, income, geographic location, and attitudes towards animals (Zhang and Yin 2014). While some wildlife

products in China are used for their presumed medicinal qualities or nutritional value, others are esteemed for the social status assigned them (Wong 2017). Legal restraints on wildlife consumption in China, such as the domestic ivory ban enacted in 2018, have reduced consumption among some segments of the population more than others (Meijer et al. 2018).

Wildlife consumer preferences and behavior in China, and elsewhere, are influenced by a variety of factors that can be broadly characterized as personal, social, and environmental (Zain 2012). A systems approach to demand reduction reflects this intersection of personal, social, and contextual or environmental factors (Figure 2.1). This paper examines how personal variables known to predict wildlife consumption (such as age and gender) and social norms/reactions to wildlife consumption function within three different environmental contexts: 1) wildlife are farmed and consumption is legal (farmed), 2) wildlife are wild and consumption is legal (harvested), and 3) wildlife are wild and consumption is illegal (banned). In so doing, it empirically analyzes how demand reduction interventions include not only consumer-oriented interventions but also macro-level decisions regarding wildlife law and policies towards wildlife farming.

Figure 2.1: Overview of Systems Approach to Demand Reduction



Adapted from Zain (2012).

One enduring area of controversy in both the academic and environmental policy spheres is how legalization affects demand for wildlife products. Much of this debate focuses on the legalization of products from two endangered megafauna: elephant ivory and rhino horn (Harvey 2016; 't Sas-Rolfes 2016; Biggs et al. 2013; Crookes and Blignaut 2015). Some scholars are critical of wildlife trade bans and argue that these bans limit the supply of wildlife products, thus increasing prices and poaching (Biggs et al. 2013); this view encourages legalization as an option (Conrad 2012). The contrary position is that demand for wildlife products is subject to the social norms codified through the law. Since legalization connotes social acceptance of the practice, it is thought that legalization will reduce stigma and undermine demand reduction campaigns (Harvey 2016). This could amplify the number of wildlife consumers and thus increase demand (Kirkpatrick and Emerton 2010). Further, for some species such as rhino, affecting the price mechanism through legalization is probably insufficient to conserve the species (Crookes and Blignaut 2015). Another issue is that legal trade often provides cover for laundered illegal wildlife products (Tensen 2016), especially in countries characterized by corruption and poor governance (Bennett 2015).

The relationship between legalization and demand depends on a variety of factors, including how demand is modeled and the assumptions of the model (Crookes and Blignaut 2015; Bulte and Damania 2005), the species in question and its rarity (Krishna et al. 2019), the relationship between international actors and local communities (McAllister et al. 2009), and the markets of neighboring countries (Lemieux and Clarke 2009). Disagreements on policies are often due to different responses to risk for an issue dominated by complexity and uncertainty ('t Sas-Rolfes 2016; Aguayo 2014).

A key aspect to this debate is whether the effects of legalization on stigma undermine its potential economic or conservation benefits; this is known as the stigma effect (Abbott and Van Kooten 2011). However, analyses of the stigma effect have relied on economic modeling (Abbott and Van Kooten 2011; Bulte and Damania 2005; Phelps et al. 2014) and have not directly measured

how legalization affects attitudes towards wildlife consumption. This study uses a vignette experimental format to directly examine how altering the legal context affects the perceived acceptability of wildlife consumption. Further, it differentiates between the legalization of products from the wild and from captive animals on wildlife farms.

As with legalization more broadly, some conservationists have proposed wildlife farming (the commercial breeding and legal sale of non-domesticated species) as a mechanism for meeting the demand for wildlife products and mitigating poaching. However, in order to have a positive conservation impact, wildlife farming needs to meet numerous conditions that involve both biological characteristics of the species and the dynamics of demand (Phelps et al. 2014). These requirements include the farmed product forming a substitute for the wild product, an absence of laundering, no restocking of the farmed population with wild-caught animals, farming being more cost-efficient than poaching, and demand remaining stable (Tensen 2016).

It is rare for all these criteria to be met (Tensen 2016; Challender et al. 2019). Often, parallel markets develop for wild-caught and farmed products (Phelps et al. 2014), as in numerous instances consumers prefer and are willing to pay a premium for wild-sourced products (Hanley et al. 2018; Davis et al. 2016; Gratwicke et al. 2008). Furthermore, legal farms can provide cover for the laundering of illegally-sourced animals (Lyons and Natusch 2011). Especially for species that don't breed well in captivity, wildlife farms are often stocked either partially or fully with wild-caught individuals (Livingstone and Shepherd 2014). Poaching continues to be profitable and to undercut the products from legal trade (Gratwicke et al. 2008). Through its impact on market dynamics and/or the social acceptability of consumption (the stigma effect), wildlife farming can actually increase demand rather than saturate it (Dutton et al. 2011; Dang Vu and Nielson 2018).

The dynamics of demand depend upon species, cultural context, and motivations for consumption, and there is still much uncertainty surrounding how legal wildlife farming affects

demand for wildlife products and wildlife consumer behavior (Challender et al. 2019). Since the first step in demand reduction is characterizing and segmenting demand, an important area of research on this front is direct measurement of consumer attitudes in response to different variables that impact the consumption choice. For example, Hanley et al. (2018) examined how price, harvesting method, rarity, and product source impacted the willingness to pay for rhino horn. However, much of this work focuses on characterizing demand for a singular product or species. This paper uses an experimental vignette design to examine how differences in species and type of use intersect with issues of source (captive versus farmed) and legality in their impact on demand. This is useful for the generalization of results to various species and contexts, which in turn can provide guidance for large-scale yet tailored demand reduction initiatives.

Methods

The sensitive nature of wildlife consumption can present methodological hurdles for research on its prevalence and effects (Razafimanahaka et al. 2012). The experimental vignette format of this study was selected for two core reasons. First, vignettes present information in context, which has numerous advantages (Atzmüller and Steiner 2010). This makes the research topic less abstract to respondents and more accurately models how respondents would encounter and respond to information in the real world. It also allows for the simultaneous presentation of numerous variables of interest. People make environmental decisions based upon the interaction of personal norms or attitudes with various contextual variables (Stern 2000). Through combining multiple variables in a single scenario, vignettes attempt to replicate how people consider numerous variables (e.g. taxon, legal status, origin of the wildlife product, type of use) simultaneously.

Second, this method helps minimize social desirability bias and gather accurate data about a sensitive issue. Surveys that ask about sensitive topics such as taboo behaviors, unsocial attitudes, or illegal activities often generate inaccurate survey results due to social desirability bias (Krumpal

2013). Social desirability bias refers to the tendency to present oneself positively to the researcher, which can lead respondents to overestimate positive behaviors and/or underestimate negative or stigmatized behaviors. This is one of the most common sources of bias impacting the validity of survey research (Nederhof 1985). Indirect questioning is one way to reduce social desirability bias and increase the validity of survey items that deal with sensitive questions (Hughes and Huby 2004). Vignettes present information about a situation rather than ask respondents to self-reveal information. Vignettes have been successfully applied to other sensitive, complex topics such as sexual assault and drug use (Bachman et al. 1992; Hughes 1998). This paper is the first application of vignette research to wildlife consumption in particular.

The selected species represent the diversity of wildlife products consumed in China, which varies both by taxon and by type of use (Table 2.1). The vignettes focused on the consumption of two mammal species (tiger and bear) and two non-mammal species (snake and turtle). Since mammals are more closely related to humans, they tend to rank higher on the sociozoologic scale of status assigned to animals (Arluke and Sanders 1996), which may affect the stigma against their use. From these four species, eight products were selected that represent the most common forms of wildlife consumption in China: wildlife as medicine, food, and ornamentation (Zhang and Yin 2014). It is important to include diverse motivations for wildlife use, as variation in motivation impacts both the dynamics of demand and demand reduction initiatives (Dang and Nielsen 2018).

These species are all frequently consumed in Mainland China. Tigers and bears are both widely farmed and consumed in China for both medicinal and non-medicinal purposes (Zhang et al. 2008; Liu et al. 2016). Tiger bones are made into medicinal wine and their pelts are ornamental status symbols. Bear bile is used widely in Traditional Chinese Medicine and bear paw soup is considered a culinary delicacy. Bear and tiger farming are notable for their prevalence and the extent of animal maltreatment that farming these species entails. In China, there are over 200 tiger farms

with 6,000 tigers held in poor welfare conditions; this is almost twice the number of tigers that exist in the wild worldwide (Environmental Investigation Agency 2017). Tigers are the most heavily traded of all captive-source Asiatic big cats, comprising over 90% of the trade (Species Survival Network 2014).

Over 12,000 bears are farmed in China alone, where their bile is extracted through a wound that is kept open for up to thirty years (Dutton et al. 2011). Both of these species are endangered and subject to international legal protections under CITES. Although China is a signatory to CITES, the Chinese government has actively promoted and legalized farming of these endangered species, using the argument that farming bears and tigers will help conserve them in the wild (Environmental Investigation Agency 2017; Dutton et al. 2011). Therefore, the debates over legalization and wildlife farming have immediate and real-world consequences for these species.

Similarly, snakes and turtles are the most widely consumed and farmed non-mammal species in China (Zhang et al. 2008). Snakes are consumed for food and their skins are made into ornamental leather (Zhou and Jiang 2004). Turtles are both eaten and used (due to their symbolism of longevity) in Traditional Chinese Medicine (Haitao et al. 2007). Both consumption and farming of these species are prevalent in China. Snakes are among the most widely eaten wildlife species in China (Yang et al. 2007) and demand continues to increase. Despite the presence of snake farming in China, legal and illegal imports of snakes and snake products remain high, and demand threatens numerous snake species with extinction (Zhou and Jiang 2004). China has undertaken legal turtle farming on a massive scale to attempt to meet demand for turtle meat and shells (Haitao et al. 2008), but it has been argued that such farming is counterproductive to conservation (Haitao et al. 2007). As with tigers and bears, the debates over legalization and farming of turtles and snakes are timely and relevant to current environmental decision-making.

Table 2.1: Selected Wildlife Species

	Consumed for medicine and food	*Consumed for medicine and ornamentation*
Mammal	Bear	Tiger
Non-mammal	Turtle	Snake

The sample (N=1,002) of adult respondents from Mainland China was recruited through the research firm Qualtrics, which has expertise in China-based sampling. Respondents were recruited from Qualtrics' panel and completed the survey online through the Qualtrics platform. The sample included a gender quota representative of China's adult population and was diverse in terms of gender, age, income, and education (Table 2.2). Before commencement of the full survey, a pretest of 50 participants was conducted in order to evaluate data quality and survey validity. The study was approved by the ethics committee of Michigan State University's Institutional Review Board (study number 00002048). All participants gave their informed consent to participate in the study.

