Exploring the role and effectiveness of celebrities in illegal wildlife product demand reduction campaigns



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DECLARATION

I declare that this thesis is my own work. Section 1.3.2 lists co-authors who have contributed to publications from thesis chapters. None of the work submitted for this thesis has been submitted, in whole or part, for any previous degree.

ABSTRACT

Celebrity endorsement has become a common tool in environmental conservation to communicate messages, promote sustainable lifestyles and influence behaviour. However, the evidence supporting the effectiveness of celebrity endorsement in achieving conservation objectives remains limited. The use of celebrities has become particularly popular in efforts to influence consumption of illegally traded wildlife in East and Southeast Asia, with numerous celebrity campaigns being implemented in China, Vietnam, Thailand, among other countries in the last decade. Illegal wildlife trade threatens many species worldwide. China and Vietnam have been identified as prominent end-markets where vast quantities of high-profile wildlife products are destined for use and consumption. One group of species threatened by illegal trade and consumption in this region is pangolins. Trade data suggests declines in two of the species native to East and Southeast Asia, the Sunda (*Manis javanica*) and Chinese pangolins (*M. pentadactyla*) has resulted from the advent of illegal trade in pangolins in East and Southeast Asia. In this thesis, I aim to explore the use of celebrities as messengers for demand reduction interventions in the illegal wildlife trade space, focusing on a case study to reduce consumption of wild meat, inclusive of pangolin meat, in Ho Chi Minh City, Vietnam.

The first half of my thesis creates a knowledge base on the use of celebrities in conservation campaigns, identifying research gaps in the use of celebrity endorsement in the field, and builds evidence and understanding on consumption of pangolin meat and wild meat in my study site. I find that the use of celebrities in this field has been poorly

evidenced and there is currently no proof that celebrity endorsement is effective in achieving conservation objectives. My results indicate there is active pangolin consumption in Ho Chi Minh City and suggest that the prevalence of this consumption is likely higher than previously reported. I report a prevalence for pangolin meat consumption at 7.1%, at 10.1% for scales and 6.5% for pangolin wine – all from a representative sample of the city. Additionally, I find more heterogeneity among consumers of wild meat in the city than what has been described in existing studies, specifically in regards to income, age, education and profession. In the second half, I explore the application of celebrity endorsement to influence behaviour in my case study, combining behavioural and celebrity influence models and theory. I find that an evidence-based selected celebrity could have the potential to influence the behaviour of consumers of wild meat in the city. In addition, I present a decision-making guide for the design of future celebrity-endorsed conservation interventions. Lastly, I test a novel approach on my case study to propose an intervention concept to reduce consumption of wild meat in Ho Chi Minh City, Vietnam. This thesis makes analytical, conceptual and empirical contributions to the biodiversity conservation field; in particular to knowledge of the use of celebrities in conservation and remaining gaps, the consumption of pangolin meat and wild meat in Vietnam, and efforts to design celebrity-endorsed interventions to achieve conservation objectives.

DEDICATION

This thesis is dedicated to my grandfather, Héctor Olmedo.

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LIST OF ACRONYMS

ACAP – Active Conservation Awareness Program

ACI – Akaike's Information Criterion

ASOC – Antarctic and Southern Ocean Coalition

BBQ – barbequed food

CITES – Convention on International Trade in Endangered Species of Wild Fauna and Flora

HCMC – Ho Chi Minh City

KII — Key Informant Interviews

MC – Master of Ceremonies

NGO – Non-governmental organization

PICO – Population, Intervention, Comparison and Outcomes

RRT – Randomised Response Technique

SVW – Save Vietnam's Wildlife

ToC — Theory of Change

UNEP – United Nations Environment Programme

UCT – Unmatched Count Technique

VND – Vietnamese Dong

VTM – Vietnamese Traditional Medicine

1 CHAPTER 1

Introduction

1.1 Background and Problem Statement

1.1.1 Research Context

Biodiversity worldwide faces numerous threats, and as a result, is experiencing severe declines with more than 37,400 species currently threatened with extinction (IUCN 2021). An increased rate of biodiversity loss is a result of human-driven threats, in particular land use change, overexploitation, invasive species introduction, pollution and climate change; all of which are likely to continue, and escalate, if large-scale conservation actions are not implemented (Joppa et al. 2016; Tilman et al. 2017). An analysis of the threats to >8,000 species in 2016 reaffirmed that the two biggest drivers of biodiversity loss are overexploitation followed by agriculture (Maxwell et al. 2016). Overexploitation constitutes the hunting, harvesting and/or collection of species (or parts thereof) from the wild at levels that exceed the ability of populations to recover (Maxwell et al. 2016; Benitez-Lopez et al. 2017). It can ultimately damage ecosystem function (e.g., extirpating species and thus, their ability to perform ecological roles (Benitez-Lopez et al. 2017)), impact human health (e.g., introducing zoonotic pathogens (UNODC 2020) and negatively affect economic development (e.g., economic losses as a result of undermined efforts to manage natural resources (Rosen & Smith 2010)) and governance (e.g., through corruption at various levels of authority (OECD 2018)).

Humans have used wildlife through history; currently millions of plants, animals and fungi are harvested annually to be used as medicine, food and for fashion and ornamental purposes, among other uses (Harfoot et al. 2018). Wildlife is used locally, at or close to its source, but is also traded across regions, country borders, and continents (Broad et al. 2003). In various instances, hunting and associated use is sustainable and can benefit biodiversity (e.g., hunting of bighorn sheep in the United States (Hurley et al. 2015)). The majority of recorded international trade in wild species across the globe is legal and the trade in a subset of these species (~39,000) is regulated by CITES, the Convention on International Trade in Endangered Species of Wild Fauna and Flora (Liew et al. 2021). However, a substantial portion of wildlife trade, from local to international levels, is illegal and goes unregulated (Challender et al. 2015a). The illegal portion is considered one of the world's most lucrative illicit trades and is one of the main contributory factors to overexploitation of biodiversity across the world (Walker et al. 2018). A wide variety of threatened taxa is impacted by illegal hunting and trade including rhinos, big cats, pangolins, sharks and other marine species, rosewood trees and orchids, and various other plant and fungi species ('t Sas-Rolfes et al. 2019).

While illicit wildlife trade is pervasive globally, high levels of trafficking and major consumer markets have been identified in key regions. An analysis of terrestrial vertebrates listed under CITES (Scheffers et al. 2019), found that South America, Central to Southeast Africa, Southeast Asia, the Himalayas and Australia are the main hotspots for trafficking due to the high number of traded species in these regions, and because they are some of the most biodiverse areas on the planet. Naturally, there is heterogeneity within these locations; South America contains a high diversity of traded

birds and amphibians, particularly from the Amazon for the latter. Although mammals are traded in South America, Africa and Southeast Asia are the most prominent regions for mammal trade, while Australia, parts of Southeast Asia and parts of Africa are hotspots for trade in reptiles (Scheffers et al. 2019). East and Southeast Asia in particular have been identified as the main consumer markets for various threatened species originating from Africa and from within Southeast Asia (Nijman 2009; Veríssimo & Wan 2018).

Several actors are involved in illegal wildlife trade and there are three main entry points where conservation interventions have focused to date in order to address this trade (Figure 1.1). These are: supply-side, which refers to the harvesting of wildlife at its source; transactional, which encompasses the activities that take place along the chain from supply to the consumer; and demand-side, which focus on the end users of wildlife products ('t Sas-Rolfes et al. 2019). Conservation interventions have historically focused on regulating the supply and trade of wildlife through strengthening law enforcement at source and at trafficking pinch-points (Challender et al. 2014). Supply-side interventions include restrictions on harvesting (e.g., area-based and/or species-based) including through the provision of incentives and/or alternative livelihood options, as well as the protection and monitoring of species and their habitat (e.g., anti-poaching patrols). However, the success of these interventions has been limited due to a lack of resources, capacity, political will, and corruption, among other factors (Watson et al. 2014; Roe et al. 2015). Of the total funding allocated to combat the illegal wildlife trade in Africa and Asia from 2010 to 2016, approximately 46% was dedicated to preventing poaching, yet offtake of wildlife continues to threaten biodiversity and ecosystems (The World Bank 2016).

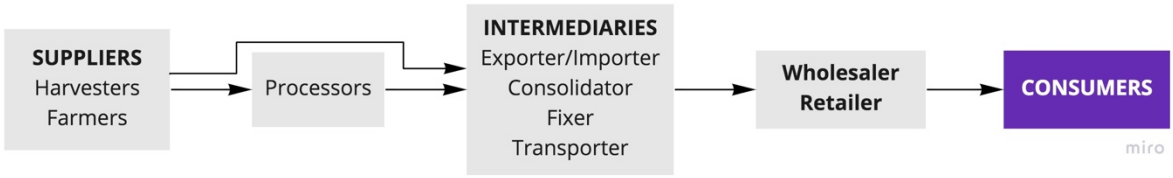


Figure 1.1. Illegal wildlife trade supply chain. Adapted from ('t Sas-Rolfes et al., 2019).

Transactional interventions include the detection of wildlife at border crossings, identification and apprehension of members of trafficking networks and syndicates, and enactment and implementation of national and international legislation to regulate trade ('t Sas-Rolfes et al. 2019). International trade is regulated by CITES, which seeks to ensure sustainable international trade of wildlife, i.e., that it does not threaten the survival of species in the wild. Around 39,000 species are listed under the Convention (CITES n.d). Under CITES, species are listed in one of three Appendices: Appendix I includes species (~1000) deemed to be threatened with extinction and prohibits trade for commercial purposes – it is only permitted in exceptional circumstances; Appendix II includes species (~38,000) for which trade is permitted but it is strictly regulated; and Appendix III includes species (~200) that have been listed at the request of one country (Party) to facilitate international cooperation to ensure trade remains sustainable (CITES n.d). Beyond including species in the Appendices, additional measures designed to support sustainability have been taken by CITES parties for a range of species including cheetahs (*Acinonyx jubatus*) and Suleiman markhor (*Capra falconeri*) (Frisina & Tareen 2009; Challender et al. 2015a).

Despite the implementation of these measures, illicit trade in threatened species continues as a result of various challenges (UNODC 2020). Detection of harvest at source

sites and the smuggling of wildlife through border points, as well as identification of wider criminal networks, relies on the capacity of individual countries and their respective agencies, and cooperation between enforcement agencies within and between countries. However, in many parts of the world, including but not limited to the global south, these efforts, as well as CITES implementation generally, are undermined by a lack of human and technical resources, trained personnel, political will, and by corruption (Challender & Waterman 2017; 't Sas-Rolfes et al. 2019).

Over the last decade, demand-side interventions in end-markets have increasingly been recognized as a priority for addressing overexploitation and illegal trade (Challender et al. 2014; Veríssimo et al. 2020a). Demand reduction campaigns or interventions in this context are efforts by non-governmental organisations (NGOs) and/or government agencies that seek to reduce the purchase and use/consumption of wildlife products or change consumer preferences (Veríssimo et al. 2020a). In contrast to efforts aimed at reducing illegal hunting and poaching as part of supply-side interventions, activities to communicate with consumers to address the illegal trade received only 6% of funding allocated to combat illegal wildlife trade between 2010 and 2016 (The World Bank 2016). Nonetheless, the last two decades have seen an increase in demand reduction interventions and research into the drivers of demand of wildlife products in Africa, South and North America, and East and Southeast Asia (e.g., Chaves et al. 2017; Veríssimo & Wan 2018; Chausson et al. 2019). Throughout this thesis, I refer to efforts that aim to reduce consumption of wildlife products both as demand reduction interventions and as behavioural interventions, given that reducing demand and/or consumption requires a change in human behaviour.

In East and Southeast Asia, where the most prominent consumer markets for a number of high-profile threatened species have been identified, demand reduction campaigns have generally lacked appropriate project design – typically failing to articulate measurable objectives, identify a target audience, develop a Theory of Change, measure adequate indicators of success and carry out robust evaluations (Olmedo et al. 2017; Greenfield & Veríssimo 2018). There has been limited implementation of behavioural models and techniques and a number of campaigns have focused instead on raising awareness among the general public about the threats species face, in the hope that educating people and profile raising will automatically catalyse a change in purchasing or consumption behaviour (Olmedo et al. 2017). However, increasing knowledge of an issue alone is unlikely to lead to behaviour change and can have perverse effects such as making a product more desirable for consumers (Wright et al. 2015; Glenn et al. 2019; Kidd et al. 2019). For example, following the principles of the anthropogenic Allee effect, rare products might be considered valuable due to their rarity, thus, messages that focus on a species' decline in the wild can enhance the perception of rarity of its products thereby increasing consumer desire to acquire and/or use these products (Courchamp et al. 2006; Glenn et al. 2019).

Celebrity endorsement has become a common tool for influencing consumer demand for wildlife products (e.g., USAID 2016; Glenn et al. 2019). Famous individuals are frequently engaged in attempts to change consumption behaviour, despite evidence suggesting that celebrities might not be the most effective messengers (Duthie et al. 2017; Vu et al. 2020), and despite calls for the selection of influential messengers to be evidence-based (e.g., Burgess 2016). The need to explore the effectiveness of celebrities in behavioural

interventions that aim to reduce the consumption of illegally traded wildlife is particularly critical in East and Southeast Asia, where multiple celebrity-endorsed campaigns have been implemented to address this issue and where demand reduction has been recognised as a priority for various species (e.g., CITES 2016; Voices for Wildlife 2018; WildAid 2018). In China, celebrity campaigns seeking to reduce consumption of shark fin and other threatened wildlife have reported success in changing consumer behaviour; but these campaigns have not measured appropriate indicators of behaviour, i.e., they have focused on campaign reach or behavioural intention rather than actual behaviour, and evaluations have not been able to attribute results to celebrity endorsement (Cao 2005; Zhang 2006; Li 2008; Yu 2008; Ali 2014; Wang 2014; Liu 2016). In Vietnam, celebrity-endorsed demand reduction campaigns have become popular (e.g., Save the Rhino, 2015; WildAid 2019; Vu et al. 2020) but robust evaluation of celebrity endorsement has not been conducted.

1.2 Pangolin consumption in Vietnam

1.2.1 Vietnam and the Illegal Wildlife Trade

Vietnam has been an exporter, importer and consumer of wildlife for centuries; a culture of wildlife consumption has long existed for medicinal, nutritional and curio purposes (Nash 1997; Yiming & Dianmo 1998). Vietnamese Traditional Medicine (VTM) has a history of more than 2000 years and is fully integrated in the country's culture and healthcare system; thousands of plant species and hundreds of animal species are used for their medicinal properties (Woerdenbag et al. 2012; Sexton et al. 2021). There is also a long history of using wild animals as a source of food, with native species of mammals, reptiles and birds being sold in urban centres and provincial communities (Nash 1997).

National regulations to protect wildlife were first promulgated in the 1990s; a number of decrees and amendments have been made since, with a new penal code introduced in 2018 to increase the penalties for trading illegal and protected wildlife, and a further amendment to the list of endangered and rare species was made in 2019 (Nash 1997; Sexton et al. 2021). Vietnam became a signatory of CITES in 1994 and is one of the countries encouraged to implement provisions in recent CITES resolutions aimed at addressing consumption of illegally traded wildlife (e.g., Resolution Conf. 17.4 on Demand Reduction Strategies (CITES 2016; 2021)). Consumption in Vietnam has been identified as one of the drivers of trafficking involving species of global conservation concern including the tiger (*Panthera tigris*), bears (Ursidae *sp.*), rhinos (Rhinocerotidae *sp.*) and pangolins (Manidae *sp.*) (Vu & Nielsen 2018; Davis et al. 2019a; Davis et al. 2020a). Wildlife consumption in the country has been linked to indiscriminate snaring which threatens endemic species (Tilker et al. 2020 ; Timmins et al. 2020) and was a contributory factor in the extinction of the Javan rhino (*Rhinoceros sondaicus*) in 2010 (Brook et al. 2012).

The use of threatened and protected wildlife continues in Vietnam despite local and global concerns about sustainability and current conservation efforts. Wildlife is commercially available in major cities throughout the country including Hanoi, Ho Chi Minh City (HCMC), Hue and Hai Phong (Nguyen 2008; Drury 2009; Sandalj et al. 2016). Historically, wildlife hunted in the central and southern regions of the country was destined for HCMC, as was wildlife transported from neighbouring Cambodia (Nash 1997). Rapid economic growth in the country in the last three decades has led to higher levels of affluence, particularly in the major cities like HCMC, which has one of the

highest incomes per capita in the country, enabling more consumers to purchase luxury and aspirational goods including high-value wildlife products (Nijman 2009; Challender et al. 2015a).