Table 2.2: Sample (in %)

Gender		**Income**	
Male	51.1%	Under RMB ¥ 4,000	14.9%
Female	48.9%	RMB ¥ 4,000-8,000	35.1%
		RMB ¥ 8,000-20,000	38.5%
		Over RMB ¥ 20,000	11.5%
Age		**Education**	
18-20	5%	Less than high school	3.3%
21-30	22.1%	High school	14.1%
31-40	19.8%	College	54.4%
41-50	23.5%	Graduate degree	28.2%
51-60	17.1%		
61-70	12.7%		

Respondents were randomly assigned one of 24 different vignettes (Figure 2.3)[6]. This design was chosen to prevent the confounding of main effects and interaction effects with vignette condition (Steiner et al. 2016; Steiner personal communication). Each vignette described the consumption of a wildlife product from one of four species (bears, tigers, snakes, or turtles), for one of two uses (medicinal or non-medicinal), in one of three legal situations (product is illegal, product is legal and from farmed animal, or product is legal and from wild animal). The choice to divide consumption into medicinal and non-medicinal use was made in order to model recent developments that have granted TCM-related wildlife use particular prestige or legal exemptions.[7]

These variables were combined and presented in a paragraph form that mimics how these respondents would be presented with this information in a real-world context (Table 2.3). Vignettes were presented to the respondents in Simplified Chinese[8] and were modeled from real press releases and laws issued by the Chinese Government.[9]

After reading the vignette, the respondent answered questions, presented on a Likert scale, about the acceptability of wildlife consumption, the social response to wildlife consumption, and the legal repercussions for all eight wildlife products examined in the study.[10] These outcome variables are drawn from the criminological literature on perceptual deterrence (Zimmerman 2008). They include measurement of both formal and informal sanctions. Formal control uses the legal system to promote compliance, whereas informal control operates through social institutions and interactions.

6 Since Qualtrics excludes unfinished surveys from the sample, the number of respondents per vignette ranged from 37 to 44. Whereas demographic variables were not used to assign respondents to different vignettes (assignment was random), the distribution of these variables across vignettes was roughly similar.

7 This includes the inclusion of TCM in the latest (11th) version of the World Health Organization's *International Statistical Classification of Diseases and Related Health Problems* and China's 2018 temporary reversal on its ban on rhino and tiger parts for medicinal use.

8 The survey was originally written in English and underwent multiple rounds of translation and back-translation, as recommended for cross-cultural surveys (Cha et al. 2007).

9 These source materials were China's 2017 ivory trade ban, China's 2017 Wildlife Protection Law, and China's 2018 temporary reversal on its ban on rhino and tiger parts in medicine.

10 These products are tiger bone, tiger skin, bear bile, bear paws, snake bile, snake leather, turtle shells, and turtle meat. The order of questions was randomized.

Chinese respondents have identified the *combination* of formal and informal control as important for crime deterrence (Jiang et al. 2010). These variables also measure the three components of a systems approach to demand reduction: personal (acceptability), social (stigma), and environmental (legal) factors.

In addition to these vignette-specific questions, all respondents completed a demographic questionnaire, to collect information on gender, age, education, geographic location, and income, and two attitudinal questionnaires.[11] The first questionnaire measured respondents' attitudes towards the four species included in the vignettes and the second questionnaire, adapted from Zhang et al. (2008), measured their overall attitudes towards wildlife consumption. This included questions characteristic of three different orientations towards wildlife consumption: pure protection (wildlife is not for human use), conditional utilization (wildlife can be used under certain conditions), and pure utilization (wildlife is for human consumption). The data was analyzed using SPSS version 25. For each species, three scenarios were modeled: 1) products from that species are farmed, 2) products from that species are harvested, and 3) products from that species are banned. Each model included the two main effects (legal context and type of use) and controlled for demographic variables, overall attitudes towards wildlife consumption, and attitude towards that particular species.

[11] For each attitudinal questionnaire, respondents were randomly assigned to receive the questionnaire at either the beginning or end of the survey. The order of the questions within each questionnaire were randomized as well.

Table 2.3: Vignettes

Vignette	Species	Origin	Consumption status	Product
1. Farming of tigers: medicinal	Tiger	Farmed	Legal	Tiger bone [medicinal]
2. Farming of tigers: non-medicinal	Tiger	Farmed	Legal	Tiger skin [ornament]
3. Harvesting of tigers: medicinal	Tiger	Wild	Legal	Tiger bone [medicinal]
4. Harvesting of tigers: non-medicinal	Tiger	Wild	Legal	Tiger skin [ornament]
5. Poaching of tigers: medicinal	Tiger	Wild	Illegal	Tiger bone [medicinal]
6. Poaching of tigers: non-medicinal	Tiger	Wild	Illegal	Tiger skin [ornament]
7. Farming of bears: medicinal	Bear	Farmed	Legal	Bear bile [medicinal]
8. Farming of bears: non-medicinal	Bear	Farmed	Legal	Bear paws [food]
9. Harvesting of bears: medicinal	Bear	Wild	Legal	Bear bile [medicinal]
10. Harvesting of bears: non-medicinal	Bear	Wild	Legal	Bear paws [food]
11. Poaching of bears: medicinal	Bear	Wild	Illegal	Bear bile [medicinal]
12. Poaching of bears: non-medicinal	Bear	Wild	Illegal	Bear paws [food]
13. Farming of snakes: medicinal	Snake	Farmed	Legal	Snake bile [medicinal]
14. Farming of snakes: non-medicinal	Snake	Farmed	Legal	Snake leather [ornament]
15. Harvesting of snakes: medicinal	Snake	Wild	Legal	Snake bile [medicinal]
16. Harvesting of snakes: non medicinal	Snake	Wild	Legal	Snake leather [ornament]
17. Poaching of snakes: medicinal	Snake	Wild	Illegal	Snake bile [medicinal]
18. Poaching of snakes: non-medicinal	Snake	Wild	Illegal	Snake leather [ornament]
19. Farming of turtles: medicinal	Turtle	Farmed	Legal	Turtle shells [medicinal]
20. Farming of turtles: non-medicinal	Turtle	Farmed	Legal	Turtle meat [food]
21. Harvesting of turtles: medicinal	Turtle	Wild	Legal	Turtle shells [medicinal]
22. Harvesting of turtles: non-medicinal	Turtle	Wild	Legal	Turtle meat [food]
23. Poaching of turtles: medicinal	Turtle	Wild	Illegal	Turtle shells [medicinal]
24. Poaching of turtles: non-medicinal	Turtle	Wild	Illegal	Turtle meat [food]

Figure 2.4: Example Vignette (English Version)

> The State Council has issued an order that allows for the legal and controlled use of tiger bone for medicinal use in China. Regulation on the sales and use of tiger bone for medicinal use will be strengthened and the trade volume will be strictly controlled. Tiger bone used in medical research or in healing will be reported to and approved by authorities. Tiger bone can only be used in qualified hospitals by qualified doctors recognized by the State Administration of Traditional Chinese Medicine. Tiger bone used in medical research or in healing can only be obtained from farmed tigers. Like agricultural animals, farmed tigers are captive-bred for the purpose of consumption. According to the State Council, tiger farming protects wild tiger populations and provides economic development. The State Council encourages and supports tiger farming.

Results

The results indicated that wildlife farming increases the acceptability and social approval of wildlife consumption and lowers perceptions of legal punishment. These effects were particularly strong for mammals (Tables 2.4 and 2.5 top row). Wildlife farming increases the acceptability of consuming tiger bone, tiger skin, bear bile, and bear paws, and lowers the perceived legal sanctions for all four of these products. Wildlife farming also increases the perceived social approval of tiger skin, bear bile, and bear paw consumption. In these models, medicinal use also had significant effects. Medicinal use increased the acceptability of tiger bone and bear bile and increased the acceptability of both bear bile and bear paws.

For non-mammals, wildlife farming had some effects on wildlife consumption, but these were less pronounced than those for mammals. Farming increased the social approval of turtle shell consumption and lowered the perceived legal punishments for turtle shells and snake leather. In the non-mammal models, other variables emerged as more significant predictors of wildlife consumption. In models of snake farming, medicinal use was a significant predictor of wildlife consumption (Table 2.6 top row). However, in contrast to tigers and bears, medicinal use of snakes *lowered* acceptability and social approval of snake bile and increased estimations of legal punishment for snake bile consumption. For both snakes and turtles, attitude towards the use of captive-bred

wildlife was a strong predictor (this variable was less frequently significant in the mammal farming models). For non-mammals, agreement with the statement that "it's only acceptable to consume captive-bred wildlife" increased the acceptability and social approval of wildlife consumption.

While wildlife farming yielded the strongest effects for mammal consumption, wildlife harvest was more predictive for non-mammal consumption. Wildlife harvest refers to the legal consumption of wild-caught individuals. This legal context had no statistically significant impacts on tiger or bear consumption. However, in models of mammal harvest, medicinal use did emerge as a core indicator of wildlife consumption. In these models, medicinal use increased the acceptability and social approval of all four mammal products and lowered the perceived legal punishment for bear bile. For non-mammals, legal harvest had significant impacts on consumption. Harvest decreased the perceived legal consequences for snake consumption (Table 2.6 middle row) and increased the acceptability of turtle consumption (Table 2.7 middle row).

Results indicated that wildlife product bans decrease the acceptability and social approval of wildlife consumption and increase estimations of legal punishments. Consumption bans had significant effects for all four species, and bans were particularly effective for bear bile and tiger products. Bans decreased the social approval of bear bile and increased perceptions of legal sanctions for bear bile consumption (Table 2.5 lower row). For tigers, bans decreased the acceptability of tiger skin, decreased the social approval of tiger bone, and increased anticipated punishment for both tiger skin and tiger bone.

Bans had equally strong effects for non-mammals. Bans decreased the acceptability of snake bile, decreased social approval for snake bile and snake leather, and increased perceived legal consequences for both snake bile and snake leather. For turtles, bans were robustly effective and had a significant impact on every measurement of turtle consumption. Bans lowered the acceptability and social approval (and increased anticipation of legal punishment) for both turtle shells and turtle

meat. Interestingly, in models of wildlife bans, medicinal use remained a strong predictor of wildlife consumption for mammals, but not for non-mammals. In ban models, medicinal use continued to increase acceptability and social approval for all mammal products (Tables 2.4 and 2.5 lower rows) but not for non-mammal products (Tables 2.6 and 2.7 lower rows).

As congruent with other research on wildlife consumption, where demographic effects were present, overall male gender, higher education, and higher income were associated with increased acceptability of wildlife consumption and less perceived legal consequences. A positive viewpoint towards the species in question decreased the acceptability and social approval of consumption and increased expected punishment.

Attitudinal variables impacted wildlife consumption in the expected directions. A pure protection attitude (measured as agreement with the statement "wildlife is not for human use") was associated with decreased acceptability of consumption, lowered social approval of consumption, and increased perceptions of legal punishment. A pure utilization attitude ("wildlife is for human consumption") had opposite effects. Increased agreement with the statement "consumption of wildlife for Traditional Chinese Medicine is allowable" increased acceptability and social approval, and decreased expected legal consequences, of wildlife consumption.

The significance of attitudes towards captive-bred and wild-caught animals (both measurements of conditional utilization) depended upon other factors such as species. Increased agreement with the statements "only consumption from captive-bred animals is allowable" and "only consumption from wild-caught animals is allowable" was associated with higher acceptability and social approval of wildlife consumption. A respondent's attitude towards wild-caught animals tended to be a significant predictor in mammal models. In contrast, one's attitude towards captive-bred animals was more frequently significant in non-mammal models.

Table 2.4: Main Effects of Tiger Regression Models

	Acceptability		*Social approval*		*Legal punishment*	
	Tiger bone	Tiger skin	Tiger bone	Tiger skin	Tiger bone	Tiger skin
Tiger Farming Model						
Tiger product is farmed	**.236***	**.296****	.199	**.191***	**-.30****	**-.283****
Tiger product is medicinal	**.209***	.098	.164	.091	-.082	-.044
Tiger Harvesting Model						
Tiger product is harvested	-.093	-.009	-.039	-.075	-.006	-.080
Tiger product is medicinal	**.306****	**.187***	**.233****	**.169***	-.167	-.100
Tiger Ban Model						
Tiger product is banned	-.137	**-.271****	**-.265****	-.155	**.329****	**.302****
Tiger product is medicinal	**.311****	**.252****	**.287****	**.185***	**-.251****	**-.201****

Values reflect unstandardized regression coefficients (B)
Each cell represents a unique model
Each model controlled for cognitive and demographic variables
* Significant at .1
** Significant at .05

Table 2.5: Main Effects of Bear Regression Models

	Acceptability		*Social approval*		*Legal punishment*	
	Bear bile	Bear paws	Bear bile	Bear paws	Bear bile	Bear paws
Bear Farming Model						
Bear product is farmed	**.392****	**.286****	**.307****	**.350****	**-.411****	**-.368****
Bear product is medicinal	**.201***	.141	**.284****	**.169***	-.102	-.024
Bear Harvesting Model						
Bear product is harvested	-.127	.024	-.140	-.048	.061	.066
Bear product is medicinal	**.349****	**.215****	**.412****	**.282****	**-.236****	-.148
Bear Ban Model						
Bear product is banned	-.202	-.173	**-.209***	-.115	**.241***	.146
Bear product is medicinal	**.368****	**.271****	**.429****	**.300****	**-.286****	-.169

Values reflect unstandardized regression coefficients (B)
Each cell represents a unique model
Each model controlled for cognitive and demographic variables
* Significant at .1
** Significant at .05

Table 2.6: Main Effects of Snake Regression Models

	Acceptability		*Social approval*		*Legal punishment*	
	Snake bile	Snake leather	Snake bile	Snake leather	Snake bile	Snake leather
Snake Farming Model						
Snake product is farmed	.182	.152	.159	.148	-.242	**-.281***
Snake product is medicinal	**-.291****	-.161	**-.230****	-.163	**.298****	**.253****
Snake Harvesting Model						
Snake product is harvested	.042	.004	.098	-.049	**-.546****	**-.362****
Snake product is medicinal	**-.250****	-.119	**-.211****	-.108	**.375****	**.270****
Snake Ban Model						
Snake product is banned	**-.399****	-.174	**-.435****	**-.330****	**.576****	**.568****
Snake product is medicinal	-.116	-.064	-.050	-.019	.051	-.002

Values reflect unstandardized regression coefficients (B)
Each cell represents a unique model
Each model controlled for cognitive and demographic variables
* Significant at .1
** Significant at .05

Table 2.7: Main Effects of Turtle Regression Models

	Acceptability		*Social approval*		*Legal punishment*	
	Turtle shells	Turtle meat	Turtle shells	Turtle meat	Turtle shells	Turtle meat
Turtle Farming Model						
Turtle product is farmed	.047	.062	**.206***	.137	**-.352****	-.216
Turtle product is medicinal	-.052	-.173	-.113	-.147	.029	.096
Turtle Harvesting Model						
Turtle product is harvested	**.227***	**.293****	.073	.069	.022	.058
Turtle product is medicinal	-.099	**-.232****	-.076	-.127	-.074	.021
Turtle Ban Model						
Turtle product is banned	**-.314****	**-.295****	**-.290****	**-.268****	**.584****	**.402****
Turtle product is medicinal	.063	-.059	.039	-.022	**-.259****	-.095

Values reflect unstandardized regression coefficients (B)
Each cell represents a unique model
Each model controlled for cognitive and demographic variables
* Significant at .1
** Significant at .05

Discussion

These results indicate how legal context, type of use, and species all influence (in an intersectional manner) the dynamics of demand for wildlife products. First, this paper provides empirical evidence for the stigma effect in wildlife consumption. Prior analyses of the stigma effect have utilized economic modeling (Abbott and Van Kooten 2011; Bulte and Damania, 2005) and have not directly measured how legalization affects attitudes towards wildlife consumption. This paper provides strong evidence that the legal context affects not only perceptions of legal punishment, but also the level of acceptability and the social approval granted wildlife consumption.

Bans *decreased* the acceptability and social approval of wildlife consumption, and legalized wildlife harvest and legalized wildlife farming *increased* acceptability and social approval. This indicates that levers of demand (acceptability and social approval) are fluid in response to legal change. This challenges the notion that demand can be saturated through products from legal or farmed wildlife products. Models of supply-side conservation need to take into account how lowered stigma can increase demand. While stigma is typically conceptualized as a barrier to the fair treatment of marginalized groups (e.g. Link and Phelan 2001), these results point to how stigmatization can protect powerless groups such as wildlife through upholding or creating norms against their exploitation.

Interestingly, the results indicate that illegality has a more uniform effect across species than legality. For all species studied (bear, tiger, snake, and turtle), bans effectively lowered acceptability and social approval, and increased perceptions of legal punishment. That is, bans increased the stigma of wildlife consumption for varied products across species. Models of legality demonstrated more variability across species and indicated that legalization and wildlife farming are related but unique policy contexts. The effects of legal wildlife farming were most substantial for mammals, whereas legal wildlife harvest was most frequently significant for non-mammals. Yet for both taxa

the effects of legalizing consumption were in the same direction; legality yielded increased acceptability, expanded social approval, and decreased perceptions of punishment.

Differences in the relative impact of legalized hunting versus legalized farming may be due to social perceptions of mammals and non-mammals. For mammals, a respondent's attitude towards wild animals was a strong predictor of attitudes towards consumption. For non-mammals, one's attitude towards captive-bred wildlife was a stronger predictor. It's possible that there is a baseline level of acceptance towards the use of captive snakes and turtles. For mammals, wildlife farming may present a more substantial escalation of commodification and thus has a stronger effect on acceptability and social approval.

These variations between mammals and non-mammals may also be due to the differential impact of medicinal use on consumption for these two taxa. For non-mammals, medicinal use was either non-significant or had a dampening effect on acceptability and approval. In contrast, for mammals, medicinal use was a strong predictor of amplified consumption acceptability and social approval of consumption as well as diminished perceptions of legal punishment. Congruent with these findings, acceptance of the conditional use of wildlife for Traditional Chinese Medicine decreased the stigma of wildlife consumption. In the legalized harvest models, medicinal use became a more prominent explanatory variable for mammals than legal context (e.g. the type of use mitigated the impact of the legal context). Even in ban models, medicinal use continued to amplify the acceptability and social approval of mammal products but not non-mammal products. This indicates that, particularly for mammals, it is essential to address both legal context and medicinal motivations for consumption.

Demand reduction begins with mapping the factors that influence consumption among various audiences. Segmentation is a foundational tenet of demand reduction; interventions must be tailored to particular audiences in order to be effective (Zain 2012). However, when looking at the

segmentation of demand, it is important to consider facilitating conditions. Human behavior is inherently contextual (Wallen and Daut 2018). A systems level approach to demand reduction emphasizes these environmental or macro-level factors, while also designing interventions to address the personal and social factors that drive the consumption behavior (Zain 2012).

Conclusion

This paper has illustrated how legal context is an important environmental condition that affects the dynamics of demand. At the same time, personal variables (such as demographic attributes, attitudes towards wildlife, and attitudes towards Traditional Chinese Medicine) and social factors (such as social stigma) remain significant contributors to wildlife consumption. Demand reduction should thus involve both the promotion of legal contexts that stem demand (through the reduction of acceptability and the amplification of social stigma) as well as interventions tailored to particular segments of the population (high earners, men, adherents to Traditional Chinese Medicine) who have higher rates of consumption. Attending to factors at all three levels (personal, social, and environmental) is most likely to yield effective behavioral change (Zain 2012).

It is essential that demand reduction interventions a) attend to taxon variability and b) include not only consumer-oriented interventions but also macro-level decisions such as wildlife laws and policies towards wildlife farming. Most demand reduction campaigns tend to be targeted at mammals (Veríssimo and Wan 2019). However, this paper found numerous and foundational differences in the predictors of mammal and non-mammal consumption. Legal context, the role of medicinal use, and attitudinal variables all had differential effects for mammals and non-mammals. This implies that mitigating demand for non-mammals may require a separate set of priorities and tools than those used for mammal-focused campaigns. For example, in this study, medicinal use was less of a predictor (but attitude towards captive-bred wildlife more of a predictor) for non-mammals

than for mammals. While wildlife farming increased the acceptability of mammal consumption, legal harvest increased the acceptability of non-mammal consumption.

For both mammals and non-mammals, the legal context significantly impacted the acceptability of consumption, the level of social stigma surrounding consumption, and the perceived legal deterrents to consumption. This paper provides empirical evidence of the stigma effect: the manner in which legality increases, and illegality decreases, the acceptability of wildlife products. For bears and tigers, wildlife farming significantly amplified the acceptability (and reduced the stigma) of consumption. Across species, wildlife product bans helped lower the acceptability (and increased the stigma) of wildlife consumption. Legal context plays an essential role in shaping demand and should thus be both a consideration and a focus of demand reduction interventions.

CHAPTER 3: WILDLIFE TOURISM AND CONSUMPTION

Introduction

Wildlife tourism is one of the main avenues through which humans interact with wildlife. Globally, wildlife tourism is valued at US $45 billion, with an annual growth rate of 10%, and it is expected to expand with international increases in education and income (Newsome and Rodger 2013). Although there is a body of literature on how tourism infrastructure and activities present risks and benefits to natural resources (e.g. Tisdell and Wilson 2012; Newsome et al. 2005), the intersection of wildlife tourism and other forms of wildlife consumption, such as eating wildlife or buying wildlife-based souvenirs, is understudied. Documentation of the impacts that tourism places on live wildlife (World Animal Protection 2017) solidifies the importance of understanding and managing the impacts of "non-consumptive" tourism on wildlife (Christiansen and Lusseau 2015, Rizzolo in press). Further, tourists' limited capacity to self-select environmentally beneficial wildlife tourism venues (Moorhouse et al. 2015) suggests the need for empirical research on the impacts of different forms of wildlife tourism to inform wildlife tourism policies.