1.2.2 Pangolin Product Use in Vietnam

Pangolins are a group of species gravely threatened by the illegal wildlife trade. All eight species face threats from unsustainable use at local and international levels (Challender et al. 2020a). Although historically pangolins have been traded in significant volumes, the vast number of pangolins and their derivatives frequently seized in Africa and Asia in recent years strongly suggest that wild populations are being heavily impacted by overexploitation and illegal trade (Challender et al. 2020a). It is estimated that the equivalent of 715,000 pangolins were trafficked globally from 2010 to 2019 (Challender et al. 2020b). While all species are included in CITES Appendix I, which prohibits international commercial trade in wild-caught pangolins and their products, enforcement challenges in countries of origin through to end-markets enable pangolin poaching, trafficking and consumption to continue (Challender & Waterman 2017; Challender et al. 2020b). Trade data suggests that a decline in the Sunda pangolin (*Manis javanica*) and Chinese pangolin (*M. pentadactyla*), both native to Southeast Asia, as a result of consumption and trade, has led to an increase in trafficking of African species to meet ongoing demand in this region (Heinrich et al. 2017; Chong et al. 2020; Wu et al. 2020). Additionally, East Asian investment and development activities in Africa more generally may also have a role in the ongoing trafficking from Africa to Asia through the facilitation of trade networks (Ingram et al. 2019). Evidence shows that large quantities of pangolin scales from Africa and Asia and whole pangolins from within Southeast Asia are destined

for Vietnam, which has been identified as a main end-market for pangolins and their derivatives along with China (Nijman et al. 2016; Heinrich et al. 2017).

Various pangolin products are used in Vietnam. Meat and scales are the most common pangolin products used and on which the most research has been conducted but there is also evidence of the use of wine, foetuses, blood, the whole body, stomach, and bones (Burgess et al. 2020; Sexton et al. 2021). Pangolin scales are known for their use in VTM to help promote lactation in breastfeeding mothers and to treat abscesses, skin conditions, cancer, detox, rheumatism, asthma, malaria, chills, menstruation stagnation, styptic and scrofula (Vo 1998; Sexton et al. 2021). Thus far, evidence suggests pangolin meat is consumed due to its rareness and high price, in order to affirm one's social status and for its perceived nutritional properties (Shairp et al. 2016; Burgess et al. 2020). Pangolin wine, which refers to pangolin body fluids mixed with rice wine or a whole pangolin or body parts submerged in rice wine, is also consumed in Vietnam but the motivations for, and consumption of wine, have not been characterised (WildAid 2016; USAID 2018).

Demand reduction efforts targeting consumers in Vietnam have been highlighted as a priority to tackle the poaching and trafficking of native and African pangolin species (IUCN SSC Pangolin Specialist Group 2018; Burgess et al. 2020; Sexton et al. 2021). Existing research has found active consumption of pangolin meat, scales and wine, in HCMC and many VTM retail shops in one of the city's central districts are known to sell scales (Nguyen 2008; Nguyen et al. 2009; Shairp et al. 2016).

1.3 Thesis Overview

1.3.1 Aim and Objectives

The aim of this thesis is to explore the role and effectiveness of celebrity endorsement in demand reduction interventions for illegally traded wildlife products, focusing on reduction of wild meat consumption —inclusive of pangolin meat— in HCMC, Vietnam, as a case study. Specific objectives are to:

- Create a knowledge-base on the use of celebrity endorsement in environmental campaigns, including demand reduction interventions, understand the extent to which this endorsement has been evaluated, and determine evidence of its effectiveness in achieving campaign objectives.
- Obtain evidence of the consumption prevalence of three pangolin products —meat, scales and wine— and gain insights into this consumption for my case study in HCMC.
- Identify and characterise different wild meat consumer groups, with particular reference to pangolin meat, and determine potential alternatives for wild meat and whether celebrities can be effective influencers in this behavioural system.
- Develop a guide for decision-making in conservation interventions that seek to change consumption behaviour of illegally traded wildlife using celebrity endorsement, and produce a potential intervention concept for my target audience.
- Test the effectiveness of the proposed intervention to reduce wild meat consumption in HCMC and suggest a final intervention design.

1.3.2 Thesis Outline

This thesis is presented in five research chapters in addition to this first introductory chapter and a final discussion chapter. In order to test celebrity effectiveness in my case study, it was necessary to obtain data and gain an understanding of the behavioural system (i.e., pangolin and wild meat consumption in HCMC) that celebrity endorsement would seek to influence. Research into the behavioural system was conducted and is presented in Chapter 3 and Chapter 4. Research pertaining to the use of celebrity endorsement to influence behaviour in my case study is presented in Chapter 5 and Chapter 6 (Figure 1.2). Below I provide a summary of each research chapter.

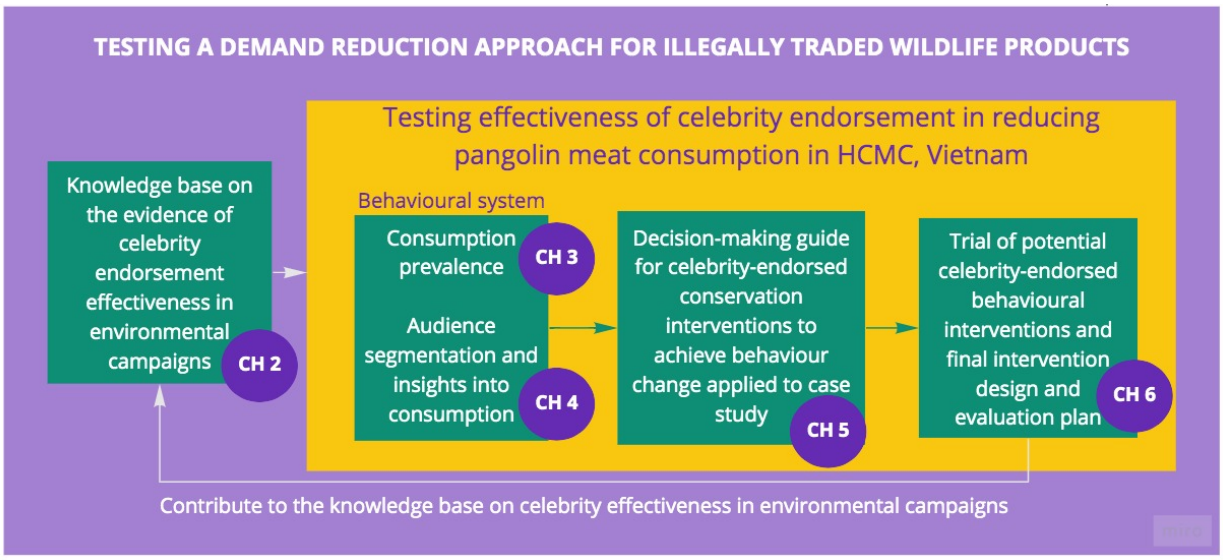


Figure 1.2 Doctoral thesis research structure including five research chapters.

Chapter 2: A scoping review of celebrity endorsement in environmental campaigns and evidence for its effectiveness

In this chapter I conducted a review of celebrity-endorsed environmental campaigns in collaboration with individuals from other academic institutions, conservation

practitioners and project partners. I report on the extent to which celebrities have been used in these campaigns, whether evaluation of the endorsement has been conducted, and assess whether there is evidence that the celebrities achieved the objectives stated. We searched the peer-reviewed and grey literature in English, Spanish, French, Portuguese, Chinese and Vietnamese from July 2018 to January 2019. Findings include the number of campaigns found, their location, topic covered, celebrities used, whether they have been evaluated and whether there is evidence of celebrity effectiveness. This chapter also provides insights into the dearth of measurable objectives, Theory of Change development, celebrity selection research and lack of reporting of celebrity use in the conservation field. The findings inform the application of celebrity endorsement in my case study in Vietnam and contribute to knowledge of celebrity use in conservation.

This chapter is published as:

Olmedo, A., Milner-Gulland, E.J., Challender, D.W.S., Cugnière, L., et al. (2020) A scoping review of celebrity endorsement in environmental campaigns and evidence for its effectiveness. *Conservation Science and Practice*, 2(10), 65–15.

Chapter 3: Uncovering prevalence of pangolin consumption

Previous research has estimated the prevalence of the consumption of pangolin products in different localities in Vietnam but, considering that national legislation prohibits the purchase of pangolin products, previous research has not accounted for the potential for biased responses. In this chapter, I investigate pangolin consumption as a sensitive behaviour and estimate consumption prevalence of pangolin meat, scales and wine in HCMC using a specialized questioning method, the unmatched count technique (UCT). I

also characterise the demographics of pangolin product consumers. These results contribute to the evidence base on pangolin consumption in the city, offering a more reliable estimate of consumption prevalence. I compare my estimates to those elicited from direct questions in the study and to those from previous studies. In addition, I report on the use of this questioning technique and its applicability in illegal wildlife product consumption research.

This chapter is published as:

Olmedo, A., Veríssimo, D., Milner-Gulland, E.J., Hinsley, A., Dao, H.T.T., Challender, D.W.S. (2021). Uncovering Prevalence of Pangolin Consumption Using a Technique for Investigating Sensitive Behaviour. *Oryx,* 1-11.

Chapter 4: Profiling consumers of wild meat in HCMC, Vietnam

In this chapter I apply the principles of target audience segmentation to a sample of wild meat consumers in HCMC (i.e., beyond pangolins), due to the sensitivity of discussing consumption of pangolin meat directly. I used cluster analysis to divide wild meat consumers into subgroups considering demographic, behavioural and psychographic variables. While one consumer group matches previous characterisations of wild meat consumers, my findings recommend other groups should also be considered in demand reduction campaigns. I report the wide variety of species consumed in wild meat restaurants including those, like pangolins, that are of conservation concern. This chapter showcases an audience segmentation approach to understanding wildlife consumers and provides insights for behavioural interventions and further research to curtail demand for wild meat in HCMC, Vietnam where it is of conservation concern.

This chapter is published as:

Olmedo, A., Veríssimo, D., Challender, D.W.S., Dao, H.T.T., Milner-Gulland, E.J. (2021). Who Eats Wild Meat? Profiling Consumers in Ho Chi Minh City, Vietnam. *People and Nature*, 3(3). 700-710.

Chapter 5: Designing celebrity-endorsed behavioural interventions

In this chapter I develop a guide for decision making in conservation interventions that aim to influence consumption behaviour of illegally traded wildlife products using celebrity endorsement. This framework follows the behaviour change, conservation and celebrity endorsement literature and is applied to my case study in HCMC, thus integrating results from previous chapters. Using this guide, I produce two potential celebrity-endorsed intervention concepts to address my target audience's consumption of wild meat, including pangolin meat. I discuss the merits of this guide to address illegal wildlife consumption and its broader use in conservation.

This chapter has been submitted to Conservation Biology as:

Olmedo, A., Veríssimo, D., Challender, D.W.S., Dao, H.T.T., Milner-Gulland, E.J. (2021). Designing celebrity-endorsed behavioural interventions in conservation.

Chapter 6: Pre-test and proposed planning for a celebrity-endorsed behavioural intervention

In this final research chapter, I test two intervention concepts with members from my target audience in HCMC to inform final intervention design. I develop a Theory of

Change and suggested next steps for a celebrity-endorsed intervention to reduce consumption of wild meat. I demonstrate the steps conservation behavioural interventions with celebrity endorsement ought to take before real-world implementation and offer recommendations for similar future campaigns.

Chapter 7: Discussion

In this final chapter, I provide an overview of how my thesis objectives were achieved in the research chapters described above. I discuss themes that emerged from my research and draw out ways forward for efforts aiming to reduce consumption of illegally traded wildlife, particularly those that are endorsed by celebrities, and outline needs for future research.

1.4 Research Approach

Recent calls have been made for researchers to reflect on their position in their work and recognise any biases that might be present during the conceptualisation, data collection, analysis and interpretation of their findings (Blair 2016). This section includes my reflections as a researcher and how my personal background and experience as a conservation practitioner may have introduced biases into my work. I also discuss how I sought to mitigate these biases.

After completing my undergraduate degree in Environmental Humanities in Whitman College in the United States, I was employed by TRAFFIC (an NGO focused on monitoring wildlife trade) in Hanoi, Vietnam, where I worked as the Communications Officer for a year. My sudden introduction to wildlife trade was unnerving and included the discovery

of bear bile stored in the refrigerator of the apartment I moved into. I experienced shock that wild animals, tigers and bears, were farmed in such harsh conditions, that snakes were killed at restaurant tables for show and a meal, that rhinos and elephants were killed in Africa so horns and tusks could be shipped to East Asia, that I could walk into a shop in broad daylight and walk out with ivory trinkets and snake wine. It seemed inevitable to feel so different from this culture and confused that the life of wild animals and their survival in the wild did not have the value it has for me. Luckily, I had colleagues to guide me in this learning process; other foreigners who had more perspective and understanding than I did and my Vietnamese colleagues who helped me navigate the cultural differences.

I left Vietnam to pursue an MSc in Conservation Science at Imperial College. My MSc thesis looked at how rhino horn demand reduction campaigns in Vietnam, which had gained traction in the preceding three years, had been designed and executed to inform how this practice could be improved. This project left me wanting another chance at being a practitioner working to address illegal consumption of wildlife products. Less than a year later, I was back in Hanoi starting a position with WWF-Vietnam as Senior Project Officer for Combating Illegal Wildlife Trade. This time around, even as I visited restaurants where wild meat was served, it was all easier, especially keeping my head straight and managing visceral reactions. I gained confidence in my conservation practice, my understanding of consumers and yet, it was still hard not to feel very alien from the notion that wildlife could serve no other purpose than that of a domestic pig, raised to become food. Nonetheless, I had come to accept these different views and the notion that not all wildlife use is unsustainable nor should it be illegal. I also got to know NGO

work more closely and experienced some common challenges like the urgency to spend project funds, picking up someone else's unfinished project, competition with other NGOs, and trying to execute a demand reduction project with limited knowledge of the context in which this demand exists.

I have been dedicated to pangolin conservation specifically for the last six years in my role as Co-Director of People for Pangolins, a UK-based non-profit which raises funds for pangolin conservation efforts in range countries, and as a member of the IUCN Species Survival Commission (SSC) Pangolin Specialist Group. I have had the opportunity of seeing rehabilitated pangolins, rescued from trade, before they are returned to their forest home and have been overcome with sadness and feelings of injustice that their wild populations are being decimated for human use and consumption. These have been difficult feelings to battle with at times, particularly when visiting restaurants and being amongst wildlife consumers. I have learned to manage these emotions, realising that focusing on the work at hand is more important and helpful in the long-run for conservation purposes.

I left WWF in 2018 to start my DPhil and was fortunate that my project was informed by my local project partner, the NGO Save Vietnam's Wildlife (SVW). In particular, I had the opportunity of working closely with Huong Dao, SVW's Communications Officer and with two groups of local Research Assistants during data collection periods. Huong and most of my Research Assistants grappled with the same feelings I did when discussing consumption of threatened animals: anger, sadness and confusion. I, along with my team, worked hard to ensure that all respondents felt safe and were never judged; this

helped hone my own skills in ensuring my judgement was not clouded by my concern for wild animals. I was aware that my presence as a Westerner could have an impact on respondents' answers and so I was not present during surveys or focus group discussions. Huong and my Research Assistants helped me ensure my research design was culturally appropriate and Huong verified that my interpretation of findings, particularly from qualitative data collections, was sound.

I have been conscious of issues associated with illegal wildlife consumer research and have strived not to fall in previous traps of 'othering' consumers (Margulies et al. 2019). I completed relevant training on research ethics before starting data collections and obtained ethical approval from the University of Oxford's Social Sciences and Humanities Interdivisional Research Ethics Committee for every research stage. I recognise I had prior knowledge and understanding of the design of conservation campaigns that employ celebrity endorsement, the extent to which these have been evaluated, and on pangolin and wild meat consumption in Vietnam. I designed all the data collection, was involved in every fieldwork stage, analysed all the data, interpreted and have reported on all of the findings. My previous knowledge on the research topic and my direct involvement in data collection, design and interpretation of results could have influenced my research by tailoring findings to fit my own preconceived notions. Being aware of this, I have strived to put my previous knowledge on campaigns and pangolin consumption aside so as to let true and new findings arise from my research, avoiding leading questions and looking for already-known answers. I have sought to be mindful of the lessons I learned while working with NGOs so as to not be too critical of current conservation practice. I also

recognise unconscious bias might be present in the writing, but with the help of my supervisors, I have endeavoured to mitigate this as much as possible.

2 CHAPTER 2

A scoping review of celebrity endorsement in environmental campaigns and evidence for its effectiveness

2.1 Introduction

The use of celebrities has become a mainstream marketing strategy (Tanaka et al. 2015). Celebrities are individuals who are identifiable and well known to a specific audience, and whose activities are more prominent and agency more amplified (in the sense of possessing more ability or resources to influence the course of events) than the average individual within that audience (adapted from Boykoff & Goodman 2009). Celebrities are highly prevalent in advertising globally (Erdogan et al. 2001; Muda et al. 2012). They have endorsed a vast array of products such as food, make-up, carbonated drinks, clothes, and sports brands (Erdogan et al. 2001; Michiza et al. 2013; Aririguzoh, Mogaji & Odiboh 2019; Englund et al. 2020). Three main theoretical models have been advanced to explain the effectiveness of celebrity endorsement across different products and brands. The source credibility model proposes a celebrity's credibility, expertise on the product being endorsed, and trustworthiness influences the effectiveness of an advertisement (Friedman et al. 1976; Ohanian 1991; Park 2016). The source attractiveness model contends attractiveness of a celebrity, which includes physical appearance, familiarity, similarity and likability affect endorsement effectiveness (McGuire 1985). Finally, the

'match-up' hypothesis explores whether the match between celebrity, brand, product and audience is appropriate (Miciak & Shanklin 1994; Park 2016).