This paper uses empirical survey data from a 2016 quantitative dataset of respondents from 12 countries (N=12,378) to examine a) the links between wildlife tourism participation and wildlife consumption (with recognition of the attitude-behavior gap) and b) the relationship between live animal encounters and wildlife consumption behavior. The first set of statistical analyses examines which types of wildlife tourism participation predict increased acceptability of wildlife consumption and wildlife consumption behavior. The second set of analyses examines if participation in live animal encounters (such as wildlife selfies) predicts other forms of wildlife consumption. Finally, implications for wildlife consumption research, wildlife tourism policy, and wildlife crime prevention are discussed.

Literature Review

The term wildlife tourism encompasses diverse activities such as wildlife viewing and photography, the use of wildlife for entertainment (e.g. circus shows), transportation and trekking, hunting and fishing, attending zoos, and visiting protected areas or sanctuaries (Newsome et al. 2005). Wildlife tourism is often conceptualized along three dimensions. First, wildlife tourism can occur in captive, semi-captive, or wild environments (Tisdell and Wilson 2012). Second, wildlife tourism can emphasize conservation or entertainment (Shackley 1996). Although most wildlife tourism venues include aspects of both conservation and entertainment, they differ in the relative emphasis they place on these two goals (Fennell 2012). Third, wildlife tourism is traditionally conceptualized as consumptive or non-consumptive. Non-consumptive wildlife tourism is defined as human recreation that does not remove or permanently alter wildlife, whereas consumptive tourism is traditionally defined as activities that result in wildlife mortality, such as hunting, trapping, and fishing (Duffus and Dearden 1990).

Wildlife tourism is often promoted as a mechanism for raising the socioeconomic value of wildlife as well as generating support for conservation. However, the risks associated with wildlife tourism include the alternation of animals' natural behaviors, growth of infrastructure, depletion of natural resources, wildlife trafficking to meet tourists' demand for souvenirs or live animal entertainment, and normalization of the use of captive wildlife for human entertainment (Rizzolo 2017). Tourists are generally unable to accurately judge the risks associated with their actions. Although a vast number of wildlife tourism attractions have substantial and negative effects on both individual animals and endangered species, tourist perceptions of these venues tend to underestimate their environmental and animal welfare impacts (Moorhouse et al. 2015).

Seemingly insignificant behaviors can have cumulatively dramatic effects on wildlife when performed by multiple tourists over time. Posing with a wild animal for a "selfie" (a photograph in

which the self is a primary focus) may seem benign, but the growth of selfie safaris has contributed to extensive wildlife poaching, animal suffering, and wildlife mortality, often in violation of environmental and animal protection laws (World Animal Protection 2017).

Tourism can also promote illegal, rare, or taboo wildlife consumption. There are two potential reasons for this: access and attitudes. First, tourism may provide access to live wildlife or wildlife products that are either unavailable or illegal in the tourist's home country. For example, research on China's 2018 ivory ban has found that, while overall ivory consumption has decreased post-ban, ivory purchases among frequent overseas travelers have actually increased (Meijer et al. 2018). Second, tourists often view travel as an "escape," or different moral space, from their everyday life; this can lead them to behave in ways that differ from their stated attitudes and values (Moorhouse et al. 2019). However, the scant existing literature on the link between wildlife tourism and consumption (e.g. Duffy 2010) relies on case studies and does not directly measure attitudes towards wildlife tourism or consumption. It has yet to be examined how various forms of wildlife consumption, such as the purchase of wildlife souvenirs or the use of wildlife as food or drink, differ by tourism type. Further, given the unique moral and legal context of tourism, it is important to analyze how wildlife consumption differs by the location of the wildlife attraction (e.g. at home or abroad, see Moorhouse et al. 2019). Such information is crucial for designing tourism policies that enhance conservation and mitigate detrimental forms of wildlife consumption.

Methods

The dataset used for this research was gathered by World Animal Protection in partnership with TNS Kantar (an international survey research firm) in 2016. It consists of samples from twelve countries[12] (N= 12,378.) Samples were drawn from the following countries: Australia (N=1,020),

[12] According to a representative from World Animal Protection (WAP), these countries were selected because a) WAP has offices and thus campaigning/mobilization leverage in these countries and b) these countries were likely sources of wildlife tourists.

Brazil (N=1,022), Canada (N=1,050), China (N=1,047), Denmark (N=1,023), Germany (N=1,034), India (N=1,007), the Netherlands (N=1,049), Sweden (N=1,012), Thailand (N=1,054) the United States (N=1,004), and Great Britain (N=1,056). Respondents were recruited by TNS Kantar from online panels according to the quotas that were set. Interlocking age within gender and geographic region was used to apply quotas to make sure that the data was representative of each country's population. For most of the countries listed, the target group was 16 to 64 years of age as that is the standard age that TNS Kantar can recruit to ensure that the samples are nationally representative.[13]

While one weakness of this dataset is the manner in which multiple different edible wildlife products and wildlife souvenirs are grouped together, the dataset offers numerous benefits that offset this limitation. First, it includes numerous survey items on wildlife tourism, wildlife consumption, and cognitions towards wildlife (Figure 3.1), which allows for the first empirical examination of the links between wildlife tourism participation and wildlife consumption. The inclusion of consumptive wildlife tourism (hunting/fishing) and non-consumptive wildlife tourism (live animal encounters) in the same dataset is particularly valuable. Further, it includes data on relatively new, understudied forms of wildlife tourism such as holding/hugging a wild animal and posing for a photograph with a wild animal.

Another strength of this dataset is that it measures both acceptability of wildlife consumption and wildlife consumption behavior. It is well documented that environmental norms, attitudes, and intentions are not perfectly correlated with environmental behavior; human environmental behavior is an interactive product of both personal attitudinal variables and contextual variables (Guagnano et al. 1995; Stern 2000). Congruent with this notion, it was found in this sample that the correlation between acceptability and actual consumption, while statistically

[13] There were a few exceptions to this age range. In the United States, the surveyed age range was 18-64 as 18 is considered the age of the adulthood in the United States. In China, India, and Thailand, the target group was 16-44 because Internet access in the 45+ populations in these countries is not high.

significant (at 0.01, 2-tailed) was relatively weak: 0.279 for buying wildlife products and 0.253 for eating or drinking wildlife. Therefore, acceptability and behavior were modeled separately. Based on prior research on the links between different cognitive orientations and wildlife consumption in China (Zhang et al. 2008), cognitions towards wildlife were grouped into two scales: a utilitarian scale (Cronbach's alpha .714) and a protection scale (Cronbach's alpha .734)[14].

The analyses of the data was divided into two parts. The first set of analyses looked at the full sample (N=12,378) and examined which types of wildlife tourism participation predict increased acceptability of wildlife consumption and consumption behavior. Logistic regression models were created for eight types of wildlife tourism that were significantly correlated (in bivariate correlations) with wildlife consumption acceptability or behavior: riding an elephant, attending a wildlife circus show, posing for a wildlife selfie, swimming with dolphins, holding or hugging a wild animal, hunting or fishing, visiting a zoo, and viewing animals in their natural habitat. In bivariate correlations, there were no statistically significant correlations between wildlife consumption and watching a wild animal on TV or online, feeding a wild animal, or visiting a wildlife sanctuary; therefore, those variables were not modeled further. Each logistic regression model controlled for gender, age, country, and utilitarian cognition, and set the threshold for statistical significance at 0.01.

The second set of analyses looked in more detail at the link between live animal encounters and wildlife consumption behavior. In order to examine if this link differed geographically, the sample was divided by country. Analyses proceeded with eight countries for which overall tourism participation correlated with wildlife consumption: China, Thailand, India, the United Kingdom,

[14] The utilitarian scale, but not the protection scale, was correlated with the dependent wildlife consumption variables. Thus, only the utilitarian scale was included in the full models.

Australia, Canada, the United States, and Brazil.[15] For each country, four logistic models were created. Each logistic model looked at one wildlife consumption behavior (or one dependent variable): buying wildlife products abroad, buying wildlife products at home, eating/drinking wildlife products abroad, and eating/drinking wildlife products at home. The independent wildlife tourism variables included the following types of live animal encounters: posed for a photograph with a wild animal, went on an elephant ride, swam with dolphins, held or hugged a wild animal, watched wild animals in their natural habitat, watched wild animals in their natural habitat, watched a show or performance involving a wild animal, and attended a zoo or aquarium.[16] Each model included all of the wildlife tourism variables simultaneously and controlled for age, gender, and utilitarian cognition. For both sets of analyses, all dependent variables were coded as binary variables: for behavior variables, 1=yes and 0=no and for acceptability variables, 1= very or somewhat acceptable and 0= neutral, somewhat unacceptable, or not acceptable.

[15] The countries excluded from these analyses were Germany, Denmark, Sweden, and the Netherlands. These countries had extremely low rates of wildlife consumption and there was no statistically significant relationship between tourism participation and wildlife consumption for these countries.

[16] The live animal encounters excluded from these analyses were a) visiting a wildlife sanctuary and b) feeding a wild animal. These variables were not significantly correlated with wildlife consumption behavior. For models of wildlife consumption abroad, wildlife tourism activities abroad were used as predictors. For models of wildlife consumption at home, wildlife tourism activities at home were used as predictors.

Figure 3.1: Dataset Variables

Wildlife Tourism
Have you been on holiday abroad in the last three years?
In the last three years, have you done any of the following?
Where did you do these activities- at home or abroad?

- Visited a zoo or aquarium
- Watched wild animals in their natural habitat
- Visited a sanctuary, wildlife park, or rescue center
- Watched a show or performance involving a wild animal
- Posed for a photograph with a wild animal
- Went on an elephant ride
- Swam with dolphins
- Held or hugged a wild animal
- Hunted or fished
- Fed a wild animal
- Saw a wild animal on TV/online

Wildlife Consumption
In the last three years, have you done any of the following?
How acceptable is each of these activities?
Where did you do these activities- at home or abroad?

- Ate or drank exotic animal parts
- Bought products made of wild animal parts

Cognitions
Utilitarian Scale (Cronbach's alpha .714)

- If a wild animal performance is part of the local culture, it should be preserved, even if it involves animal suffering
- It is more important for me to find the best value offer for a holiday activity rather than worry about animal suffering

Results

The results indicated that the acceptability of wildlife consumption was highest in India, Thailand, the United States, Canada, and China, whereas wildlife consumption behaviors were highest in India, China, Thailand, Brazil, and Great Britain. This suggests that there is an unmet demand for wildlife products in the United States and Canada; wildlife consumption is viewed as highly acceptable in these countries but engaging in wildlife consumption is relatively rare (perhaps due to lack of access to wildlife products). High rates of wildlife consumption acceptability and

behaviors in China, India, and Thailand is congruent with the existent literature, which notes high levels of both legal and illegal wildlife consumption in these countries (Nijman 2010; Mohapatra 2015; Zhang et al. 2008). In all models, the likelihood of wildlife consumption increased for men and for younger people (aged 18 to 25 years old).

In bivariate correlations, there were significant and positive correlations between wildlife consumption and riding an elephant (.178/.215), attending a wildlife circus show (.121/.152), posing for a wildlife selfie (.151/.172), swimming with dolphins (.178/.174), holding or hugging a wild animal (.169/.207), hunting/fishing (.049), visiting a zoo or aquarium (.025/.054), and viewing wildlife in their natural habitat (.090/.085)[17]. There were significant and negative correlations between abstaining from wildlife tourism and wildlife consumption behaviors, indicating that not participating in wildlife tourism potentially reduces wildlife consumption. Finally, there were no significant correlations between wildlife consumption and visiting a wildlife sanctuary or rescue center, feeding wildlife, or viewing wildlife on television or online.

Next, logistic regression models were conducted for wildlife tourism variables that were significantly and positively correlated (in bivariate correlations) with wildlife consumption acceptability or behavior. The full regression models controlled for age, gender, country, and utilitarian cognition (Tables 3.1 and 3.2). The results indicated that wildlife tourism's effect on wildlife consumption depends both upon a) the type of wildlife tourism and b) whether the dependent variable is wildlife consumption acceptability or behavior. The forms of wildlife tourism that were correlated with wildlife consumption acceptability were a) hunting or fishing, b) viewing wildlife in a natural habitat, c) swimming with dolphins, d) holding or hugging a wild animal, and e) visiting a zoo or aquarium (Table 3.1). People who hunted or fished were 10 times more likely to

[17] The first value is for eating/drinking wildlife and the second value is for purchasing wildlife products. Hunting/fishing was correlated with eating/drinking wildlife but not with purchasing wildlife products. All correlations are significant at the .01 level.

find it acceptable to consume wildlife. People who participated in two forms of live animal encounters, swimming with dolphins and holding/hugging a wild animal, were also more likely (by 1.5 to 1.8 times) to find it acceptable to consume and buy animal products. In contrast, people who had viewed wildlife in their natural habitat or visited a zoo or aquarium were more likely to find wildlife consumption unacceptable.

For wildlife consumption behaviors (Table 3.2), people who hunted/fished had a greater likelihood of eating/drinking wildlife but not of purchasing wildlife products. Visits to captive wildlife entertainment venues were strongly correlated with the likelihood of consuming wildlife. People who had ridden an elephant, posed for a wildlife selfie, or attended a wildlife circus show had double the likelihood of eating/drinking wildlife or purchasing wildlife products, even after controlling for demographic, geographic, and cognitive variables. People who had swum with dolphins or held/hugged a wild animal were three times as likely to consume wildlife. Although viewing wildlife in their natural habitat had either no effect or was correlated with a decreased likelihood of wildlife consumption *acceptability*, this activity was correlated with an increased likelihood of wildlife consumption *behavior*.

Table 3.1: Wildlife Tourism Participation and Acceptability of Wildlife Consumption

Type of Wildlife Tourism	*Acceptability of Eating or Drinking Wildlife**	*Acceptability of Purchasing Wildlife Products**
Hunting/Fishing	**Exp(B)=9.838**	**Exp(B)=10.646**
Riding an Elephant	No significant relationship	No significant relationship
Swimming with Dolphins	**Exp(B)=1.822**	**Exp(B)=1.767**
Holding/Hugging a Wild Animal	**Exp(B)=1.570**	**Exp(B)=1.669**
Posing for a Wildlife Selfie	No significant relationship	No significant relationship
Attending a Wildlife Circus Show	No significant relationship	No significant relationship
Viewing Wildlife in Natural Habitat	No significant relationship	**Exp(B)=0.837**
Visiting Zoo/Aquarium	**Exp(B)=0.728**	**Exp(B)=0.660**

*After controlling for age, gender, country, and utilitarian cognition scale
*Significant relationships are significant at the 0.01 level
*Exp(B) values >1 signify increased odds, whereas Exp(B) values <1 signify decreased odds

Table 3.2: Wildlife Tourism Participation and Wildlife Consumption Behavior

Type of Wildlife Tourism	*Eating/Drinking Wildlife**	*Purchasing Wildlife Products**
Hunting/Fishing	**Exp(B)=18.551**	No significant relationship
Riding an Elephant	**Exp(B)=2.949**	**Exp(B)=2.629**
Swimming with Dolphins	**Exp(B)=3.370**	**Exp(B)=2.502**
Holding/Hugging a Wild Animal	**Exp(B)=3.167**	**Exp(B)=3.570**
Posing for a Wildlife Selfie	**Exp(B)=2.275**	**Exp(B)=2.243**
Attending a Wildlife Circus Show	**Exp(B)=1.811**	**Exp(B)=1.791**
Viewing Wildlife in Natural Habitat	**Exp(B)=1.915**	**Exp(B)=1.662**
Visiting Zoo/Aquarium	No significant relationship	No significant relationship

*After controlling for age, gender, country, and utilitarian cognition scale
*Significant relationships are significant at the 0.01 level
*Exp(B) values >1 signify increased odds, whereas Exp(B) values <1 signify decreased odds

In the second set of analyses, models of participation in live animal encounters and wildlife consumption behaviors were created for eight countries.[18] For each country, one model was created to predict each of the following dependent variables: eating/drinking wildlife at home, eating/drinking wildlife abroad, buying wildlife products at home, and buying wildlife products abroad (for a total of 32 models). Each model included all of the wildlife tourism variables simultaneously and controlled for age, gender, and utilitarian cognition.

Numerous types of live animal encounters were statistically significant in these models (Figure 3.2). Holding or hugging a wild animal was significant in 12 models, followed closely by swimming with dolphins (10 models). Other live animal encounters that were correlated with increased wildlife consumption were watching wild animals in their natural habitat (9 models), riding an elephant (8 models), posing for a photograph with a wild animal (4 models), and attending a wildlife circus show (4 models). The only live animal attraction that was correlated with lowered wildlife consumption was a visit to a zoo or aquarium, although this result was not unilateral across countries.[19]

For some countries, the difference in abroad and at-home wildlife consumption were striking. For Australia, there was no link between wildlife tourism and wildlife consumption abroad, but people who, at home, had ridden an elephant, posed for a wildlife selfie, swam with dolphins, or watched animals in their natural habitat were more likely to consume wildlife. For the United States, the relationship between wildlife tourism and wildlife consumption was markedly different abroad and at home. At home, the only form of wildlife tourism correlated with increased consumption was watching wildlife in their natural habitat, whereas people from the United States who had posed for a wildlife selfie abroad were significantly more likely to consume wildlife.

[18] These countries were China, Thailand, India, the United Kingdom, Australia, Canada, the United States, and Brazil.
[19] For the United States, people who visited a zoo/aquarium were less likely to consume wildlife, but for Great Britain people who visited a zoo/aquarium were more likely to consume wildlife.

For some countries, the correlation between participation in live animal encounters and wildlife consumption also depended upon the form of consumption. For Great Britain, people who had attended a wildlife circus show were more likely to purchase wildlife products but not to eat/drink wildlife. And, for Thailand, people who had posed for a wildlife selfie and ridden an elephant were more likely to purchase wildlife products but not to eat/drink wildlife. Certain forms of live animal encounters emerged as frequent correlates of wildlife consumption for particular countries (Table 3.3).

Figure 3.2: Most Frequent Correlates of Wildlife Consumption

1. Holding or hugging a wild animal
2. Swimming with dolphins
3. Watching wild animals in their natural habitat
4. Riding an elephant
5. Posing for a photograph with a wild animal
6. Attending a wildlife circus show

Table 3.3: Live Animal Encounters Correlated with Increased Wildlife Consumption

Country	*Live Animal Encounter*
China	Holding or hugging a wild animal
Canada	Watching wild animals in their natural habitat
Brazil	Watching wild animals in their natural habitat
Great Britain	Swimming with dolphins Riding an elephant

Of the 32 models created, certain ones produced striking results. For Brazil, people who had held/hugged a wild animal abroad were 54 times more likely to buy wildlife products abroad; this full model (participation in live animal encounters, gender, age, and utilitarian cognition) predicted

35% of the variance in the dependent variable. Another strong result occurred for the United States. For the United States, people who had posed for a wildlife selfie abroad were 74 times more likely to eat/drink wildlife products abroad (and this full model predicted 62% of the variance).

Discussion

The results have several important implications for wildlife tourism, wildlife consumption research, and wildlife crime prevention, as well as larger debates on wildlife commodification and stigma. First, the results challenge the traditional division in tourism studies between consumptive tourism, which typically refers to hunting and fishing, and non-consumptive wildlife tourism, which connotes forms of tourism that do not leave a permanent impact on wildlife (Reynolds and Braithwaite 2001). In the first set of analyses, hunting or fishing did have the greatest effect on the likelihood of consuming wildlife as food or drink. However, other forms of wildlife tourism also had significant impacts on eating or drinking wildlife and actually had a more significant effect than hunting on purchasing wildlife products.

Interestingly, viewing wildlife in their natural habitat was correlated with increased wildlife consumption behavior, but visiting a wildlife sanctuary or rescue center was not. This result requires further research, but this difference may be due to relatively increased guardianship of wildlife at sanctuaries and rescue centers or to the tendency of wildlife sanctuaries to prohibit hunting (e.g. to limit access to wildlife products).

People who had participated in entertainment-based wildlife tourism that featured captive wildlife, such as wildlife selfies, elephant riding, and wildlife circus shows, were significantly more likely to consume wildlife and purchase wildlife products. Reports from non-governmental organizations in the gray literature have noted that these forms of captive wildlife tourism can be linked to wildlife trafficking (World Animal Protection 2017; Schmidt-Burbach 2017). While this dataset did not separate illegal from legal consumption, this distinction is often blurred in practice.

The legal trade can be intertwined with and provide laundering for the illegal wildlife trade (Lyons and Natusch 2011). An understanding of wildlife consumption patterns, both legal and illegal, is essential for tackling increasingly unsustainable rates of wildlife consumption (Zhang and Yin 2014). The results indicate that, congruent with the gray literature (World Animal Protection 2017), "selfie safaris" are correlated with increased wildlife consumption among tourists. For example, for the United States, people who had posed for a wildlife selfie abroad were 74 times more likely to eat/drink wildlife products abroad.

This paper examined the effects of five different forms of entertainment-based captive wildlife tourism: watching a show or performance involving a wild animal, posing for a photograph with a wild animal (commonly known as a "selfie safari"), going on an elephant ride, swimming with dolphins, and holding/hugging a wild animal. Tourists who participated in any of these five activities were more likely to consume wildlife. However, only people who swam with dolphins or held/hugged a wild animal were more likely both to consume wildlife and to find consumption acceptable. These results indicate that wildlife consumption acceptability and wildlife consumption behavior are distinct variables that require discrete analysis.