Celebrity endorsements are one way for brands and products to be conspicuous in a competitive marketing environment, as celebrities can increase message persuasiveness, impact message recall, attitude towards a specific advertisement and the brand in general, brand recognition and purchase intension, thus improving advertisement effectiveness (Muda et al. 2012; Agnihotri & Bhattacharya 2016; Park 2016). There is also evidence that a celebrity's profession affects the effectiveness of the endorsement. Individuals who are famous because of their performances or talent, such as athletes, may be perceived as more authentic than those who have 'glamorous' professions (e.g., acting; Roy & Mishra 2018).

There are also recognised challenges to celebrity endorsement. Enlisting famous individuals as endorsers requires investment, for example time and effort needed to manage the relationship, and the cost of employing liaison officers (Brockington 2017). Celebrities may not be the most effective messengers for complex topics (Bradshaw et al. 2007; Jeffreys 2016) and might be perceived as insincere by the public (de los Salmones & Dominguez 2016). There are also potential risks for businesses, organisations and investors associated with a lack of control over celebrities' personal lives and controversies they may be involved in, which can damage the image of a product or brand being endorsed (Tanaka et al. 2015; Ford 2018) or result in substantial market-value declines (Ilicic et al. 2016).

Evidence for the effectiveness of celebrity endorsement positively affecting brands and influencing purchasing behaviour is therefore mixed (Wang & Scheinbaum 2018). Thus, there is a need to test the prevailing assumption that such endorsement is effective (Tanaka et al. 2015; Ford 2018). While most research on celebrities in advertising has taken place in the USA, using student participants (Brockington 2015a), it is necessary to explore responses to endorsements in diverse audiences across social and cultural contexts (Choi et al. 2005; Bergkvist & Zhou 2016).

2.1.1 Celebrity Endorsement in Environmental Conservation

Since the 1990s, the use of celebrity endorsement in environmental conservation has increased (Doyle et al. 2017). Celebrity involvement has ranged from endorsing non-governmental organizations' (NGOs') messages (e.g., Jackie Chan endorsing WildAid's messages (WildAid 2018)), to celebrities creating their own institutions built around their profile and brand (e.g., the Jane Goodall Institute), and participating in high-level political forums (e.g., Leonardo DiCaprio speaking at United Nations climate change summit in 2014; Doyle et al. 2017). This is reflected in the recent creation of celebrity liaison officer positions in prominent environmental NGOs, and the involvement of Hollywood talent management companies in the management of celebrities' charitable interests (Brockington 2017).

More broadly, celebrities have played a range of roles, promoting myriad topics and messages. One is climate change, leading to the labelling of particular celebrities as the 'charismatic megafauna' of the climate change movement (Boykoff et al. 2010). As in product advertising, the marketplace for environmental causes is cluttered and

celebrities are seen as a tool to help break through noise and reach the intended audiences (Boykoff et al. 2010). They can be powerful messengers by making distant issues seem relevant in people's everyday lives (Anderson 2013) and presenting complicated topics in a more appealing and emotional manner, which frames how the public should feel about issues they may not otherwise give attention (Jeffreys 2016; Doyle et al. 2017). Brockington (2008) argues that alienation from nature as a result of modern urban lifestyles creates yet another commodity celebrities can sell to the public; a first-hand experience of closeness to nature. Famous individuals involved in conservation have the ability to mobilise support to conserve wildlife (Brockington 2008). Due to their elite status, celebrities may also have access to key individuals and organizations, acting as strategic assets for NGOs (Turner 2016).

Efforts aimed at achieving environmental objectives typically rely on communicating effectively to different audiences and encouraging pro-environmental behaviours, such as following sustainable diets and lifestyles, to be adopted. It is essential, therefore, that conservationists ground their use of conservation marketing and, in particular, celebrity endorsements, in evidence, in order to maximise the likelihood of success. The need for further research on the effect of celebrity endorsement in the environmental field has been highlighted (Anderson 2011), but has not yet been rigorously examined. Despite this, the assumption that celebrities' symbolic power will result in effective environmental action (Craig 2018) has driven their continued use. Duthie et al. (2017) explored the effectiveness of celebrities in conservation marketing by testing willingness to engage with an advertisement and message recall, using messages created for the purpose of the study delivered by a celebrity and a non-celebrity. Findings show

respondents had a higher willingness to engage with adverts featuring celebrities but message recall was lower with these advertisements, as the celebrity appeared to distract viewers from the message. These results showcase the complexities of using celebrity endorsements as a conservation tool. This review investigates the extent to which celebrity endorsement has been used in environmental conservation campaigns, whether and how its effectiveness has been evaluated, and what evidence exists of its effectiveness.

2.2 Methods

I use a broad definition of celebrity adapted from Boykoff & Goodman 2009 (see Chapter Introduction). I define 'celebrity endorsement' as active participation by a celebrity in delivering campaign messages, and 'environmental conservation campaign' as the organized delivery of messages that focus on actions benefitting the natural environment and/or biodiversity, including both protection against a specific threat and conservation generally.

I searched for existing reviews on celebrity endorsement in environmental conservation campaigns in the following databases: PROSPERO, the Cochrane Library, The Campbell Collaboration Library, the Collaboration for Environmental Evidence Library, Web of Science, ProQuest and Google Scholar. Terms searched for were '*review AND celebrity AND environmental AND campaigns'* and *'review AND celebrity AND conservation AND campaigns.'* I found no other review on this topic. I led a team that conducted searches in six languages: English, Spanish, French, Portuguese, Chinese and Vietnamese. These languages were selected to cover a wide geographic range of publications, ensuring that

in particular those areas where celebrities are known to be used for campaigns on the illegal wildlife trade (Vietnam and China) were covered.

The team searched Web of Science (databases specified in Appendix 2.1), ProQuest (databases specified in Appendix 2.1), Scopus, Open Grey and Google Scholar to search for relevant literature in each language in both published and grey literature as I suspected reports of environmental conservation campaigns that have employed celebrity endorsement may be published in NGO reports. Additional databases in Vietnamese, Chinese and Spanish were used; reviewers identified language specific databases to get the best coverage possible of the literature (Appendix 2.1). A pilot search in Google was tested *('Environmental campaigns celebrities'*) to add to the grey literature but results from the first five pages ranged widely from online news articles to lists of celebrities who support environmental topics without mentioning specific campaigns and thus would have been excluded. Links that did mention campaigns did not report the information required for inclusion in the review.

Searches were conducted from July 2018 to January 2019 using institutional access from the University of Oxford, Sun Yat-Sen University, University of Exeter and University of Kent, with the time frame of the search being set from the earliest records available to January 2019. Reviewers translated twelve original search strings from English into each language (Table 2.1; Appendix 2.2). Original search strings in each language were used in all data bases except for Google Scholar and Open Grey. There is a character limit for searches in Google Scholar; search strings that exceeded this limit were divided into two different search strings. Half of the synonyms of 'celebrity' were combined with the other

search terms for the first search and the other half of the synonyms were combined with the other search terms for the second search. Google Scholar and Open Grey did not have Boolean logic to search for plural terms; this was remediated in Open Grey by using the Boolean logic for different word endings and in Google Scholar all the synonyms and plural words had to be added into the search string next to the original word.

Table 2.1 Search strings in English using Boolean logic.

(Celebrit* OR "Very Important Person" OR "famous individual*" OR superstar* OR "household name*" OR "famous pe*" OR ambassador* OR "famous face*" OR "famous name*" OR influencer$ OR "role model$")	AND	(environment* OR conservation)
		impact$ AND (environment* OR conservation)
		marketing AND (environment* OR conservation)
		(campaign$ OR advert*) AND (environment* OR conservation)
		(endorsement OR advoca* OR support*) AND (environment* OR conservation)
		(campaign$ OR advert*) AND (endorsement OR advoca* OR support*) AND (environment* OR conservation)
		(evaluat* OR effect*) AND (environment* OR conservation)
		(campaign$ OR advert*) AND (endorsement OR advoca* OR support*) AND (evaluat* OR effect*)
		(campaign$ OR advert*) AND (attitude OR behavio$r OR awareness)
		"behavio$r* intention"
		(environment* OR conservation) AND "social norm$"
		(environment* OR conservation) AND "behavio$r* change"

I followed guidelines from the Centre for Environmental Evidence (CEE 2018) and developed a protocol to outline the process, objectives, key definitions, screening strategy and inclusion and exclusion criteria for my review (Appendix 2.3). The protocol was sent to experts in celebrity research, practitioners in celebrity relations within the NGO sector, and researchers who have conducted, or are conducting, illegal wildlife trade consumer research, given the popularity of celebrity use regarding this topic (e.g., USAID 2016; Voices for Wildlife 2018; WildAid 2018; Appendix 2.3). Stakeholders were consulted for feedback on the protocol during the development stage. Changes were

made to the protocol following this feedback. These changes are included in Appendix 2.4.

I sought to answer a two-part question in this review: to what extent has celebrity endorsement been used in environmental conservation campaigns, and is there evidence for its effectiveness? I used the list of elements commonly used in evidence synthesis to guide inclusion and exclusion of articles; *Population, Intervention, Comparison and Outcomes* (PICO; CEE 2018), where *Intervention* is celebrity endorsed environmental conservation campaigns and the *Outcome* is the evidence for celebrity endorsement effectiveness. To critically assess the *Outcome*, I set out to understand if and how these campaigns have been evaluated. Although the *Population* is not explicit in my review question it has been defined with the other parameters in Table 2.2. I excluded the *Comparison* element as this review aimed to find any evidence of celebrity endorsement and not to compare it to endorsement by different messengers.

Table 2.2 Inclusion and exclusion criteria for the scoping review.

POPULATION	Interventions may focus either on a specific target audience or on the general public. Review is not limited to a geographical location.
INTERVENTIONS	Environmental conservation campaigns: organized delivery of messages that focus on benefitting the natural environment and/or biodiversity, including protection against a specific threat and general conservation. Excluding: natural disaster relief efforts, the promotion of use and purchase of products, campaigns that focus solely on health benefits, animal welfare campaigns and interventions that encourage the adoption of a vegan or vegetarian diet solely for health and/or welfare reasons, concerts, simulated campaigns under experimental conditions and celebrities' blogs discussing personal lifestyle choices.
OUTCOMES	Articles that describe the use of celebrities in campaigns are included, whether or not they specifically address outcomes. This is because one of the aims of this review is to understand celebrity use across the

	environmental field. Publications reporting on the evaluation of effectiveness of celebrity endorsement can include various outcomes such as: campaign reach; campaign results (including amount of donations raised, pledges, commitments or other immediate action); message or advertisement recall; evidence of voluntary change in behaviour or change in awareness and attitude (e.g. obtained through pre- and post-intervention surveys or experiments that compare changes in the target audience with a control group).

To analyse campaign design, I evaluated the campaigns against the steps necessary for a celebrity-based intervention to be adequately planned and implemented (Figure 2.1). These are based on Olmedo et al. (2017), who developed key steps required for an intervention to achieve and demonstrate behavioural change. This framework was based on interviews with practitioners responsible for delivering behaviour change interventions for the illegal wildlife trade in Vietnam, combined with elements from the conservation, business, and behavioural science literatures (Margoluis et al. 2009; Zhuang 2013; Osterwalder et al. 2014). As this review did not seek to evaluate behaviour change campaigns exclusively, but rather celebrity campaigns regardless of their objective, the elements related to behaviour change in the original diagram in Olmedo et al. (2017), including research into motivations driving behaviour and selecting a behaviour change model, were removed. I used steps 1-8 in the diagram below to assess the extent to which the campaigns I found in the literature followed a robust design-delivery-evaluation-learning process.

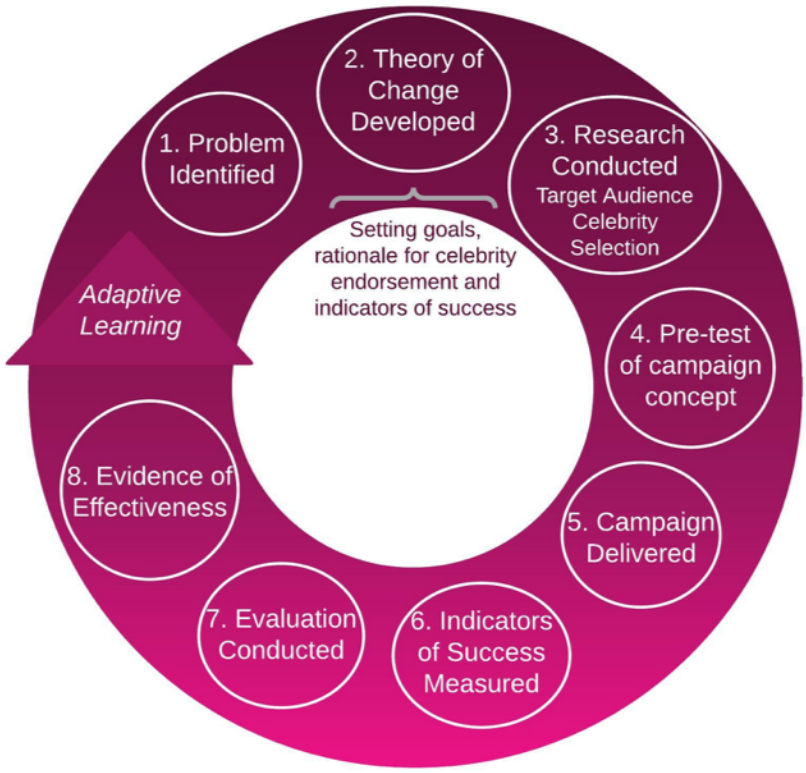


Figure 2.1 Steps for the design and implementation of a celebrity-based intervention. Adapted from Olmedo et al. (2017).

I worked with 10 other reviewers, two per language (I reviewed in two languages). Each language had a designated lead reviewer who conducted the searches across all databases. Both reviewers screened the titles, abstracts and full texts separately and met to discuss and agree on their decisions about inclusion and exclusion and reach consensus keeping track in flow diagrams (Appendix 2.5). Once the lead reviewer in each language had conducted the searches and downloaded the articles found, both reviewers separately screened all the titles and abstracts, categorising them as 'Excluded', 'Included' or 'Maybe Included'. Reviewers then compared the articles each had placed in these categories to ensure mutual agreement was reached. The abstracts for the articles categorised as 'Included' and 'Maybe Included' were then read and screened separately by both reviewers to categorise them as 'Included' or 'Excluded', and then compared for

mutual agreement. Where there was a difference on the decision to include an article, reviewers were instructed to include the article in order to be as inclusive as possible. Both reviewers read all the full-texts of articles that were included after abstract screening and if articles complied with the inclusion criteria, the main reviewer extracted the data from the full-texts (Appendix 2.8 and 2.9).

Data were extracted by each lead reviewer in every language recording information on the campaign, its implementation, and the evaluation of effectiveness (based on Table 2.2 and Figure 2.1); all data were recorded in English. Once the data had been extracted from each of the included articles this was shared with the second reviewer in each language to ensure there was agreement on extraction. Data on all campaigns from every language were then collated into a single spreadsheet using Microsoft Excel where details of campaign information (location, year, audience, objective, celebrities involved), campaign design elements (theory of change, indicators of success, evaluation) and evidence of effectiveness were grouped into relevant categories (e.g., campaign topic, type of celebrity, objective of celebrity endorsement) and graphed in line with standard practice for a scoping review (Sucharew 2019).

Due to limited time, I was not able to search for campaign websites, social media posts or find and reach out to individuals involved with implementation to gather further information on campaign design, evaluation and outcomes. Thus, the results presented here pertain only to what was reported on each campaign in the literature included.

2.3 Results

2.3.1 Celebrity Endorsement campaigns

I found 79 campaigns with celebrity endorsement in the literature, in English (N=23), Portuguese (N=1) and Chinese (N=55). Searches include records published until January 2019. The campaigns were implemented between 1976 and 2018, with between one and six campaigns each year ($\bar{x}$ =2.5). Campaigns were implemented across nine countries, the majority in China. However, not all sources specified the year or location of campaign implementation. A myriad of topics was represented in these campaigns; the majority (N=29/79) focused on sustainable living practices (e.g., promoting energy conservation) and wildlife conservation, while others including pollution and climate change received limited attention (Figure 2.2, Appendix 2.6).