Both swimming with dolphins and holding/hugging a wild animal rely upon physical proximity to the animal, which is known to produce adverse animal welfare and environmental effects (D'Cruze et al. 2017; Rizzolo in press). While tourists particularly amenable to wildlife consumption may be drawn to these forms of tourism (Moorhouse et al. 2019), it is also possible that this proximity somehow lessens the stigma against wildlife consumption or raises its social status. Even after controlling for tourist variables that might influence a predilection towards wildlife consumption, such as nationality, age, gender, and utilitarian cognition (Zhang et al. 2008; Zhang and Yin 2014; Moorhouse et al. 2019), tourists who swam with dolphins and held/hugged a wild animal were more likely to consume wildlife.

These results are also congruent with the literature on environmental behavior, which indicates that people's environmental actions are based upon the interaction of personal norms or attitudes with various contextual variables (Stern 2000). There are contextual factors, such as the availability of wildlife-based souvenirs at certain tourism venues, that can facilitate wildlife consumption. This might explain why people who view wildlife in their natural habitat are less likely to find it acceptable to consume wildlife yet are more likely to engage in consumption behavior. Another example is elephant rides; people who rode elephants were more likely to consume wildlife but were no more likely to find consumption acceptable. Even if the venue does not rely upon the commodification of wildlife nor alters attitudes towards wildlife consumption, it can provide *access to* wildlife in a manner that increases consumption. Future research should continue to parse out how wildlife tourism impacts both access to wildlife products and attitudes towards wildlife consumption.

The results also indicate that geographic and cultural contexts alter the conservation repercussions of various forms of wildlife tourism. In this dataset, there were only small correlations (approximately 0.2) between participation in wildlife tourism activities abroad and engagement in that same form of tourism at home. The links between wildlife tourism participation and wildlife consumption differed depending upon the nationality of the respondent and the location of the wildlife venue- whether it was in the respondent's home country or abroad. This may be because wildlife tourism attractions abroad provide access to exotic or banned wildlife. For example, in the United States, wildlife selfies had no effect on consumption at home, but an enormous effect on wildlife consumption abroad. This may be because the animals commonly featured in wildlife selfies, such as tigers, sloths, and elephants (World Animal Protection 2017) are not native to the United States. International destinations can provide these tourists a greater variety of animals, less stringent regulations and closer access to rarer, more appealing animals (Rizzolo in press).

The impact of geographic context may also be due to the unique ethical choices made by tourists. Tourism can be a form of escape from everyday life and ethical constraints, a way of engaging in the desires of the "want self" rather than the "should self" (Moorhouse et al. 2017). Even if a tourist knows a given wildlife tourism attraction is problematic and refrains from patronizing this type of venue at home, s/he might relax these ethical restrictions when on holiday abroad. However, on a country level, frequent travel alone does not predict increased wildlife consumption; cultural attitudes also play a role. Several Scandinavian countries included in the sample had high rates of overseas travel but low rates of wildlife consumption. Stated acceptability of wildlife products was also low in these countries. In contrast, acceptability of wildlife consumption in the United States was fairly high, and for this country the link between wildlife tourism participation and wildlife consumption was strong.

This paper also has important ramifications for wildlife crime prevention policies. As mentioned, although not all wildlife consumption is illegal, the reduction of demand for wildlife products is key to combatting the illegal wildlife trade (Wong 2017; Zain 2012). One limitation of this dataset is that it separates wildlife consumption only by type of use (eating/drinking versus product purchases) and not by species; however, the data can still be used to direct scholars and policy-makers towards forms of wildlife tourism that are hot spots of consumption.

Criminological perspectives that focus on how situational or environmental factors promote crime (rather than criminals' motivations) are known as situational opportunity theories of crime (Wilcox and Cullen 2018). This view of crime posits that wildlife crime (like other forms of crime) results from the intersection of a willing offender, a suitable target, and an absence of a capable guardian of the target (Cohen and Felson 1979). Addressing one or more of these factors is key to situational crime prevention of wildlife crime (Pires and Moreto 2011). The results of this paper indicate that wildlife tourism venues are common venues of wildlife consumption. Thus, the

category of offender can be broadened from poachers to also include tourist consumers. Further, the offender's interaction with a suitable target, in this case a live animal, is due not just to the animal's feeding or mating patterns (as commonly conceptualized in situational crime prevention, see Lemieux 2014) but also to the animal's use in wildlife tourism venues. This use is based upon social factors, such as tourist perceptions of different species' suitability for tourism or the normalization of wildlife selfies (Hausmann et al. 2018; Rizzolo in press). Wildlife tourism may contribute to or mitigate wildlife crime by impacting attitudes and/or providing a place for offender and target to meet. Thus, efforts to reduce wildlife consumption should incorporate a consideration of other forms of wildlife use, such as wildlife tourism, and should integrate wildlife tourism policies with wildlife crime prevention.

The links between participation in certain forms of wildlife tourism and other forms of wildlife consumption also relate to larger debates regarding wildlife commodification, consumption, and stigma. Commodification is the capitalist process by which nature is transformed into a product for the purpose of sale in markets (Paterson 2014). From this standpoint, "wildlife consumption" is not limited to food-based uses of wildlife but includes any interaction where a consumer is engaging with wildlife as a commodity, which includes wildlife tourism. Markets constantly create novel wildlife commodities and thus ways of consuming wildlife. For example, the commodification of wild animals for selfies is a relatively recent tourism product that has emerged from technological advances and social media (Rizzolo in press).

From an animal rights position, through the entrenchment of wildlife as resources, commodification can reduce the stigma against wildlife consumption. Tourists who participated in forms of wildlife tourism that relied more heavily on commodification (that altered/controlled wildlife in order to transform them into a marketable product), such as elephant rides, swimming with dolphins, and holding/hugging wildlife, were more likely to consume wildlife in other ways (to

eat/drink wildlife or purchase wildlife products). One possible explanation for this result is that participation in one form of wildlife commodification lowers the stigma of other wildlife commodities.

However, the results also suggest that, while wildlife tourism may impact wildlife consumption through *stigma*, it can also affect wildlife consumption through *accessibility*. This was apparent in the disconnect between how participation in wildlife tourism is correlated with the acceptability of consumption versus actual consumption behavior. For example, tourists who participated in elephant rides were more likely to consume wildlife products. However, people who held/hugged a wild animal were more likely both to consume wildlife and to find consumption acceptable. Therefore, there are likely two routes through which commodification affects consumption.

Conclusion

The results presented in the paper indicate that live animal encounters, particularly entertainment-based captive wildlife attractions such as holding/hugging a wild animal, selfie safaris, elephant rides, and swimming with dolphins, are often consumptive. However, unlike hunters or fishers, the tourists who visit these venues are often unware of the impact they have on wildlife (Moorhouse et al. 2015). These attractions specifically target tourists who value wildlife. Greenwashing, or the presentation of false conservation and animal welfare benefits, is rampant among these venues (Moorhouse et al. 2017; Rizzolo in press). There is thus a disconnect between tourists' values and their behaviors that needs to be addressed through education, regulation, and the development of alternative wildlife tourism activities. Wildlife tourism and wildlife consumption both have substantial effects on wildlife species and the wellbeing of individual animals. Understanding the link between wildlife tourism and consumption is essential for mapping the

impacts of wildlife tourism and for designing wildlife tourism attractions that promote both animal welfare and species conservation.

CONCLUSION

Through a three-paper format, this dissertation has examined how two types of wildlife commodification (wildlife tourism and wildlife farms) affect stigma, wildlife consumption, and crime. The first paper used qualitative interview data with scientists to analyze a) how scientists evaluate the harms and benefits of wildlife farms and b) how the social construction of deviance influences the stigmatization or promotion of wildlife farms. The results indicate that scientists evaluate the harms and benefits through a number of factors: animal welfare, environmental impacts (on poaching, wildlife laundering, waste, genetics, land management, and climate change), sustenance, commercialism, scale, demand, consumer preferences, species differences, substitutability, accessibility, and governance. Numerous harms mentioned by the scientists (particularly animal welfare harms) are legal within their context, which illustrates how a harm-based approach can offer a broader consideration of impacts then a strictly legalistic perspective. These harms and benefits are interpreted and acted upon within diverse cultural, economic, and political contexts, all of which influence the construction of stigma. Aspects that influence the process of stigmatization (or promotion) of wildlife farms include the social construction of the "wildlife farm" label, what characteristic of wildlife consumption the stigma is attached to, cultural differences in wildlife use, consumer typology, geopolitical factors, and demand reduction efforts.

For the second paper, an experimental vignette survey was conducted in Mainland China (N=1002) to explore empirically how legalization and wildlife farming affect demand for wildlife products. Each respondent read a vignette (short scenario) about the consumption of a wildlife product from one of four species (bears, tigers, snakes, or turtles), for one of two uses (medicinal or non-medicinal), in one of three legal situations (product is illegal, product is legal and from a farmed animal, or product is legal and from a wild animal). All respondents were asked on Likert scales about the acceptability of wildlife consumption, the social stigma around consumption, and the

perceived legal consequences of consumption for eight wildlife products: bear bile, bear paws, tiger bone, tiger skin, snake bile, snake leather, turtle shells, and turtle meat. The data was analyzed using linear regression models that controlled for age, gender, education, income, and attitudes towards specific species, towards wildlife consumption, and towards Traditional Chinese Medicine. The results indicated that bans (product is illegal) lowered acceptability, increased stigma, and amplified perceived legal deterrents. This effect held for varied products across species. In contrast, legality yielded increased acceptability, expanded social approval, and decreased perceptions of punishment. The effects of legal wildlife farming were most substantial for mammals, whereas legal wildlife harvest was most frequently significant for non-mammals; further, medicinal use was a more significant variable for mammals than for non-mammals. This paper provided empirical evidence of the stigma effect (legalization increased social acceptability) and described how the stigma effect differs by taxon and type of use.

The third paper used empirical survey data from twelve countries (N=12,378) to examine a) the links between wildlife tourism participation and wildlife consumption (with recognition of the attitude-behavior gap) and b) the relationship between live animal encounters and wildlife consumption behavior. The first part of the paper examined which types of wildlife tourism participation predicted increased acceptability of wildlife consumption and wildlife consumption behavior. The second part of the paper looked at how participation in live animal encounters (such as wildlife selfies) predicts other forms of wildlife consumption. In the first set of analyzes, hunting or fishing did have the greatest effect on the likelihood of consuming wildlife as food or drink. However, other forms of wildlife tourism also had significant impacts on eating or drinking wildlife and actually had a stronger effect than hunting/fishing on purchasing wildlife products. Viewing wildlife in their natural habitat significantly increased wildlife consumption behavior but visiting a wildlife sanctuary or rescue center did not. While viewing wildlife in their natural habitat increased

wildlife consumption behavior, it lowered the acceptability of wildlife consumption. These results indicate that wildlife consumption behavior and wildlife consumption acceptability are related, but discrete, variables.