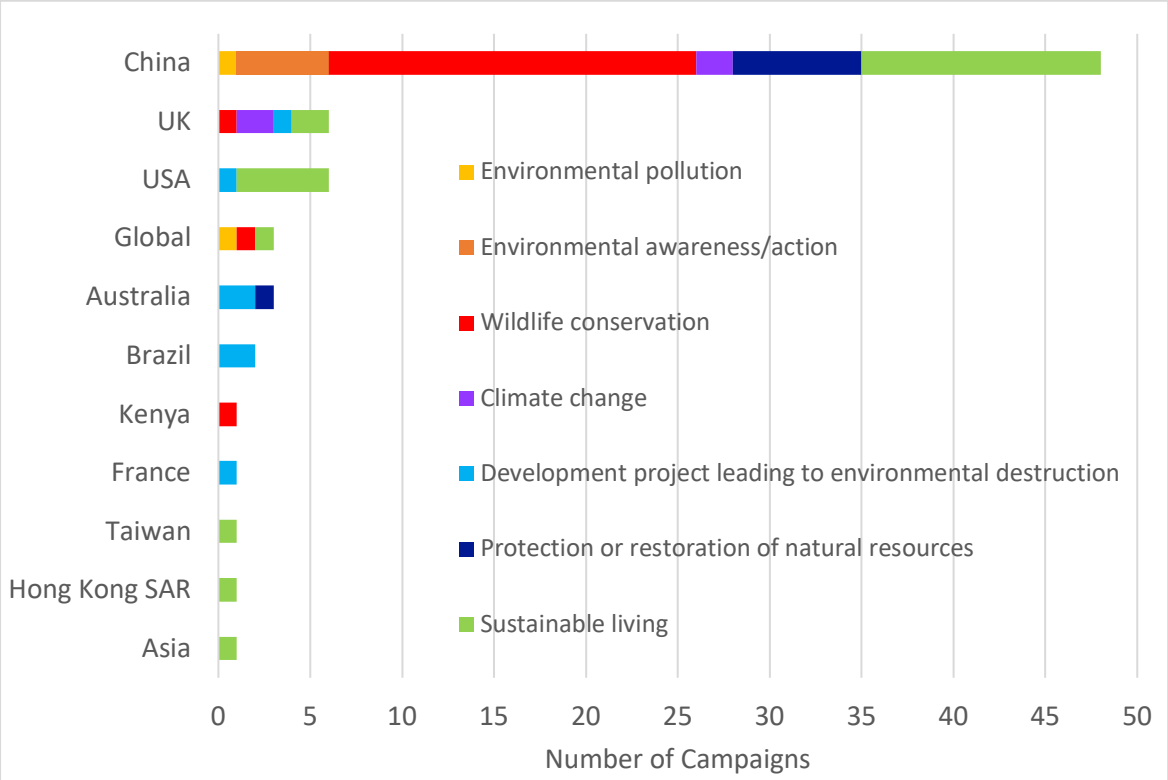


Figure 2.2 Number of campaigns implemented by geographical location by topic of focus. Does not include campaigns where implementation location is unknown.

A total of 181 celebrities were involved in these campaigns, some endorsing multiple campaigns. For example, the Chinese athlete Yao Ming endorsed six different campaigns, most with WildAid and some in collaboration with the Yao Ming Foundation and Save the Elephants, focused on wildlife conservation. The vast majority of celebrities (N=143) only endorsed one campaign reported. Regarding campaigns, the majority (N=52) used a single celebrity endorser. Three campaigns did not specify which celebrity(ies) were involved and an additional nine did not provide a full list of participating celebrities. Actors were the celebrities most used for endorsement (N=70), followed by musicians, athletes and experts on different topics (e.g., chefs, scientists) (Figure 2.3); a full list of the celebrities is provided in Appendix 2.7. Sixty-six organizations and/or agencies (local government and international) were responsible for implementation of the campaigns reported in the literature. For 21 campaigns, the organisation/agency responsible was not reported. The majority of the organisations/agencies (N=50) implemented one of the included campaigns while WildAid, implemented eight.

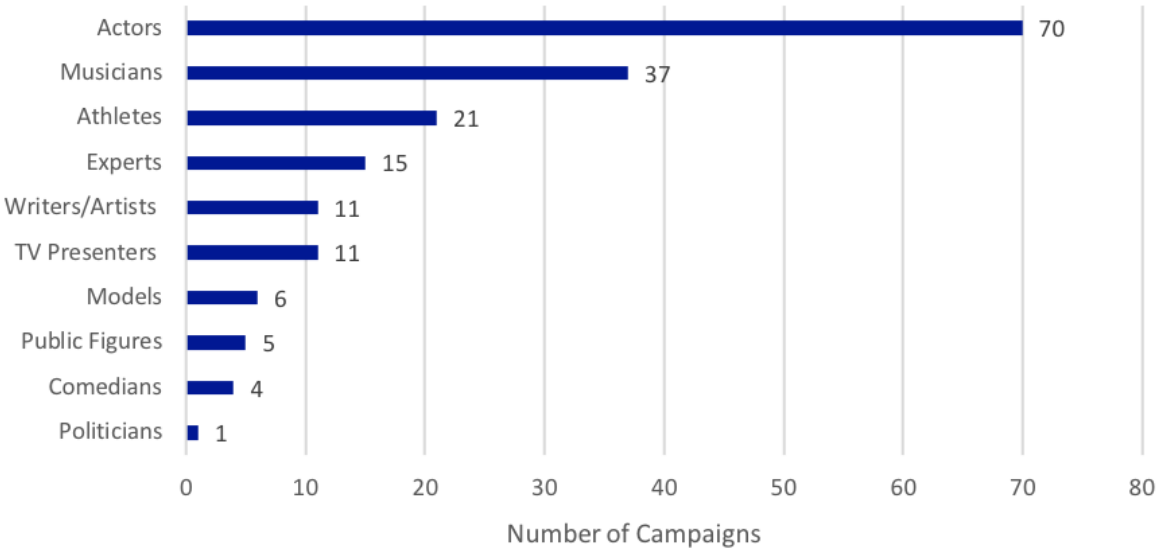


Figure 2.3 Types of celebrities who endorsed the recorded campaigns.

Only 40% of the campaigns stated the objective(s) celebrity endorsement was meant to achieve. The most common objective for enlisting celebrities was to increase media coverage of the campaign (N=7). This was followed by increasing campaign impact (although no campaign actually defined impact), applying pressure to governments, and changing the behaviour of the target audience or influencing the adoption of sustainable lifestyles as role models. Other campaigns made use of celebrities' access to elite spaces and people, such as high-ranking executives or politicians. These campaigns aimed to increase pressure on governments, asking celebrities to deliver petitions to drive specific actions, or reach out to other famous individuals to increase campaign support.

2.3.2 Eight Steps of the Campaign Evaluation Framework

Only 15 campaigns provided evidence that they had included more than two of the steps required to design and evaluate a celebrity-based intervention, outlined in the framework (Figure 2.4).

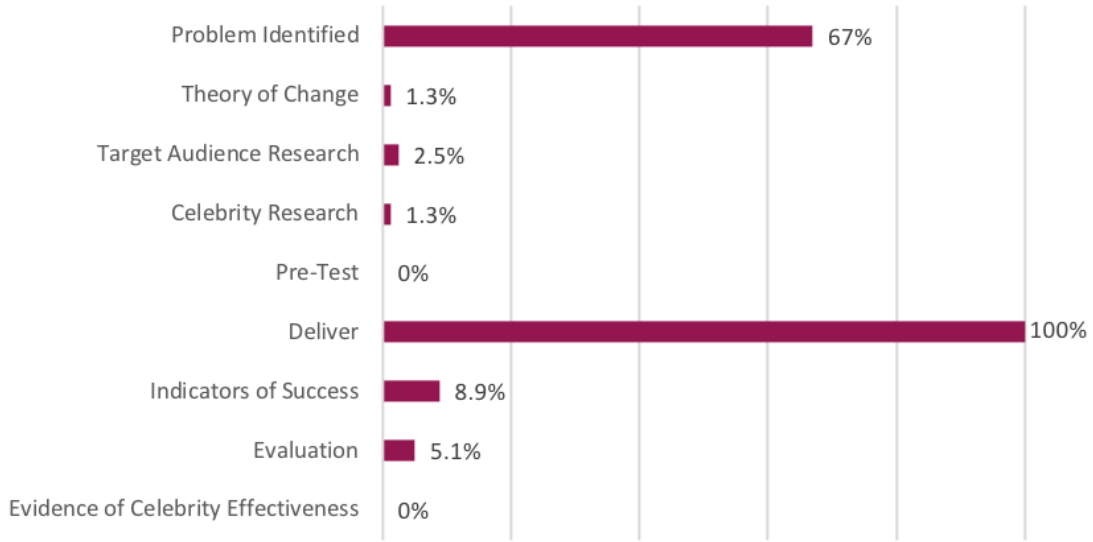


Figure 2.4 Proportion of campaigns (N = 79) that included the design and implementation steps for celebrity-based interventions identified in Figure 2.1

Most campaigns (67%) identified an environmental problem to be addressed. The remainder did not articulate a specific problem but aimed to encourage support for the environmental cause more generally. Only Hether (2018), who discussed the United Nations Environment Programme's (UNEP) #WildforLife campaign, provided evidence of a theory of change that guided the development of measurable objectives, target audience selection, campaign design, and celebrity choice.

Only two campaigns reported on research conducted to understand the target audience and identified which specific behaviour change was sought. The 'Target 140 campaign', which aimed to reduce residential water use in Brisbane, Australia, investigated residents' current water use and attitudes towards efforts to conserve water, and used this information to design the intervention (Walton & Hume 2011). The #WildforLife campaign identified the relevant demographic groups to target, to raise the profile of illegal wildlife trade in consuming countries. This was the only campaign for which celebrity selection research was reported; identifying local celebrities who the target audience followed on social media in order to engage those individuals as influencers (Hether 2018).

Seven campaigns measured indicators of effectiveness, but only the Target 140 campaign measured effectiveness against the campaign's objective. Residential water consumption was recorded throughout campaign implementation (Walton & Hume 2011). Other campaigns measured effectiveness based on number of pledges signed (Zhang 2010; Peng 2012), the amount of funds donated (Liu 2011), advertisement views (Cao 2005; Zhang 2006; Li 2008; Yu 2008; Liu 2016), and number of celebrities who installed solar

power facilities in their homes (Qin 2005). However, none of these indicators relates to the effect of celebrity involvement in these campaigns.

Only four campaigns reported information on evaluation (Table 2.3), but did not assess whether the celebrity endorsement was successful in achieving the campaign and/or endorsement objectives. UNEP's #WildforLife campaign was successful in reaching the intended number of people, however Hether (2018) states that the primary goal of the campaign was to raise "awareness about the problems and risks associated with illegal trade of wildlife and to mobilize individuals to support the protection of endangered species and ending illegal trade in wildlife". It is not clear from the evaluation whether this was achieved or not, or even evaluated, and whether it was assumed that campaign reach was equivalent to accomplishing the primary goal.

WildAid's Active Conservation Awareness Program (ACAP) for "endangered wildlife" campaign aimed to achieve a change in threatened wildlife consumption, but, as reported in the literature, WildAid focused its evaluation on campaign reach rather than behaviour change, using advertisement views and self-declared future consumption intention among people who reported having seen the campaign as their metrics (Cao 2005; Zhang 2006; Li 2008; Yu 2008; Liu 2016). WildAid's ACAP shark campaign reported reduced shark fin consumption, increased knowledge of shark issues and how shark fins are sourced, and a high proportion of people who had seen the campaign and had indicated no future consumption intention (Zhang 2006; Ali 2014; Wang 2014; Liu 2016). However, it is not clear whether the survey respondents were shark fin consumers or had any intention to consume shark products prior to the campaign.

Table 2.3 Summary of evaluation of campaigns with celebrity endorsement reported in the literature.

Campaign	Reported objectives	Reported celebrity engagement	Reported pre-intervention data	Reported post-intervention data	Reported results
#WildforLife (Hether 2018)	Reach 10 million unique individuals, engage 50,000 individuals in social media and build a community of partners	Celebrities created avatars, shared messages on their social media, created social influencer pyramid	No data available before intervention	Reach and reactions on social media, number of pledges, partnerships and goodwill ambassadors	Reached over 1 billion people, 4.5 million social media reactions, 12,500 pledges signed, 25 partners and 35 goodwill ambassadors recruited
Target 140 (Walton & Hume 2011)	20% reduction of water use in the residential area	Celebrities supported the campaign (no other details provided)	Current water use at the residential level in the target area	Water use after intervention in target area	22% reduction in average daily water consumption in target area
Asian Conservation Awareness Program (ACAP) on endangered wildlife (Cao 2005; Zhang 2006; Li 2008; Yu 2008; Liu 2016)	Raise awareness of endangered species conservation, change consumption behaviour of endangered species	Celebrities included in campaign communications materials and attended campaign events	None available	Advertisement views, intention of future consumption	Over 1 billion advertisement views, 78% of viewers in Taiwan claimed no future consumption intention
ACAP shark (Zhang 2006; Ali 2014; Wang 2014; Liu 2016)	Raise awareness on shark conservation, reduce shark fin consumption	Celebrities included in campaign communications materials and attended campaign events	Consumption prevalence	Consumption prevalence, knowledge/awareness, future consumption intention	50% reduction in consumption 35% increase in awareness of shark issues 80% of respondents indicated no future consumption intention

Despite the dearth of evaluation effort, 11 of the campaigns made claims of general success. Of these, three claimed celebrity endorsement was effective. In these campaigns, celebrities were reported to be effective at encouraging individuals who might otherwise be difficult to access, to take certain actions: chefs were encouraged to make public commitments stating they will avoid cooking with endangered wildlife (Zhang 2004) and multiple celebrities in Hollywood installed solar panels in their homes (Qin 2005; Dai 2008). Celebrities were also reported as helping to achieve the campaign reach desired (Hether 2018). The common denominator in these effectiveness claims appears to be that the celebrities were the main means of communication, and therefore any impact was attributed to celebrity endorsement. The #WildforLife campaign made use of the celebrities' own social media to deliver messages to their followers. Celebrities in the other two campaigns engaged directly with other elites, who, being in positions of power, were able to make the desired changes. In one of these campaigns, two famous Chinese writers, Zhao Danian and Shu Yi, encouraged famous chefs to sign a pledge committing not to cook with threatened plants or animals (Zhang 2004). In another, the actor Edward Norton catalysed a snowball effect of multiple celebrities installing solar power facilities in their homes (Qin 2005; Dai 2008).

2.3.3 Celebrity Endorsement Evaluation Studies

In addition to the 79 reports of campaigns themselves, I found 15 studies that evaluated the role of celebrity endorsement in environmental campaigns. Of these, only five suggested that celebrities were effective at fulfilling the stated campaign objectives. Two studies evaluated the impact of the endorsement of chef and TV personality, Hugh Fearnley-Whittingstall, one focused on the French scientist, Jacques Cousteau, another

on the film director, James Cameron, and the fifth on the internationally known architect, Roberto Burle Marx.

After the release of a movie he had directed (*Avatar*) James Cameron spearheaded his own campaign against the construction of the Belo Monte Dam in Brazil. Jampolsky (2012) argues that Cameron's involvement contributed significantly to the Brazilian courts' consideration of the indigenous and environmental advocates of the region, rallied the support of thousands against the construction of the dam and generated more media coverage for the issue than ever before. Hugh Fearnley-Whittingstall's personal efforts were associated with revisions of the European Union fisheries legislation in 2014 (Hopkinson & Cronin 2015). Jacques Cousteau was invited to join the Antarctic and Southern Ocean Coalition (ASOC) and Greenpeace's efforts to rally support against mining in the Antarctic, but he was already personally committed to ensuring governments would abstain from joining the Mining Convention. The scientist and explorer went beyond what was initially asked of him and successfully pressured the French, Australian and United States governments to reconsider their support towards mining in the Antarctic and make commitments to protect the ecosystem instead (Shortis 2015). Pereira (2017) argues that Roberto Burle Marx was effective at raising awareness of Volkswagen's role in destroying the Amazon forest by sending private letters to newspapers, government representatives and other key stakeholders.

A common factor is that all of these four celebrities were seemingly personally committed to the topics they endorsed. Cameron had publicly shown his interest in the protection of ecosystems and native people's rights; as a chef, Fearnley-Whittingstall had

previously covered topics on sustainable seafood consumption; Cousteau is known for his interest in ocean conservation and the Antarctic ecosystem; and Marx began private correspondence with key stakeholders to stop habitat destruction in the Amazon. Although the evidence for their success may appear compelling, it is only supported by anecdote rather than rigorous analysis (Craig 2018).

The remaining studies evaluated celebrity endorsement, not linked to a specific campaign, and found mostly negative or inconclusive results. One study tested the effectiveness of Indian actor Mohanlal Viswanathan's attractiveness (based on whether he was perceived to be attractive/unattractive, classy/not classy, beautiful/ugly, elegant/plain and sexy/not sexy) in improving message comprehension and changing attitudes and behavioural intention towards energy conservation. The results showed that respondents understood the message, that there was a positive attitude towards the advertisement, and a future intention to conserve energy (Thomas & Johnson 2016). However, the study did not include a comparison with an influencer considered to be unattractive, or with a non-celebrity as a control, nor did it compare message comprehension, attitudes or intention of respondents who did not find the actor attractive. Furthermore, the study did not compare results to data on intentions to conserve energy before being exposed to the message. Other confounding factors, such as the celebrity's perceived expertise or trustworthiness, or respondent characteristics that might suggest they are already interested in energy conservation, were not taken into consideration either. It is therefore difficult to effectively demonstrate that it was Viswanathan, and his physical attractiveness in particular, that were responsible for the results. Three studies looking at campaign media coverage generated by celebrity

endorsement concluded that this strategy can acquire media coverage but does not guarantee it (Lester 2006), and that celebrity involvement distracted media attention from the issues being discussed (Wells & Heming 2009; Anderson 2013). A study comparing the effects of celebrity Public Service Announcements (PSAs) discussing shark conservation to non-celebrity PSAs (not linked to a particular campaign) discovered there was no significant difference in intentions to support shark conservation between the two (Myrick & Evans 2014).

Five other studies evaluated the effectiveness of particular campaigns by conducting pre- and post- intervention surveys to measure attitudes, behaviour, awareness, and behavioural intention, and by recording campaign reach. However, they did not report on the celebrity endorsement or whether it contributed to campaign results (Gueterbock 2004; Yu 2008; Liu 2016; Hether 2018). One of these studies, which analysed Yao Ming's endorsement of WildAid's shark campaign in mainland China, concluded that a PSA in which Ming pushes away a bowl of shark fin soup at a banquet and shows images of fins being removed from sharks resulted in incoherent framing for the audience (Jeffreys 2016). Jeffreys argues the PSA assumes that 'empathy with an edible animal naturally supersedes the social relations between host and guest', and that it would be socially acceptable for a guest to reject a dish and potentially insult the host in the particular situation depicted in the PSA. Jeffreys further highlights that the PSA received much better coverage in the West than it did in China, and proposes that the reported decline in shark fin sales is more likely due to the efforts of Chinese business elites advocating for relevant legislation, rather than mass communication featuring Yao Ming and other celebrities. Jeffreys compares the PSA featuring Yao Ming, among other international

celebrities, to one featuring only Chinese business elites and finds the latter's framing to be more coherent, as it links environmental protection with national pride, although she still suggests business leaders might not be the most appropriate messengers. Jeffreys' study is an example of where the overall campaign goal was reached but the effectiveness of the celebrity endorsement (i.e., attribution) was unclear, partly due to confounding factors such as other interventions being implemented simultaneously.

2.4 Discussion

2.4.1 Articles reviewed

An increase in celebrity endorsement for environmental causes has been reported since the 1990s (Boykoff et al. 2010; Doyle et al. 2017; Craig 2018). In this scoping review, I found only 79 environmental campaigns featuring celebrity endorsement, and 15 studies of celebrity-endorsed environmental campaigns. The fact that the majority of the campaigns reported (N=55) were in Chinese suggests that reviews solely in English can exclude a large amount of relevant literature (Amano et al. 2016). I hypothesize that most of my results are in the Chinese literature because multiple additional Chinese language databases were available and thus more grey literature was captured than in other languages. This emphasises the importance of conducting reviews in languages other than English and including language specific databases in a review's search strategy. While there is ample literature in English on the topic of celebrities acting as endorsers for environmental causes, only a limited number focus on the actual delivery of campaigns. This may be because organisations implementing campaigns keep results and evaluations internal but this raises questions over whether organisations are conducting evaluations at all. Conservation marketing professionals may not always have the

resources, time or even skills to carry out evaluations. There is very limited impact evaluation for conservation projects generally (Baylis et al. 2015) and it is likely that this is the case for celebrity associated campaigns.

2.4.2 Celebrity use and the lack of research

The range of campaign topics found shows that celebrity endorsement has proliferated across the environmental field. The high frequency of endorsement by actors, which follows patterns elsewhere in marketing (Roy & Mishra 2018), may be because film stars, as well as musicians, are often featured in mass media (Tamizhjyothi & Rajakumar 2011) and may therefore be perceived to have high recognisability among audiences. However, the consumer research necessary to guide celebrity selection was only conducted by one campaign. Additionally, apart from Thomas and Johnson (2016), no literature was found on whether the celebrity attributes which the marketing literature finds to impact advertisement effectiveness have a similar effect in an environmental context, nor on how to use these attributes to guide endorser selection. It is surprising that there is little evidence that the knowledge and principles used in marketing are being applied in environmental conservation.

Choosing the right celebrity is as important as delivering a message which is framed appropriately for the campaign subject and the cultural context (Lakoff 2010). As illustrated by Jeffreys' (2016) analysis of Yao Ming in WildAid's shark fin campaign, the actions enacted by celebrities might not reflect what is culturally appropriate or possible within a particular social context. Thus, the message risks being ignored because it does not match the narrative, social roles, emotions and values associated with that particular

situation (Lakoff 2010). This emphasizes the need to rely on evidence for celebrity choice and message design. While it appears that WildAid's campaign's goals were reached, better design of the intervention itself, based on audience research and message testing, could have helped to disentangle confounding factors and thus success could have been more confidently attributed. Uncertainty of attribution is seen in the literature reporting another WildAid campaign. An uncritical evaluation of the reduction in shark fin consumption may suggest the campaign was effective, but there are numerous confounding factors, such as a decrease in availability of the product, policy changes in state functions, and that the studied audience was exposed to and persuaded by other messages being delivered at the same time (Zhang 2006; A 2014; Wang 2014; Liu 2016).

2.4.3 Celebrity Endorsement Effectiveness

While celebrities were engaged to achieve several goals, none of the objectives reported for celebrity endorsement were measurable and it is therefore impossible to examine whether the celebrity was effective in meeting those objectives (Britt 2000; Stem et al. 2005). Information on the quality and content of social media reactions to #WildforLife's campaign messages could have indicated whether the audience was responding to the celebrity or the message, but this information was lacking. Future behavioural intention to consume, as measured by WildAid, should be viewed cautiously, as present intentions can differ from future behaviour for many reasons (Fife-Schaw et al. 2007). In addition, it is not clear whether the respondents surveyed for evaluation were consumers or had the intention to consume before being exposed to the campaign. Similarly, the 'knowledge deficit' model of behaviour change interventions, which assumes that people's ignorance about the consequences of their actions is the problem, and that giving them information

will therefore change their behaviour, has been shown to be largely unfounded (McKenzie-Mohr et al. 2012). Counting an increase in people's knowledge of the threats wildlife faces as a success, as done in many illegal wildlife trade campaigns in Asia, assumes that providing knowledge will catalyse a change in consumption behaviour. This is unlikely to happen in conservation, just as it does not happen in other fields such as public health (Marteau 2017; Jebb 2018).

Higher campaign visibility, as achieved by increased media coverage or reach, should not be an end in itself because it is an output metric (Anderson 2013; Veríssimo & Wan 2018). Yet, it is common for conservation campaigns to focus on reach and other measures that assess delivery rather than success with attribution (Wright et al. 2015; Greenfield & Veríssimo 2018). While there are examples of private and public commitments leading to a change in behaviour, their efficacy depends greatly on the audience and context, and pledges or intentions should therefore not be the sole evaluation measurement for campaign effectiveness (Mullaly 1998; McKenzie-Mohr & Schultz 2012).

The non-profit sector literature has suggested that celebrities can be effective in their role as endorsers when they are known to be personally connected to a cause, as they are perceived to be more credible (Wheeler 2009). The same has been noted in public health where experience with an illness elevates a celebrity's credibility. For example, Magic Johnson's support for HIV-AIDS and Michael J. Fox's efforts to increase awareness of Parkinson's disease (O'Regan 2014). This was the case in four examples from the review; Hugh Fearnley-Whittingstall, James Cameron, Roberto Burle Marx and Jacques

Cousteau were all passionate about the topics they endorsed and campaigned to achieve their personal objectives. Audiences can recognise a genuine interest in a topic; if it appears that celebrities are advocating for a cause simply because they have been hired to do so, they can be perceived as deceptive (de los Salmones & Dominguez 2016).

Making strategic use of the access provided by celebrities can be an effective way of reaching individuals who would not otherwise be reached. This use of celebrities has been discussed in the international development field. Brockington (2014) describes the enjoyment elites, such as politicians, get from interactions with celebrities as it enhances their own image and reinforces their own status. Famous individuals can not only provide access but can also facilitate discussion and their presence can attract the participation of corporate executives and politicians, which might not otherwise be possible (Brockington 2014).

Despite there being some circumstances in which celebrities do appear to be helpful in achieving campaign objectives, based on the evidence analysed here, it is impossible to say whether the outcomes achieved in the campaigns would have occurred without the presence of the celebrities. This uncertainty is a result of a lack of robust evaluation, which mirrors that in the non-profit sector more broadly (Duthie 2014; de los Salmones & Dominguez 2016). Even if success can be demonstrated for some of the campaigns, failure to assess whether the celebrity engagement contributed to this or not obstructs the creation of any evidence to substantiate the use of celebrity endorsement.

It is likely that more information about the effectiveness of celebrity involvement in environmental campaigns exists but was not captured in this review and is not available in the peer-reviewed or grey literature. I hypothesize this because I am aware of a number of campaigns having been implemented but found no evidence of their evaluation in the literature (e.g., Knot On My Planet 2019; Live Kindly 2018; WildAid 2018). This raises important concerns for the future of the environmental conservation field. If evaluation of celebrity endorsement remains internal to practitioner organizations, it makes it harder to test assumptions about the effectiveness of celebrities, thus potentially impeding the achievement of conservation objectives and precluding improvements to future conservation practice. Future research should aim to improve understanding of why celebrity endorsement evaluation is so limited; this will inform what steps can be taken to ensure evaluation does take place, and that results are used to inform future practice.

2.5 Supplementary Materials

Appendix 2.1 Databases used

Appendix 2.2 Searches translated into other five languages

Appendix 2.3 Review Protocol

Appendix 2.4 Changes suggested from expert feedback

Appendix 2.5 Flow Diagrams

Appendix 2.6 Campaign topic categories

Appendix 2.7 Full list of celebrities

Appendix 2.8 Included articles References

Appendix 2.9 Excluded articles

3 CHAPTER 3

Uncovering prevalence of pangolin consumption using a technique for investigating sensitive behaviour

3.1 Introduction

Overexploitation is a major threat to many species, affecting plants and animals used for various purposes, including medicine, food and ornaments, ultimately threatening ecosystem processes and functions (Broad et al. 2003; Maxwell et al. 2016). Reducing consumer demand for unsustainably or illegally traded species has been identified as a priority, recognizing that law enforcement is by itself inadequate to control trade (Challender & MacMillan 2014; CITES 2016; Hanoi Statement 2016). Efforts to reduce demand for wildlife products have increased substantially since 2010 (Veríssimo & Wan 2018). However, these efforts do not always follow best practice, as they are often not based on an understanding of consumers. Best practice includes conducting in-depth research prior to intervening to understand consumer motivations around the use of illegally traded products and to discern the underlying drivers of consumption that must be addressed, the specific behaviours to be influenced, and the individuals performing them (Greenfield & Veríssimo 2018; Olmedo et al. 2017). Such in-depth research also facilitates identification of the most appropriate and influential messages and messengers to catalyse behaviour change for a particular consumer group (Veríssimo et al. 2020b).

Pangolins are legally protected in most range states (IUCN SSC Pangolin Specialist Group 2016), and all eight species are included in Appendix I of CITES, meaning international commercial trade in wild-caught pangolins and their products is prohibited. However, evidence indicates that overexploitation of pangolins since 2000 has led to severe population declines, especially in parts of East and Southeast Asia (Chong et al. 2020; Wu et al. 2020). In Vietnam, enforcement challenges, combined with prevailing demand and increasing wealth, particularly in urban centres with high per capita incomes, means that more people are able to purchase expensive and aspirational items, including pangolin products (Nijman 2009; Challender et al. 2019). Available data suggest that large quantities of pangolin scales and whole animals are trafficked to Vietnam each year from other countries in Southeast Asia, such as Malaysia, and from Africa (Heinrich et al. 2017). There are two pangolin species native to Vietnam, the Sunda pangolin and Chinese pangolin*,* both of which are probably consumed or otherwise used in the country (Chong et al. 2020; Wu et al. 2020).

The concept of sensitivity is relevant for research on the consumption of illegally traded wildlife. Tourangeau et al. (2000) discussed three aspects of this concept: (1) intrusive: raising the topic is considered inappropriate and the questions can offend respondents; (2) threat of disclosure: respondents worry about the potential consequences of answering sensitive questions honestly, regardless of assurances that information provided will remain confidential; and (3) social desirability: respondents modify their answers to reflect what is deemed socially desirable and underreport activities that are not. The third meaning assumes clear social norms exist regarding a given behaviour (Tourangeau & Yan 2007).

Despite the importance of recognizing when designing and interpreting research on the illegal wildlife trade that the purchase and consumption of pangolins and their derivatives is likely to be sensitive, past research on pangolin consumption in Vietnam has not addressed this potential bias. However, in their study to characterize demand for wild meat in Hue, Vietnam, Sandalj et al. (2016) did recognize the possibility of respondents underreporting consumption because of its illegality. There have been several mass media campaigns since 2015 highlighting the illegality of purchasing and consuming pangolin products (ENV 2007; WildAid 2019). Consequently, consumers may now be less willing to disclose such behaviours because of fear of legal consequences and perceived shifts in social norms (Thomas et al. 2017).

With respect to the first aspect of sensitivity, enquiring about an illegal behaviour could be seen as intrusive and discussing it could offend respondents, potentially implying they may have carried it out, particularly if the enquirer is unknown to them. With respect to the second concept, disclosing the purchase or consumption of pangolin products would confirm the respondent had broken the law and cause concern that answers would be shared with authorities, leading to legal consequences. However, because of the lack of effective law enforcement in Vietnam (UNODC 2015) there is probably little or limited perceived risk in engaging in these activities. With respect to the third concept, I can assume that performing an illegal behaviour is socially undesirable, in which case those who have consumed pangolins would be inclined to deny it. Purchasing specific wildlife products can, however, be a way to convey one's social status in Vietnam (Shairp et al. 2016), and consuming pangolin products could therefore be a socially desirable

behaviour and respondents may thus claim they have consumed them when they have not.

All these considerations suggest that respondents could under- or over-report consumption, and therefore in this research I considered consumption of pangolin products to be a sensitive behaviour. My aim was to explore the prevalence of consumption of three pangolin products known to be available in HCMC: scales, meat and wine (a whole pangolin or pangolin parts or fluids soaked or mixed in rice wine; Do 2011; WildAid 2016; USAID 2018). HCMC has one of the highest gross domestic product per capita in Vietnam (General Statistics Office 2016), suggesting residents have higher disposable income than elsewhere in the country and may therefore potentially be able to purchase aspirational products such as pangolin derivatives and products. I used methods appropriate for sensitive behaviours, to mitigate response bias. I also aimed to characterize the profiles of consumers of the three products. To my knowledge, this is the first study that has considered the risk of bias when investigating consumption of pangolin derivatives and products.

3.2 Methods

3.2.1 Sampling

I calculated the sample size necessary to achieve power to detect consumption of pangolin products, based on a random representative sample of the HCMC population. HCMC had 8,441,903 inhabitants in 2016 (Ho Chi Minh City Statistical Office 2016). Using a confidence level of 95%, and a confidence interval of 3%, my target sample size was 1,067 but I aimed to acquire 1,200 respondents to account for incomplete responses.

Respondents were individuals who had resided in the city for at least the previous 12 months (at the time of the survey), and were ≥18 years old.

I used stratified sampling to select target districts in HCMC. I compared urban and rural districts, as defined by the Vietnamese government, with respect to key variables that I hypothesized could influence pangolin consumption. I hypothesized that these would include population density and income but, as data on income per district was not available, I used the number of education and health service facilities in each district as a proxy for income per capita (Falkingham and Namazie 2002). I hypothesized that income could influence the consumption of pangolin products, which have been described as expensive (WildAid 2016; USAID 2018), and thus wanted to observe whether consumption varied in areas of different per capita income. I also hypothesized that population density could influence consumption because a greater aggregation of people could result in higher commercial activity and thus greater availability of pangolin products. There were differences between rural and urban districts: population density and monthly average income per capita were substantially higher in urban districts (median 27,005 people per km^2 vs 1,553 people per km^2 in rural districts; income in urban districts VND 5,118,400, c. USD 220, vs income in rural districts VND 3,578,400, c. USD 150). Thus, rural and urban districts were treated separately in the sampling process. Districts with higher or lower values than the norm for their category (Ho Chi Minh City Statistical Office 2016) were classified as outliers and excluded from sampling. Based on the constraints of field work (i.e. time and resources) and the target sample size, I randomly selected six districts from the final list of representative districts: four urban and two rural (Figure 3.1). The sample size in each district followed stratified proportional

random sampling (Newing 2010) and, as c. 80% of people live in urban districts and c. 20% in rural districts, I apportioned the sample sizes in the urban and rural districts accordingly.