Entertainment-based wildlife tourism that featured captive wildlife, such as wildlife selfies, elephant riding, and wildlife circus shows, significantly increased the likelihood of eating/drinking wildlife and purchasing wildlife products. The paper looked at five forms of entertainment-based captive wildlife tourism: watching a show or performance involving a wild animal, posing for a photograph with a wild animal (commonly known as a "selfie safari"), going on an elephant ride, swimming with dolphins, and holding/hugging a wild animal. While all five of these activities significantly increased consumption behavior, two activities (swimming with dolphins and holding/hugging a wild animal) also increased the acceptability of wildlife consumption. Both swimming with dolphins and holding/hugging a wild animal rely upon physical proximity to the animal; while tourists particularly susceptible to wildlife consumption may be drawn to these forms of tourism, it is also possible that this proximity somehow lessens the stigma against wildlife consumption or raises its social status. Swimming with dolphins and holding/hugging a wild animal both increased the acceptability of wildlife consumption even after controlling for tourist variables that might influence a predilection towards wildlife consumption, such as nationality, age, gender, and utilitarian cognition.

Previous scholarship on the stigma effect has been based in ecological economics and has measured stigma as pre-ban and post-ban wildlife seizure records (Fischer 2004; Abbott and van Kooten 2011). However, a measure of stigma that incorporates social nuance is important as demand for wildlife products is not just economic but is related to culture and social norms (Lertzman and Baragona 2016; Ngoc and Wyatt, 2013). The cumulative results of this dissertation broaden the stigma literature in three main ways.

First, this dissertation describes how stigma can have a protective function. Sociological scholarship tends to assume that stigmatization harms marginalized groups through the perpetuation of power relations (Link and Phelan 2001). However, in the case of the wildlife trade, stigma can serve to disrupt, rather than perpetuate, the disempowerment of a marginalized group (nonhuman animals). In the first paper, numerous scientists mentioned that stigma can enhance wildlife protection through limiting the frequency of consumption or reducing demand. The second paper provided evidence that wildlife product bans both lower the social acceptability of consumption (increase stigma) and increase perceived legal deterrents to consumption. However, it is important to note that the relationship between stigma and power is complex. The interviewees mentioned how wildlife farms range from luxury products for wealthy consumers (in the case of tigers or bears) to sustenance-based farming for food for impoverished people (in the case of snakes or the giant cane rat). When the broad term "wildlife farm" is stigmatized, that can ignore the nuance of North-South relations, type of use, and species differences. Stigmatization can both protect marginalized groups (nonhuman animals) and harm marginalized groups (farmers from the global South).

This leads to the second contribution of this dissertation to the analysis of stigma. This dissertation offers an in-depth analysis of how different contextual factors influence both the process of stigmatization and the effects of stigma on wildlife conservation. Stigma is not a singular entity but a multidimensional construct. In the first paper, the dissertation details how social context affects everything from the meaning of "wildlife farm," to which species are acceptable to eat/farm, to notions of proper treatment of animals. The results of this paper describe how stigma is sensitive to cultural differences in wildlife use as well as regional and international geopolitics.

In both the first and second papers, species differences emerged as a prominent theme and interacted with other contextual factors to influence stigma. These species differences may be due to different social perceptions of mammals and non-mammals. In the experimental survey portion of

the dissertation, attitudinal predictors of consumption acceptability differed for mammals and non-mammals. One's attitude towards *wild* animals predicted one's attitude towards consumption of mammals. In contrast, one's attitude towards *captive* animals predicted one's attitude towards consumption of non-mammals. If mammals are more likely than non-mammals to be viewed as "wild," then wildlife farming may present a more substantial escalation of commodification and thus has a stronger effect on acceptability and social approval for mammals. Congruent with this, legal wildlife farming had a more significant impact on the acceptability of consumption for mammals than for non-mammals.

Further, for non-mammals, medicinal use was either non-significant or had a dampening effect on acceptability and approval. In contrast, for mammals, medicinal use was a strong predictor of amplified consumption acceptability and social approval of consumption as well as diminished perceptions of legal punishment. Even in ban models, medicinal use continued to amplify the acceptability and social approval of mammal products but not non-mammal products. This indicates that, for mammals, it is essential to address both legal context and medicinal motivations for consumption. These results demonstrate that the stigma effect of wildlife farms differs by species and type of use, and that these factors interact with one another. The results of the third paper illustrate that participation in wildlife tourism is another contextual factor that can alter the social acceptability (or stigma) of wildlife consumption.

Finally, this dissertation offers the first survey-based empirical evidence of the stigma effect: the manner in which legality increases, and illegality decreases, the acceptability of wildlife products. The experimental vignette survey indicated that, for bears and tigers, wildlife farming significantly reduced the stigma of consumption. Across species, wildlife product bans increased the stigma of wildlife consumption. These results provide strong evidence that the legal context affects not only perceptions of legal punishment, but also the level of acceptability and the social approval granted

wildlife consumption. This disputes the notion that demand can be saturated through products from legal or farmed wildlife products and implies that models of supply-side conservation need to take into account how lowered stigma can amplify demand. These results also indicate the benefits of applying the vignette method to wildlife consumption. Vignettes allow numerous variables (species, type of use, etc.) to be combined and analyzed simultaneously. This method proved useful for revealing how contextual factors such as medicinal use and taxon interact in their impact on the stigma effect.

This dissertation also has significant repercussions for environmental policies related to wildlife law, wildlife tourism, and wildlife crime prevention. First, the legal status of wildlife consumption and trade is strongly debated in the conservation literature (Harvey 2016; 't Sas-Rolfes 2016). The issue of legalization has major implications for the purpose and construction of environmental policies, and whether (and under what circumstances) sustainable use benefits or harms conservation (Oldfield 2003). However, contributors to this discussion tend to use economic modeling or case studies to examine the impacts of legalization or commodification on conservation. Through direct analysis of how these variables impact stigmatization around wildlife consumption, this dissertation makes an empirical contribution to this essential debate. The vignette survey provides empirical evidence that wildlife bans increase the stigma of consumption across the four species studied. This paper also describes how legal wildlife harvest lowers the stigma of non-mammal consumption, and how legal wildlife farming decreases the stigma of mammal consumption. This indicates that wildlife law has an effect on stigma. Levers of demand (consumption acceptability and social approval) are malleable to legal change. Supply-side conservation (e.g. legalized harvest/wildlife farms) needs to account for how lowered stigma can increase demand.

Second, this dissertation expands the conservation crime literature through its empirical analysis of the link between wildlife tourism and wildlife consumption. Although there is a body of literature on how tourism infrastructure and activities present risks and benefits to natural resources (Tisdell and Wilson 2012; Newsome et al. 2005), the intersection of wildlife consumption and tourism is understudied. In one of the few works on this topic, Duffy (2010) presents case studies of how tourist activities, such as posing for photographs with captive wildlife or purchasing wildlife products, can contribute to wildlife trafficking. However, this work does not directly measure attitudes towards wildlife tourism or consumption or empirically measure how participation in wildlife tourism impacts wildlife product consumption.

The results in paper three indicate that, even after controlling for demographic, geographic, and cognitive variables, wildlife tourism participation is a significant predictor of increased wildlife consumption. The results also challenge the traditional division in tourism studies between consumptive tourism (hunting and fishing) and non-consumptive wildlife tourism, or tourism that does not leave a permanent impact on wildlife (Reynolds and Braithwaite 2001). While hunting or fishing did have the greatest effect on the likelihood of consuming wildlife as food or drink, other forms of wildlife tourism also had significant impacts on eating or drinking wildlife. Further, live animal encounters had more significant effects than hunting/fishing on purchasing wildlife products. The results indicate that live animal encounters, particularly entertainment-based captive wildlife attractions such as holding/hugging a wild animal, selfie safaris, elephant rides, and swimming with dolphins, are often consumptive. However, unlike hunters or fishers, the tourists who visit these venues are often naïve of the impact they have on wildlife (Moorhouse et al. 2015). Greenwashing, or the presentation of false conservation and animal welfare benefits, is rampant among these venues (Moorhouse et al. 2017). There is thus a disconnect between tourists' values

and their behaviors that needs to be addressed through education, regulation, and the development of alternative wildlife tourism activities.

These results also have implications for wildlife crime prevention. First, the results on wildlife tourism and consumption can broaden situational opportunity theories of wildlife crime (Wilcox and Cullen 2018). These theories describe how wildlife crime occurs at the junction of a willing offender, a suitable target, and an absence of a capable guardian of the target (Cohen and Felson 1979). Addressing one or more of these factors is key to situational crime prevention of wildlife crime (Pires and Moreto 2011). The results of the third paper indicate that tourists are often consumers of wildlife products. The category of offender can be broadened from poachers to also include tourist consumers. Further, the offender's interaction with a suitable target, in this case a live animal, is due not just to the animal's feeding or mating patterns (as commonly conceptualized in situational crime prevention, e.g. Lemieux 2014) but also to the animal's use in wildlife tourism venues. This use is based upon social factors, such as tourist perceptions of different species' suitability for tourism or the normalization of wildlife selfies (Hausmann et al. 2018). Wildlife tourism may contribute to or mitigate wildlife crime by impacting attitudes and/or providing a place for offender and target to meet.

Further, guardianship of wildlife at wildlife tourism sites is an important aspect of alleviating wildlife consumption and preventing crime. The results showed that viewing wildlife in their natural habitat significantly increased wildlife consumption behavior but visiting a wildlife sanctuary or rescue center did not. This result requires further research, but this difference may be due to relatively increased guardianship of wildlife at sanctuaries and rescue centers or to the tendency of wildlife sanctuaries to prohibit hunting (e.g. to limit access to wildlife products). Thus, efforts to reduce wildlife consumption should incorporate a consideration of other forms of wildlife use, such as wildlife tourism, and should integrate wildlife tourism policies with wildlife crime prevention.

Finally, this dissertation offers several contributions to the literature on wildlife product demand reduction. First, it offers evidence that legal context shapes demand and should be both a consideration and a focus of demand reduction interventions. For myriad species, current levels of wildlife consumption are unsustainable. While demand reduction is urgently needed, there are ongoing controversies about the nature of demand itself. It is still debated whether legalization can saturate demand and thus reduce poaching, or if this decreases the stigma against consumption and thus increases demand. The experimental vignette paper illustrated how legal context is an important environmental condition that affects the dynamics of demand; bans increased stigma and legalization lowered stigma. Demand reduction should thus involve both the promotion of legal contexts that stem demand (through the reduction of acceptability and the amplification of stigma) as well as interventions tailored to particular segments of the population (high earners, men, adherents to Traditional Chinese Medicine) who were shown to have higher rates of consumption.

This dissertation also describes how demand reduction interventions must attend to taxon variability. Most demand reduction campaigns are targeted at mammals (Veríssimo and Wan 2019). However, this dissertation found numerous and foundational differences in the predictors of consumption of mammals and non-mammals. Legal context, the role of medicinal use, and attitudinal variables all had differential effects for mammals and non-mammals. This implies that mitigating demand for non-mammals may require disparate priorities and tools than those used for mammal-focused campaigns.