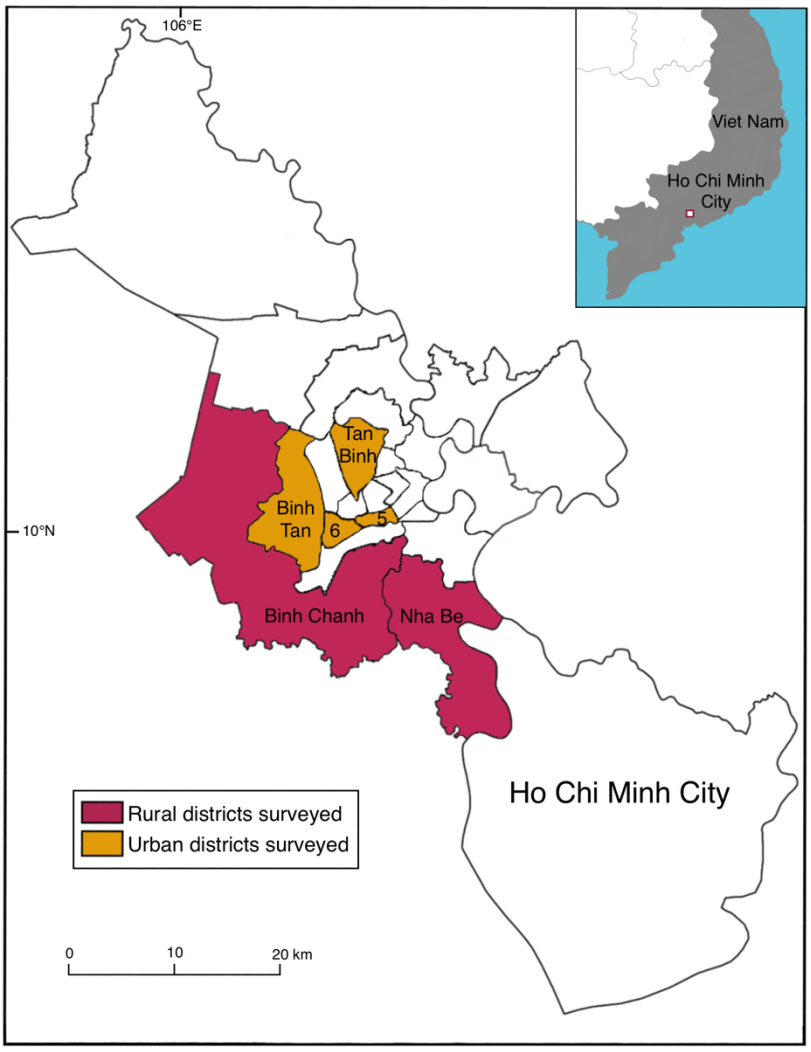


Figure 3.1 The districts of HCMC, Vietnam indicating the urban and rural districts where surveys were carried out.

I used a questionnaire and intercept surveys to collect data on consumption at the individual level (Newing 2010). I used systematic sampling, in which research assistants approached every second person. I piloted the questionnaire in October 2018 with 128 respondents, which also enabled identification of areas where there was sufficient foot

traffic for the intercept surveys. The pilot survey informed questionnaire design through testing of indirect and direct questions, which helped with the selection of appropriate multiple-choice answer options. To mitigate non-response and social desirability biases the surveys were conducted on tablets and were self-administered. This has been found to increase the likelihood of respondents reporting on sensitive information, although it can also result in incomplete questionnaires (Tourangeau & Yan 2007a). Self-administered questionnaires have also been found to reduce over-reporting of socially desirable behaviours (Presser & Stinson 1998). I collected data with the help of eight graduate research assistants, who were trained in surveying techniques beforehand, during 30 October–29 November 2018. My research assistants and I visited locations in the morning, afternoon and evening on weekdays and weekends, to ensure a diverse range of respondents were encountered. I collected basic demographic data from respondents (district of residence, age, gender, education, income, marital status and profession).

3.2.2 Specialized questioning approach

I chose the unmatched count technique (UCT) as the method to obtain an estimate of prevalence of pangolin consumption. This technique is increasingly being used in conservation (St John et al. 2010; Nuno et al. 2013; Davis et al. 2019b), as it is more effective than direct questions in estimating prevalence of a sensitive behaviour (Tsuchiya et al. 2007). In addition, respondents do not have to randomize the responses themselves. The simplicity of the technique can also avoid confusion among respondents regarding how the method provides privacy (Hubbard et al. 1989; Imai 2011).

The UCT, also known as the item count technique or list experiment, assigns respondents to either a treatment or a control group. Each group is presented with a list; the control group is given a list of non-sensitive items and the treatment group receives the same list plus a sensitive item of interest. Both groups are requested to state the number of the items in the list that apply to them (e.g. behaviours they have performed, products they have consumed). The prevalence of the sensitive item is then calculated by conducting a difference of means calculation between the answers of the two groups (Hinsley et al. 2019). I used three UCT questions to enquire about consumption of pangolin meat, scales and wine in the previous 12 months. Each respondent was randomly allocated (via the randomization feature of the tablets' software) to either the control or treatment group of each question. Both groups were presented with four non-sensitive items related to either food (for pangolin meat), medicine (for pangolin scales) or beverages (for pangolin wine). Each respondent was asked to state the number of products (up to four for the control group and five for the treatment group) they had consumed in the previous 12 months. The treatment group was presented with a list in which the pangolin product was included among non-sensitive items and the control group was presented with the list of non-sensitive items only (Appendix 3.1; Nuno & St John 2015).

Non-sensitive items in each list were related to the sensitive item so as not to arouse suspicion about the presence of the pangolin product, following Tsuchiya et al. (2007). To avoid ceiling and floor effects, in which respondents have consumed either all or none of the items on the list (Glynn 2013), each UCT list included non-sensitive products with high, medium and low prevalence of consumption. Control non-sensitive items were identified in October 2018 by approaching residents in public locations of all target

districts and discussing perceptions on the prevalence of consumption of appropriate products.

3.2.3 Direct questions

Direct questions on the consumption of pangolin products were included at the end of the questionnaire. This was to allow comparison between direct and indirect questioning techniques, thereby giving insights on the degree of sensitivity of pangolin product consumption and providing a minimum estimate of consumption (Nuno & St John 2015). I designed these as multiple answer questions in which respondents could select more than one answer (where applicable), including an 'other' option.

3.2.4 Analysis

I analysed the data in *R 3.5.2* (R Core Team 2019) using the *list* package (Blair et al. 2018). I first used the *ict* test to check for design effects in the UCT questions; i.e. whether the presence of the sensitive item in the treatment question affected respondents' answers to the control items (no design effect was detected). I also conducted combined list estimator analysis, which combines the UCT and direct question responses to obtain a more robust estimate. The combined analysis conducts two design tests: placebo test one and two. Placebo test one conducts three tests: for false positive confessions, for whether individuals who directly admit to performing the sensitive behaviour also state that the behaviour applies to them in their answer to the unmatched count technique question, and for design effects. Placebo test two examines whether the answer given by individuals in the treatment group is affected by seeing the sensitive item in the

unmatched count test list. No design effect was found from either placebo test for pangolin meat (test one: $p = 0.75$; test two: $p = 0.35$) or wine (test one: $p = 0.35$; test two: $p = 0.41$ (Aronow et al. 2015). There were not enough positive responses to the direct question on pangolin scale consumption and therefore I could not conduct the placebo tests for this product (Aronow et al. 2015). I therefore relied on the result of the *ict* test for pangolin scales. Following the tests for design effects, I calculated the difference in means between the treatment and control UCT responses to estimate the prevalence of consumption for each product, including the standard error. I compared estimates of prevalence from the UCT and direct question responses, including confidence intervals and the significance of differences, using the *predict.ictreg* function.

Lastly, I carried out a multivariate analysis to identify correlates of my best estimates of consumption, using the MuMin package in R. The variables tested were: district of residence, age, gender, education, income, marital status and profession. I first tested these variables for collinearity using Cramer's V Package for nominal variables. No collinearity was found (at ≥ 0.5) among the demographic variables and they were therefore all included in the same model; age, education and income were treated as ordinal variables. Levels in profession, education, income and age levels were combined into relevant categories and used in the model (Appendix 3.2). I ranked and averaged models which interacted with the UCT for each pangolin product using the second order Akaike's Information Criterion (AIC) with $\Delta AIC < 4$ for pangolin meat and scales. There were not enough models to average for pangolin wine at $\Delta AIC < 4$ so $\Delta AIC < 5$ was used.

3.3 Results

My best prevalence estimates of consumption for all three pangolin products in the 12 months prior to the survey were 7.1 ± SE 5.7 % (CI –4, 18.2%) for pangolin meat, 10.1 ± SE 5.7% (CI –1.2, 21.4%) for scales, and 6.5 ± SE 6.3 (CI –5.7, 18.8%) for wine (Figure 3.2). The specialized questioning technique detected a higher prevalence of consumption for meat and scales than the direct questions, which yielded estimates of 0.70% and 0.08% respectively, suggesting that consumption of pangolin meat and scales are sensitive behaviours in HCMC. The direct question for pangolin wine consumption elicited a prevalence of 0.50%, overlapping with the standard error of the unmatched count technique prevalence estimate (Figure 3.2).

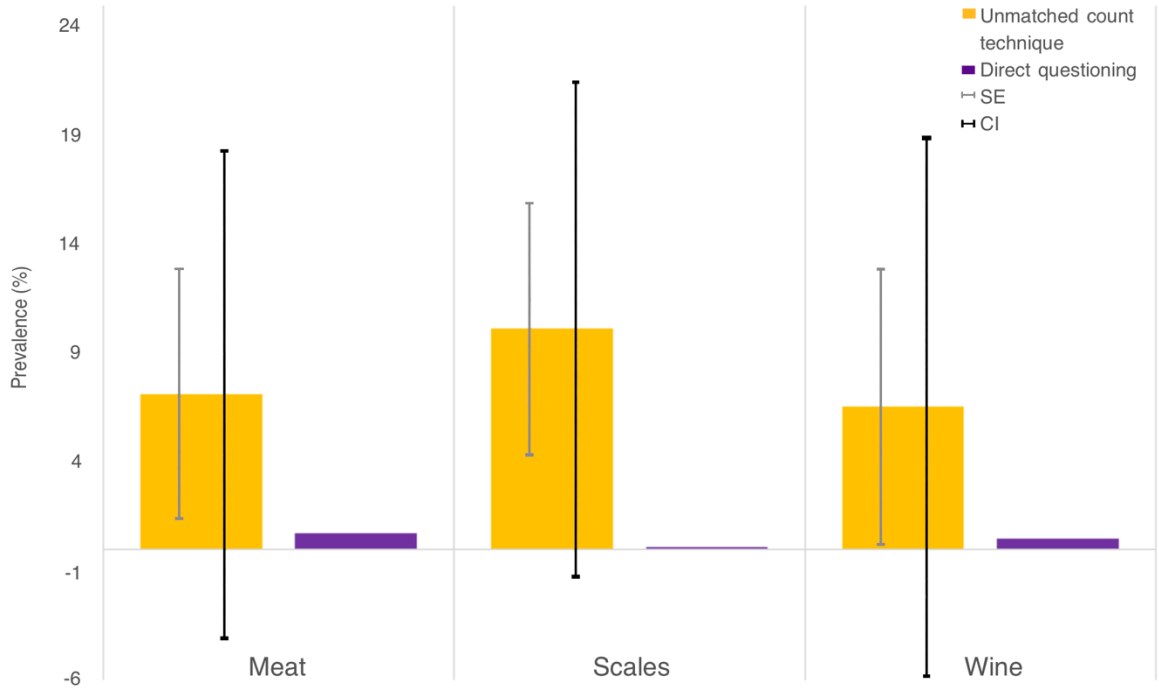


Figure 3.2 Estimate of prevalence of consumption (percent of the sample of respondents) of pangolin meat, scales and wine in HCMC elicited from the UCT and from direct questioning, with error bars representing the SE and 95% confidence interval.

The multivariate analysis provided insights into characteristics of respondents that may affect whether they consume pangolin products (Table 3.1). Overall, individuals who were more likely to consume pangolin wine have some similarities with consumers of meat. Consumers of pangolin meat and wine were found to be more likely to work in occupations in service industry, primary production such as farming, and industrial sectors. A lower income was also significantly associated with pangolin meat consumption but those earning a higher income were more likely to consume pangolin wine. Lastly, a significant association was found with consumption of scales and married individuals.

Table 3.1 Summary of regression with demographic variables tested for significance in regards to consumption of pangolin meat, scales and wine elicited from the UCT estimates, with the reference level for each variable (i.e. the level against which other levels were compared) except for ordinal variables. Shading denotes levels with significance at p *≤0.001(***), 0.01(**) and 0.05(*) and NA means the variable was not present in the model for that product.*

	Meat	**Scales**	**Wine**
	Estimate (SE)	Estimate (SE)	Estimate (SE)
District of residence (Reference level: District 5)			
District 6	NA	NA	-0.018 (0.201)
Binh Chanh			0.070 (0.242)
Binh Tan			-0.312 (0.194)
Nha Be			-0.040 (0.250)
Tan Binh			-0.070 (0.195)
Age			
Linear	-0.160 (0.157)	NA	-0.150 (0.194)
Quadratic	-0.071 (0.131)	NA	0.106 (0.157)
Cubic	-0.029 (0.107)	NA	-0.004 (0.119)
Gender (Reference level: Women)			
Men	0.019 (0.118)	-0.125 (0.125)	NA
Education			
Linear	0.238 (0.230)	NA	NA
Quadratic	-0.018 (0.159)		
Income			
Linear	-0.174 (0.010) *	0.014 (0.101)	0.185 (0.109) *
Quadratic	0.106 (0.217)	-0.062 (0.217)	0.161 (0.234)
Marital Status (Reference level: Married)			
Single	-0.037 (0.156)	-0.265 (0.131) **	
Profession (Reference level: Elementary)			
Homemaker	-0.777 (0.342) **	0.154 (0.340)	-0.758 (0.366) **
Other	-0.941 (0.370) **	0.531 (0.368)	-1.024 (0.340) **
Professionals	-0.993 (0.308) ***	0.072 (0.302)	-1.012 (0.332) ***
Retiree	-1.099 (0.369) ***	-0.131 (0.346)	-0.853 (0.380) **
Students	-1.059 (0.364) ***	0.002 (0.353)	-0.833 (0.375) **
Unemployed	-1.143 (0.416) ***	-0.028 (0.410)	-0.618 (0.443)

3.4 Discussion

My results corroborate the findings of previous research that there is active consumption of pangolin products in HCMC (Do 2011; ENV 2016; WildAid 2016; USAID 2018). Although the UCT results have large errors, which is a common drawback of this method (Nuno et

al. 2013), the prevalence estimates one standard error below the best estimate (a commonly used approximation for the likely minimum estimate of prevalence) suggest c. 2% of HCMC's population consume pangolin meat and 4% consume scales. Given that the city has a population of 8.4 million people, these results suggest that the number of people who may have consumed pangolin meat and scales in the 12 months prior to the survey could be 170,000–340,000. The direct questions also provided positive prevalence estimates, but they were substantially lower than those resulting from the UCT, especially for scales. My best estimates for meat consumption are broadly of the same magnitude as previous studies, but the best estimates for scale and wine consumption are substantially higher (Table 3.2). This could be because other studies did not mitigate response bias; the differences between the responses to the direct and indirect questions suggest that consumption of scales in particular is a sensitive behaviour. Drury et al. (2011) found <2% of 915 individuals surveyed admitted to consuming pangolin meat in the previous year; this prevalence is slightly lower than estimates generated by research conducted in HCMC (Table 3.2). However, Drury et al. surveyed four central districts in Hanoi, which are unlikely to be representative of the city's population as a whole.

Table 3.2 Summary of prevalence of pangolin consumption research in HCMC and other locations, with SE where available.

Organization (source)	Year	Location	Sample size	Methods	Prevalence of consumption (% of population)			
					General	Meat	Scales	Wine
Wildlife At Risk (Do et al. 2011)	2011	Ho Chi Minh City	4,062 adults 3,562 children	Direct household interviews	<10 (adults) >10 (children)	<10 (adults)		1
Education for Nature Viet Nam (ENV 2016)	2014	Ho Chi Minh City	1,000	Telephone surveys with randomly selected respondents	0.3[1]			
WildAid (2016)	2015	Hanoi, Ho Chi Minh City, Da Nang	815	Computer-assisted web interviewing. Only included individuals earning VND >8.5 million (c. USD 365) per month	4[2]	10[3]	1.64	2
USAID (2018)	2018	Hanoi, Ho Chi Minh City, Hai Phong, Da Nang, Can Tho	1,400	Mobile phone surveys via opt-in panel. Only included individuals earning VND >12 million (c. USD 515) per month	6[2]	12[4]	2.22[4]	0.06[4]
This study	2018	Ho Chi Minh City	1,200	Indirect questioning, intercept sampling		7.1 ± SE 5.7[5]	10.1 ± SE 5.7[5]	6.5 ± SE 6.3[5]

[1] *Refers to pangolin product use.*

[2] *Refers to purchases of pangolin products in general.*

[3] *The majority of whom consumed meat >5 years previously.*

[4] *Refers to purchases in the previous 12 months.*

[5] *Refers to consumption in the previous 12 months.*

I cannot differentiate my UCT prevalence estimates from zero at a 95% level of statistical certainty, as the confidence intervals cross zero for all three products (Figure 3.2). However, responses to my direct questions indicated positive prevalence, meaning I can be more certain that consumption of pangolin meat, scales and wine occurs in HCMC. Most UCT studies (e.g., Hinsley et al. 2016; Veríssimo et al. 2020b) present estimates with their standard errors (encompassing c. 66% of the distribution around the best estimate), rather than confidence intervals (encompassing c. 95% of the distribution around the best estimate). I present both, for consistency with previous studies, and recommend that future UCT studies do the same. The wide confidence intervals probably result from a combination of consumption of pangolin products being a sensitive behaviour that has low prevalence. These issues can only be tackled with larger sample sizes and/or more targeting of sampling towards groups with known higher prevalence of the sensitive behaviour. This is, however, a post hoc methodological insight. When investigating sensitive behaviours an a priori power analysis to calculate sample size can only be done based on what is known about the prevalence of the behaviour. Targeting of particular groups for sampling is more likely to be useful once factors associated with consumption in the general population are understood.

It is possible that the design of my UCT questions had limitations, despite pre-testing with the target audience. This is most relevant to my estimates of pangolin wine consumption, which had the widest confidence intervals and the lowest prevalence. Levels of consumption of this product require further investigation. The use of other beverages in the control items for pangolin wine in the UCT question may have aroused suspicion about the sensitive item. Pangolin wine use might be more common as a health tonic,

given that previous research indicates pangolin products are perceived to promote good health (USAID 2018), in which case control items should have been other traditional medicines/tonics rather than beverages not associated with medicinal benefits.

Despite these limitations, my prevalence estimates are currently the best available. Consumers of pangolin scales were more likely to be married, which I speculate, is related to consumers' age which would hint at consistency with previous research indicating that scales, which are used in traditional medicine, are in general used by older people in Vietnam (Drury 2011), to treat chronic illnesses (Woerdenbag et al. 2012). Previous research in Vietnam has also identified mothers as consumers of pangolin scales, as the scales, combined with other ingredients in traditional medicine, are believed to promote lactation (WildAid 2016; USAID 2018). However, this has been described as an occasional purchase and of low importance for conservation purposes (USAID 2018). I did not find a strong association between gender and any of the pangolin products, also suggesting scale consumption to support lactation is not a strong driver of demand. Although rural and urban districts were sampled separately, I found no evidence that consumption differed between district types.

The demographic characteristics strongly associated with pangolin consumption in my study differ from findings of previous research. A study in five cities, including HCMC (USAID 2018) found pangolin consumers were more likely to be men, with a mean age of 35.8 years and a high income (VND >23.5 million monthly, c. USD 1,010). Sandalj et al. (2016) identified consumers of wild meat, including of pangolins, in HCMC as wealthy

business elites and government officials. Do et al. (2011) described consumers of wildlife products, including pangolins, in HCMC as wealthy middle-aged men. Drury (2011) found businessmen and finance professionals, and those with a high income, were more likely to consume wild meat, including pangolins, than other groups in Hanoi. My findings suggest men are not more likely to consume pangolin products than women and lower-earning individuals are more likely to eat pangolin meat than those with a higher income. However, the association between pangolin wine and a higher income suggests this product may be more expensive than the other two products.

My results also differ from existing research regarding profession. Those strongly associated with consumption of pangolin meat and wine in my study are individuals with elementary occupations rather than individuals working in managerial, business or high-ranking positions or as government staff (as found by Sandalj et al. 2016; Shairp et al. 2016). However, the differences found between my results and those of Drury (2011) and Shairp et al. (2016) may be a result of consumer variation between study locations; these studies focused on different Vietnamese cities (Davis et al. 2019a). The similar professional profiles of consumers of pangolin meat and wine suggests they might be obtaining these products from the same sources and that consumers of these two products are more diverse than previously described.

Comparison of my results with previous research requires caution because of fundamental differences in study design (Table 3.2). Consequently, results from previous studies are not likely to be representative of HCMC's broader population, as they selected

respondents representing specific groups. A limiting factor in my study is that only locations with high foot traffic were surveyed in each target district, which will also have created biases (e.g. towards people who are out in public during the day and evenings and those who frequent busier places). Additionally, although I surveyed only Vietnamese nationals, there is a large Chinese community in the city, particularly in District 5. Anecdotal evidence suggests this community might also be consuming pangolin products.

My findings have implications for interventions to address consumer demand, and for law enforcement regarding pangolin products in HCMC and more broadly in Vietnam. Although previous research has identified wealthy, middle-aged men as consumers of several wildlife products (Drury 2011; Olmedo et al. 2017), this group may not represent the majority of consumers. Further research should focus on understanding the context of consumption of each pangolin product and the underlying motivations of different consumer groups. This could inform the design of targeted behaviour change interventions to address demand, a recognized priority for pangolin conservation (IUCN SSC Pangolin Specialist Group 2018). Various behaviour change strategies to achieve a reduction in the consumption of pangolins have been proposed and could be trialled in Vietnam (Burgess et al. 2020). Pangolin scales are currently sold openly but illegally in HCMC (Challender et al. 2015b) especially in District 5 where consumption of scales and wine appears to be prevalent.

My study suggests that the UCT is a useful method for examining illicit and/or sensitive behaviours in conservation, but the technique has limitations. Design and

implementation require significant planning and testing, which can be hindered by time and resource constraints (Hinsley et al. 2019; Davis et al. 2019b). The inclusion of an item or behaviour of interest among a list of other items or behaviours generates wider confidence intervals than other methods (Glynn 2013) such as the ballot box technique (Bova et al. 2018). The UCT is therefore not the most appropriate method when the behaviour of interest has a very low prevalence and/or when only small sample sizes can be obtained (Ibbet et al. 2017; Davis et al. 2019b). This is an important limitation because the conservation implications of the result depend on both the magnitude of the best estimate and the confidence interval. A low estimated prevalence is not the same as one that cannot be differentiated from zero because the confidence interval is large. This limitation also makes it difficult to use the UCT longitudinally; e.g. to understand whether there has been a change in the prevalence of a behaviour as a result of an intervention.

To my knowledge, this is the first published study that has used a specialized questioning technique to explore consumption of pangolin products. My findings indicate consumption of pangolin scales, meat, and wine in HCMC. Consumption also takes place in other urban centres, including Hanoi (USAID 2018) and Hue (Sandalj et al. 2016). The magnitude of the consumption of pangolins in Vietnam is probably placing pressure on already declining wild pangolin populations in the country (Newton et al. 2008). My results suggest a large number of pangolin consumers in HCMC alone, indicating the need for urgent conservation action. This consumption is also likely to be putting pressure on populations elsewhere in Southeast Asia (Challender et al. 2020) and, regarding scales, in Africa (Heinrich et al. 2016; Ingram et al. 2019). Addressing consumption of pangolin

products in Vietnam, by targeting the prevailing high level of demand and availability of products, is a priority to protect these species.

3.5 Acknowledgements

I would like to thank my team of Research Assistants in Ho Chi Minh City: Ngọc Phú, Lê Long, Lê Thị Thu Hiền, Lương Thế Dương, Minh Phương, Phạm Ngọc Bích, Võ Trâm and Vũ Loan for their hard work and dedication.

3.6 Supplementary Materials

Appendix 3.1 Questionnaire

Appendix 3.2 Variables combined for analysis

4 CHAPTER 4

Profiling consumers of wild meat in Ho Chi Minh City, Vietnam

4.1 Introduction

Overexploitation has caused severe declines in terrestrial wildlife populations in Southeast Asia in the last three decades (Duckworth et al. 2012; Harrison et al. 2016). While there is a prevailing demand for wildlife for various uses, Gray et al. (2017) argue that indiscriminate hunting in the region persists primarily to satisfy demand for meat from wild animals (hereafter 'wild meat'). Vietnam is one of the countries where wildlife has been gravely affected by unsustainable offtake and where demand for wild meat has been highlighted as a key driver (MacMillan & Nguyen 2013; Sandalj et al. 2016; Shairp et al. 2016; Nguyen et al. 2019). In Vietnam, poor law enforcement fails to deter poaching and trafficking, while pervasive demand for wildlife continues to drive illegal exploitation (Duckworth et al. 2012; MacMillan & Nguyen 2013; Gray et al. 2017). Wild meat is consumed by rural communities and hunters' families but many species, including pangolins, have a high market value and are illicitly sold to middle men, traders, and restaurants for consumption in large urban centres (MacMillan & Nguyen 2013; Harrison et al. 2016). In the Vietnamese context, Hanoi, HCMC, Hai Phong and Hue are some of the many cities where illegally sourced wild meat is consumed in restaurants, despite attempts by local authorities to bring these establishments into compliance with the law (Nguyen & Nguyen 2008; Drury 2009; Sandalj et al. 2016).

This illegal trade exists in the context of a legal trade in wild-caught and captive-bred wildlife. Commercial farming of wildlife provides a legal supply of certain species (e.g., deer (Cervidae *sp.*), snakes (Serpentes), porcupines (*Hystrix brachyura*)) to restaurants (Nguyen & Nguyen 2008; WCS 2008; Brooks et al. 2010). However, this legal trade is not closely regulated in Vietnam, facilitating the illegal trade by enabling the laundering of wild caught specimens (Brooks et al. 2010). In July 2020 (after this study), in light of the COVID-19 pandemic, Vietnam passed a new directive which calls for the enforcement of existing laws to eliminate markets and other establishments where advertising, buying, selling and consuming illegal wildlife products takes place. This directive was introduced in order to minimise any potential public health risk associated with the consumption and trade in wild animals (Directive No. 29/CT-TTg). It remains to be seen if and how this law will be enforced.

There is a recognised need to address demand for, and consumption of, wild meat where it constitutes a threat to species through initiatives that change consumer behaviour (e.g., Harrison et al. 2016; Shairp et al. 2016; Gray et al. 2017). Critically, interventions must go beyond providing information on existing laws and penalties, to focus on influencing consumers' choices about the species and products they consume. Research demonstrates that initiatives based on the 'knowledge deficit' model are rarely effective in achieving a change in human behaviour (McKenzie-Mohr et al. 2012) and therefore, carefully designed, tailored and evidence-based messages that align with the motivations for consumption must be delivered (Olmedo et al. 2017; Veríssimo et al. 2020b). Many wildlife products are illegally traded and consumed by different actors for various purposes (e.g., pangolin meat, timber, and rhino horn), and there is no single

intervention that can curb demand across all products and users, or even address all uses for a single product (Thomas-Walters et al. 2021). To understand the drivers of wild meat consumption and how they can be addressed, it is crucial to understand who the individuals consuming a given product are and the context in which consumption takes place (Veríssimo et al. 2020b).

To characterize the different consumer groups involved in the consumption of wild meat in Vietnam, I applied the principles of audience segmentation; a social marketing technique that defines similar subgroups within a wider audience and identifies a segment for intervention implementation (Longfield et al. 2016). Segments can be identified by exploring demographic, psychographic and behavioural characteristics which allows researchers to define a segment's profile, purchasing power, consuming habits and attitudes (Kotler 2002; Kitunen et al. 2019). Demographic characteristics are the most popular for consumer segmentation because they are the easiest to measure; they include gender, age, income, profession, and education. Reference to these characteristics at the end of the segmentation process is useful to identify the distribution channels required to reach specific segments (Kotler 2002). Psychographic characteristics define a group's values, personality or lifestyle, and behavioural characteristics provide data on the use of a product, consumption habits, and occasions on which a product is used (Kotler 2002). Once segments have been identified, researchers and/or practitioners can select one or more of them to target. Segmentation has proven successful in guiding the design of targeted interventions in public health (Kitunen et al. 2019) and environmental conservation efforts (Metcalf et al. 2019) but is not yet used widely in biodiversity conservation (Jones et al. 2019).

Research carried out in urban centres in Vietnam demonstrates that most wild meat consumption occurs in restaurants, as opposed to households (Do et al. 2011; Drury 2011; Sandalj et al. 2016). Further, the literature on restaurant choice identifies multiple factors which guide choices, including satisfaction with the experience, dish options, and perceptions of tastiness. Two different stimuli that affect food likeability have been identified: food-internal stimuli, which refer to the food taste, texture, temperature, sound and appearance; and food-external stimuli such as societal influence, availability of food and health information (Eertmans et al. 2001). Social consequences, activities and interactions associated with food consumption are also important determinants of food choice (Rozin & Vollmecke 1986; Desmet & Schifferstein 2008). Beyond food, several other factors also influence satisfaction with a dining experience; waiting time, quality of service, responsiveness of front-line employees, menu variety, food prices, food quality, food-quality consistency, ambience of the facilities, and convenience (Andaleeb & Conway 2006; Gupta et al. 2016; Ladhari et al. 2008).

In this study, I aimed to use the food-choice literature to gain an understanding of wild meat consumption behaviour in wild meat restaurants in HCMC, Vietnam. I define wild meat restaurants as those that sell wild meat, although these same establishment most often also sell other kinds of food, for example seafood and meat from domestic animals. I offer insights for the development of behavioural interventions for species of conservation concern in need of reduced consumption. I focused on HCMC as previous studies have found active wild meat consumption in the city (Nguyen & Nguyen 2008; Do et al. 2011; Shairp et al. 2016; Chapter 3). This city also has among the highest income per capita in the country, meaning residents have higher disposable incomes and can

more likely afford aspirational products, including wild meat (General Statistics Office 2019). I conducted audience segmentation to discern consumer types based on demographic, psychographic and behavioural differences, and identified motivations for consumption of different meat products. This study aims to contribute to the literature on wild meat consumption by carrying out audience segmentation of wild meat consumers and exploring motivations for restaurant-based wild meat consumption using a food-choice framing.

4.2 Methods

4.2.1 Sampling Strategy

I aimed to obtain a sample of individuals who had frequented wild meat restaurants in HCMC in the 12 months prior to the survey. To calculate the sample size, I assumed random sampling, a confidence level of 95% and a 5% confidence interval (or margin of error). I estimated that a sample of 384 respondents would ensure the inclusion of consumers of even less commonly consumed wild meats, such as pangolin, based on the lower bound of consumption prevalence estimated in the survey of residents of HCMC conducted in Chapter 3. I aimed to survey 400 individuals to account for incomplete or invalid responses. Individuals included were those that had resided in HCMC for at least a year prior to the survey, were 18 years of age or older at the time of the survey and gave their free, prior and informed consent to participate. This research was approved by the University of Oxford's Social Sciences and Humanities Inter-Divisional Research Ethics Committee (R59702/RE003).

I collected data in the urban districts of central HCMC (District 1, District 2, District 3, District 4, District 7, District 8, District 10, Tan Binh, Go Vap, Thu Duc) as this is where the majority of known wild meat restaurants are located (Lê Long, pers. comm.; Do et al. 2011). I used non-probability and targeted sampling (Newing 2010), with intercept surveys in areas with high foot traffic near restaurants known to sell wild meat. The aim of this approach was to increase the probability of encountering customers of these restaurants. Previous research in Vietnam has suggested that trade and consumption of wildlife in restaurants, including wild meat, are sensitive behaviours, as many of the species that are sold are nationally protected, and trade and consumption of these species is illegal (Sandalj et al. 2016; Chapter 3). To mitigate the potential of non-response and social desirability bias, therefore, questionnaires were conducted using tablets and self-administered by respondents (Tourangeau & Yan 2007; St John et al. 2010). I did not ask directly about the consumption of illegal products, but allowed respondents to indicate themselves which species they had consumed. Data were collected in April and May 2019 by a team of seven local Research Assistants who visited survey locations on afternoons and evenings throughout the week.

4.2.2 Survey Instrument

I used the questionnaire to collect data on respondent demographics, food consumption, food satisfaction, restaurant selection, and animals consumed (Appendix 4.1). Demographic characteristics included gender, age, education, profession, and income. Direct questions on reasons for selecting restaurants, food choice and the social context of food consumption were multiple choice questions where respondents could also select 'Other' and 'Don't know/Don't want to answer'. The literature on food likeability and

selection and restaurant satisfaction and choice were consulted to guide the design of the questions (Andaleeb & Conway 2006; Gupta et al. 2016; Ladhari et al. 2008). Questions regarding the social context in which consumers visit wild meat restaurants were informed by the research conducted by Sandalj et al. (2016), who found that people in the city of Hue are likely to visit wild meat restaurants with friends, family, and/or colleagues. Questions on species consumed were informed by a list of animals found in wild meat restaurants in studies conducted elsewhere in Vietnam (Sandalj et al. 2016; WWF 2017). A list of species was presented to respondents so they could select which they had consumed; they also had the option of adding 'Other' if an animal they had consumed was not on the list. Although I used common names for species or species groups (e.g. 'pangolin', which encompasses eight species, or 'snake'), I used the IUCN Red List of Threatened Species to identify, as far as possible, animals native to Vietnam of conservation concern which would benefit from a reduction in consumer demand. It was beyond the scope of this study to assess whether respondents believed the wild species consumed in restaurants were indeed wild-caught as opposed to farmed, to inquire with the restaurants themselves about the origin of wild species served, or determine the legality of specimens reportedly consumed by respondents.

Respondents were also asked to rate attributes of meat types on a 5-point Likert scale. The list of food attributes comprised taste, freshness, quality, health value, and price, and was informed by food preferences and motivations for wild meat consumption in Vietnam (Rozin & Vollmecke 1986; Drury 2009; Zhang et al. 2012; Sandalj et al. 2016; WWF 2017). The scale was bipolar and all the points on the scale were given text labels (Krosnick & Berent 1993; Krosnick & Fabrigar 1997).