This dissertation has employed three papers to examine how different forms of wildlife commodification (wildlife tourism and wildlife farms) affect stigma, wildlife consumption, and crime. The collective results have important implications for a) conceptualizations of stigma and measurement of the stigma effect and b) environmental policies related to wildlife law, wildlife tourism, and wildlife crime prevention. In so doing, this work also makes methodological and

theoretical contributions. This dissertation is the first work to apply vignette research to wildlife crime and to offer a direct survey-based measurement of the stigma effect (which refers to how legal context affects the social acceptability of wildlife consumption). It also broadens sociological understanding of stigma through discussing how stigma can protect marginalized groups and expands the conservation crime literature through its focus on the link between wildlife tourism and wildlife consumption. In addition to its contributions to the scientific literature, this dissertation can be applied to policies that address complex environmental issues with the dual aim of social resonance and wildlife conservation.

APPENDICES

APPENDIX A: INTERVIEW QUESTIONS

Question 1:
How would you define *wildlife farming*? Which species and what geographic areas are your areas of expertise? Is wildlife farming expanding, decreasing, or remaining constant?

Question 2:
How do you evaluate the pros and cons of wildlife farming?

Question 3:
How do you define conservation?

Question 4:
How do you define the "correct" treatment of wildlife? What do you use to make this decision? Economic considerations? Moral, religious, cultural or philosophical factors?

Question 5:
Does wildlife farming *harm* wildlife? If so, how would you describe that harm?

Question 6:
In your work, do you gather data on the well-being or suffering of individual animals? If so, please describe if wildlife farming leads to any of the following:

- Disease, injury or functional impairment?
- Environmental challenges such as exposure to extreme temperatures or injurious housing conditions?
- Behavioral or interactive restrictions, such as the inability to exercise natural behaviors or interact with other animals?
- Anxiety, fear, pain, or distress?
- Food deprivation, water deprivation, or malnutrition?

Question 7:
Can you describe the methods used to farm wildlife? Does the profit motive (the need to maximize profit) affect the techniques used to farm wildlife? If so, how?

Question 8:
What economic, social, cultural, or environmental factors have contributed to the rise of wildlife farming, to the perpetuation of wildlife farming, and to its legal status?

Question 9:
Who decides if wildlife farming is legal or illegal? How is this decision made? What factors are considered when making this decision? Economic factors? Cultural factors? Animal rights or welfare? The conservation status of the species?

Question 10:
What do you see as the connection between poaching and wildlife farming? In your opinion, does wildlife farming increase, decrease, or have no impact on poaching? What, if any, do you see as the difference between an animal killed legally on a wildlife farm and an animal poached from the wild?

Question 11:
Does your work involve interaction between people from different cultures and/or countries? If so:

- How would you describe this interaction?
- Have you encountered cultural differences (either between your colleagues or between your colleagues and members of the local community) in notions of conservation? In notions of animal rights? In attitudes towards wildlife farming? In attitudes towards wildlife consumption? If so, how do you navigate cultural differences?
- How do you set research or advocacy agendas?
- How do you decide the organization's position on wildlife farming?

Question 12:
Is there a stigma surrounding wildlife farming? If so, is the presence or absence of stigma a benefit or a detriment to the species? Is the presence or absence of stigma a benefit or a detriment to individual animals? Would you like to see the level of stigma surrounding wildlife farming increase, decrease, or remain the same? What do you think would need to change to increase, decrease, or maintain the current level of stigma surrounding wildlife farming?

Question 13:
In your opinion, how does wildlife farming affect the demand for wildlife products? Does wildlife farming increase demand, decrease demand, or have no effect?

APPENDIX B: VIGNETTE METHODS AND CONSERVATION SOCIAL SCIENCE

While vignettes have been used for research on other sensitive issues such as sexual assault and drug use, they have yet to be applied to wildlife consumption and are not widely used in conservation social science. Given the difficulties of accurately measuring wildlife consumption (and other forms of unsocial, taboo or illegal behavior that impacts the environment), the use of a new methodological tool is significant. This methodological paper provides an introduction for conservation social scientists to: a) the process of vignette research, b) the strengths of vignette methods, c) why vignettes are well-suited to environmental research. The case of wildlife consumption is used to illustrate how vignettes can inform environmental problem-solving and policy-making.

Vignettes are short paragraphs of text that comprise multiple variables that the researcher can experimentally alter. When conducting vignette research there are various methodological points to consider. First, there is the issue of vignette construction. When developing vignettes, researchers must consider a variety of factors, such as relevance, realism, timing, internal reliability, and stratification (Hughes and Huby 2004). Stratification is a statistical technique that allows the experimenter to control variance and context effects and which represents best practice vignette design (Su and Steiner 2018). Second, researchers should consider how respondents interpret and respond to vignettes. This includes the choice between open and closed questioning (Hughes and Huby 2004). Finally, there is the issue of vignette analysis. When each respondent receives more than one vignette, there are two main methods for vignette analysis: multilevel modeling (with vignettes as level-one units and individual respondents as level-two units) or analysis of variance (ANOVA) with random respondent effects (Steiner et al. 2016). The method of analysis should be suited to the research questions and design.

There are two main strengths of the vignette methodology. The first is the way it presents information in context. The second is that it reduces social desirability bias and provides a way of gathering data about sensitive questions. First, vignettes present information in context. This has numerous advantages. It makes the research topic less abstract to respondents and more accurately models how respondents would encounter and respond to information in the real world. It also allows for the simultaneous presentation of numerous variables of interest. For example, a vignette about recycling might simultaneously provide information on numerous variables that could impact recycling (such as the time needed to recycle, the presence or absence of mixed recycling, the lack or availability of curbside pickup, and the existence or lack of tax breaks for recycling). This aids in the analysis of interaction effects.

Secondly, vignette methodology represents a significant contribution to the literature on sensitive questions. Surveys that ask about sensitive topics such as taboo behaviors (e.g. sexual behaviors), unsocial attitudes (e.g. racism or gender bias), or illegal activities (e.g. sexual assault or drug use) often generate inaccurate survey results due to social desirability bias (Krumpal 2013). This is one of the most common sources of bias impacting the validity of survey research (Nederhof 1985). Even when the topic of interest is not illegal (e.g. recycling behavior), respondents may still be prone to social desirability bias. Social desirability bias refers to the tendency to present oneself positively to the researcher, which can lead respondents to overestimate positive behaviors (such as recycling) and/or underestimate negative or stigmatized behaviors (e.g. excess energy use or waste production). Indirect questioning is one way to reduce social desirability bias and increase the validity of survey items that deal with sensitive questions. Vignettes present information about a character rather than ask respondents to self-reveal information.

The vignette methodology is well-suited to environmental research for multiple reasons. First, environmental behaviors are dependent upon context: people make decisions based upon the

interaction of personal norms or attitudes with various contextual variables (Stern 2000). Through combining multiple variables in a single scenario, rather than artificially isolating variables of interest, the vignette methodology parallels how people would actually experience an environmental decision in the real world. For example, poaching behavior might be dependent upon the simultaneous consideration of multiple financial, social, cultural, and geographic factors. Although vignettes technically ask hypothetical behavior choices, responses to vignettes tend to be highly correlated with real-world behaviors (Hainmueller et al. 2015).

Second, work on the social desirability bias has determined that environmental behavior is susceptible to this bias. There is empirical evidence for the over-reporting or mis-reporting of environmentally responsible actions, such as energy conservation and recycling, in survey research (Ong and Weiss 2000). Thus, it is important for conservation social science to utilize research methodologies (such as vignettes) that minimize social desirability bias (Krumpal 2013).

Third, research on environmental topics often involves accurately measuring levels of non-compliance with social norms or laws. For example, management policies and governance decisions about wildlife and fisheries (e.g. hunting regulations, the management of protected areas) requires an accurate measurement of poaching behaviors. However, the two most common survey techniques for sensitive environmental questions, the random response technique and the ballot box method, have a less than 50% accuracy rate (Bova et al. 2018). This demonstrates the need for additional methodological tools for measuring sensitive environmental topics.

The case of wildlife consumption exemplifies how the vignette methodology can advance scientific understanding and improve environmental decision-making. The illegal wildlife trade is one of the world's largest criminal enterprises and threatens numerous species with extinction. However, there are two ongoing debates about the illegal wildlife trade. First, there is the question of how the legalization of wildlife products affects demand for wildlife products. Second, there is the

issue of whether wildlife farming, or raising endangered species in captivity for consumption, presents a conservation solution or only serves to increase demand for wildlife products. However, there is little empirical evidence on how legalization and commodification of wildlife influence wildlife consumption.

The author used an experimental vignette survey of 1,002 respondents in Mainland China to analyze how the variables of legalization and commodification alter the acceptability of, and perceived deterrents to, wildlife consumption. Respondents were provided with vignettes about four endangered species widely consumed in China (tigers, bears, snakes, and turtles), for two types of use (medicinal and non-medicinal), in one of three different legal contexts (legal wildlife farming, legal wildlife harvesting, and consumption ban). Statistical modeling was then used to analyze how these variables impact a) the acceptability of wildlife consumption and b) perceptions of deterrents to wildlife consumption, specifically social disapproval and legal punishment.

In the case of wildlife consumption, the vignette methodology provided multiple benefits. It allowed for the experimental manipulation of variables, presented information in a manner that is congruent with how respondents encounter wildlife consumption in the real world, and allowed for the examination of various interaction effects. The results suggested that illegality has a more uniform effect across species than legality. For all species studied (bear, tiger, snake, and turtle), bans effectively lowered acceptability and social approval, and increased perceptions of legal punishment. Legal wildlife farming demonstrated more variability across species; the effects of legal wildlife farming were most substantial for mammals. This indicates that legalization and wildlife farming are related but unique policy contexts and that their effects differ by taxon. Policymakers can use the results of this work to understand how altering the legal context impacts demand for wildlife products.

Further, the ability of vignettes to model interaction effects was essential for analyzing how different combinations of variables impact wildlife consumption. For example, the results indicated that a *medicinal ban* is a salient demand reducer for bear bile consumption (a medicinal product), whereas a *species-level ban* on bear products is more potent for bear paw consumption (a food product). This information can help tailor environmental decision-making and demand reduction interventions to the specific wildlife product.

It is now widely accepted that high-quality conservation social science is necessary for improving environmental outcomes (Bennett et al. 2017). However, there is a need among conservation researchers for a deepened understanding of social science methods (Sandbrook et al. 2013). In order to provide valid and generalizable results, survey research might be well-designed and must minimize bias as much as possible. The human dimension is integral to every environmental problem, from pollution and recycling to poaching and deforestation, and most environmental topics are susceptible to the social desirability bias. Thus, vignette methods can be applied by social science researchers in a wide range of conservation disciplines, from sociology, anthropology, and psychology to conservation biology, forestry, and wildlife science diversity. These methods can be used to delve into diverse environmental problems, from recycling to the international wildlife trade, and can provide guidance for research-oriented environmental decision-makers.

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