The questionnaire was piloted with 40 respondents in my survey locations prior to data collection; these data were not included in the final dataset. Piloting led to the addition of a final question regarding the frequency with which respondents purchase wild meat in restaurants to be consumed elsewhere. This is because research assistants encountered individuals who explained that they do not consume wild meat at restaurants but purchase it to consume it at home. This question was added to determine whether purchasing wild meat for consumption away from a restaurant was a prevalent behaviour which ought to be considered in future interventions.

4.2.3 Analysis

To explore the demographic characteristics of respondents I grouped education, income and profession levels into broader categories (Appendix 4.2). To segment my respondents, I performed a two-step cluster analysis in SPSS 26.0, which generated sub-groups with similar demographic and psychographic characteristics, and relationships to wild meat consumption. A two-step cluster analysis first groups individual cases into pre-clusters. The algorithm determines if each case should be grouped with a previously formed pre-cluster or if it should start a new pre-cluster based on log-likelihood distance. The pre-clusters are then consolidated into the best number of clusters based on Schwartz's Bayesian information criterion (Norusis 2012). This analysis was considered most appropriate because it allows exploratory testing, where numbers of clusters do not need to be specified prior to analysis, and it can be used with categorical data (Kitunen et al. 2019). Cluster quality is evaluated based on the average silhouette score; a measure of the similarity (cohesion) between the elements within a cluster and the difference (separation) between clusters (Norusis 2012). This score is presented between -1 and 1;

the higher the score, the smaller the distances within clusters and the larger the distances between clusters. If the score is, or is close to, zero the average distance among cases within a cluster is the same as the distance between those cases and those in adjacent clusters. If the score is negative, the average distance among cases within a cluster is larger than the average distance to adjacent clusters (Norusis 2012). Thus, the higher the score, the stronger the cluster quality (Rousseeuw 1987).

I started with all variables except those that resulted from questions that are conditional on previous answers (i.e., only respondents who stated that a different person had paid for a meal at a restaurant for them were asked who this other person was), and those which represented a behaviour to be influenced rather than the respondents' characteristics. Variables were first tested for collinearity using Cramer's V Package for nominal variables. No collinearity at or above an association coefficient of 0.7 was found. To determine the variables that differentiated respondents the most, in order to form clusters, I looked at the predictor importance score of each variable. This reveals which variables vary most between respondents and are therefore the most useful for cluster creation. I then sequentially removed variables with the lowest predictor importance score until the silhouette score could not improve further while maintaining a small number of large clusters, following Norusis (2012).

Once the clusters were identified, I conducted a multinomial regression analysis in R 3.5.2 using the *nnet* package (R Core Team 2019) with behavioural variables that could inform the selection of a segment for a behavioural intervention. I chose behavioural variables that characterised a respondent's agency and consumption habits. With respect to agency, an effective intervention would target people who have the power to change

their own behaviour. Behavioural models contend that having the social opportunity and psychological capability, or the perceived ability to perform a behaviour, are essential to enacting a behaviour (Michie et al. 2011; de Vries 2017). The variables chosen in relation to respondent agency were; whether the respondent had selected the type of restaurant to attend, and whether they paid for the meal themselves (or had split the cost or someone else paid for them). With respect to consumption habits, I was aiming for people who were most likely to order wild meat dishes once in the restaurant, as they would be targets for interventions. Social marketing literature suggests prioritising a high-impact behaviour to guide intervention design and achieve the desirable outcome (Schultz 2011; Lede et al. 2019); in my study, this is ordering wild meat. The variable chosen was: whether an individual was more or less likely to order: a) wild meat only, b) meat from domestic animals/seafood/another type of food, or c) a combination of the two. The multinomial analysis was completed with a two-tailed z test to calculate the p-value of the coefficients and determine statistically significant differences between groups.

4.3 Results

4.3.1 Wild species consumed

A wide variety of wild species is consumed in wild meat restaurants; wild pig (*Sus scrofa*), deer and junglefowl (Gallus *sp*.) were the most common (Figure 4.1). Individuals who typically eat wild meat are more likely to order it with other types of food than by itself. Only 16% of respondents claimed to typically order only wild meat at these restaurants. One third of all respondents stated that they typically order only domestic meat (i.e., beef, pork, chicken, or buffalo), seafood, or other food types, rather than wild meat or a

combination of the two. However, when asked about the last time a wild meat restaurant was visited, less than 5% of respondents claimed to have solely eaten a different type of food to wild meat. This reveals a stark difference with claims made of typical consumption at wild meat restaurants, and suggests that 95% of respondents consumed some form of wild meat the last time they frequented a wild meat restaurant.

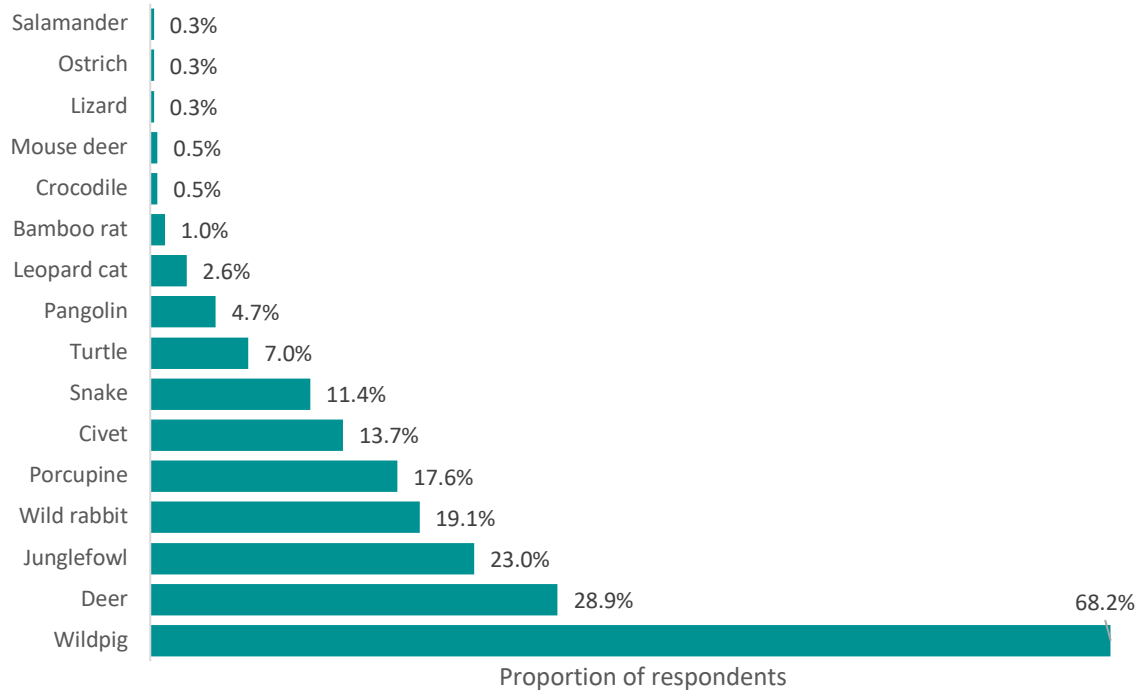


Figure 4.1 Wild species consumed by respondents the last time they frequented a wild meat restaurant (% of respondents stating they had consumed this meat). Respondents could select multiple animals.

Only two species or groups from the list in my questionnaire could be unquestionably categorised as of conservation concern: pangolins, as all eight species are threatened, and wild rabbits, which I infer to be the Annamite-striped rabbit (*Nesolagus timminsi*), which is Endangered. Both are known to be threatened by overexploitation for consumption (Appendix 4.3). Results indicate that 19% and 5% of all respondents had

consumed wild rabbit and pangolin respectively the last time they visited a wild meat restaurant (Figure 4.1). It is possible restaurants are serving farmed rabbit or hare rather than *Nesolagus timminsi* because it is considered rare (Tilker et al. 2019). Other species consumed may well include species of conservation concern (see Appendix 4.3), but as the exact species consumed are not known, it is impossible to state with certainty.

4.3.2 Clusters

My analysis of a total sample of 387 respondents (after removing incomplete answers) produced three consumer groups with an average silhouette score of 0.5, which represented a good separation of clusters. I labelled the groups in a way that summarised their main characteristics, as Up-and-coming Professionals, Classic Consumers, and Students (Figure 4.2). A visual summary of the descriptive statistics of all respondents is provided in Appendix 4.4.

The Up-and-coming Professionals, which represent 50.3% of respondents, are mostly professionals who have received higher education, earn 11-30 million VND (Vietnamese Dong)/month, which is above the average income for HCMC overall (~6.3 million VND (General Statistics Office 2019)) and are 26-35 years old (Figure 4.2). The majority of individuals who belong to the Classic Consumers, representing 31.7% of respondents, have received basic education, are middle-aged (36-55 years old), and earn 5-10 million VND/month (Figure 4.2). Students, which make up 18% of respondents, are students who fall in the lowest income category, are between 18 -25 years old, and have received higher education (Figure 4.2). Variables excluded from the cluster analysis because they do not significantly differ between groups are summarised in Table 4.1.

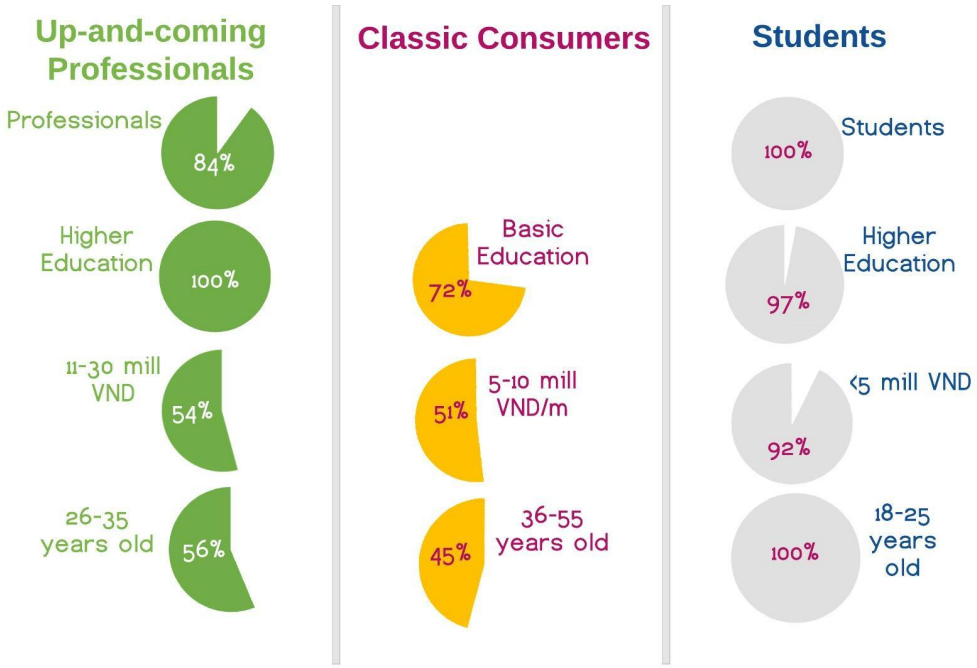


Figure 4.2 Cluster analysis results depicting three clusters of patrons of wild meat restaurants in Ho Chi Minh City, Vietnam. Variables are presented in order of predictor importance (top to bottom).

Table 4.1 Summary of the demographic and behavioural variables excluded from the cluster analysis (% of respondents in each category).

Variable	All Respondents
Gender	Male: 63% Female: 35% Other gender: 0.8%
Group gone to the restaurant with	Friends: 61% Family: 50% Colleagues: 34%
Last time restaurant was visited	In the last 6 months: 29% In the last 3 months: 24% In the last month: 18% In the last year: 18%
Purchased wild meat as take-away	Never: 57% 1-3 times in the last year: 21% 1-3 times in my life: 8% 1-3 times a month: 4% Once a week: 3%
Number of people the restaurant was visited with	1-5 people: 47% 6-10 people: 42% 11-20 people: 7% >20 people: 1%

Psychographic variables, including the reasons why people go to wild meat restaurants, their opinion on the most important food attribute, and their rating of food attributes, did not differ between groups (Figure 4.3). With regard to the choice of restaurant, *Food* was the main reason, followed by *Not my choice* (Figure 4.3a). *Price*, *Reputation* and *Ambiance* were the least-selected reasons for going to a wild meat restaurant. Regarding the attributes of food in the restaurant, *Taste* was most important, followed by *Variety of options* (Figure 4.3b). Only 2% of respondents valued *Price* most highly. Attributes were relatively consistently rated, with 'Okay' and 'Good' being the most usual answers (Figure 4.3c).

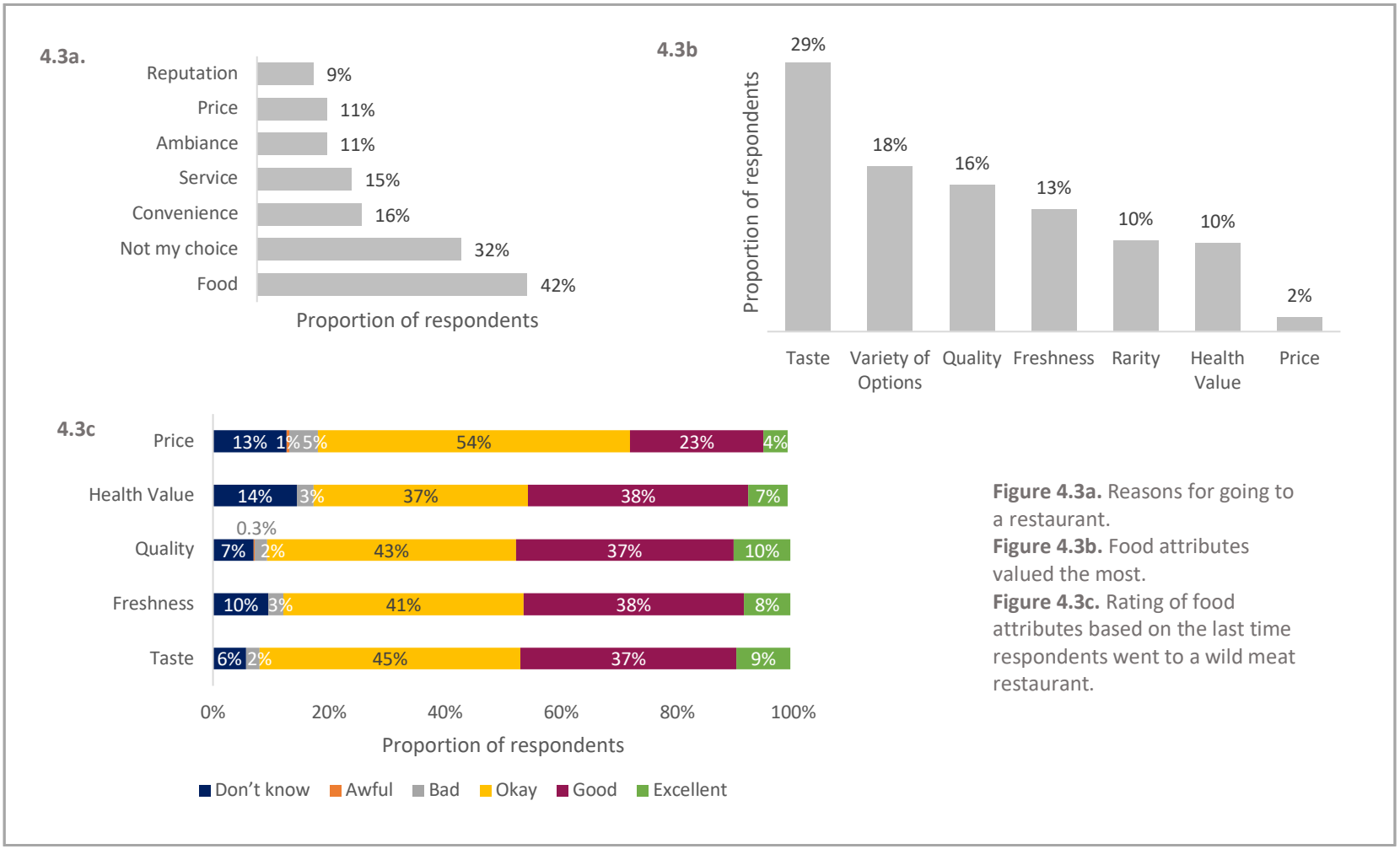


Figure 4.3a. Reasons for going to a restaurant.
Figure 4.3b. Food attributes valued the most.
Figure 4.3c. Rating of food attributes based on the last time respondents went to a wild meat restaurant.

Figure 4.3 Psychographic variables excluded from the cluster analysis presented by proportion of all respondents.

The person who paid for the meal and the type of food typically consumed significantly differed between consumer groups (Figure 4.4). Students were significantly more likely than Up-and-coming Professionals and Classic Consumers to have someone else pay for the meal at wild meat restaurants, and to order meat from domestic animals, seafood or another food type instead of a combination of these and wild meat. Family (24%) and older relatives (21%) were most likely to cover the cost of Students' meals.

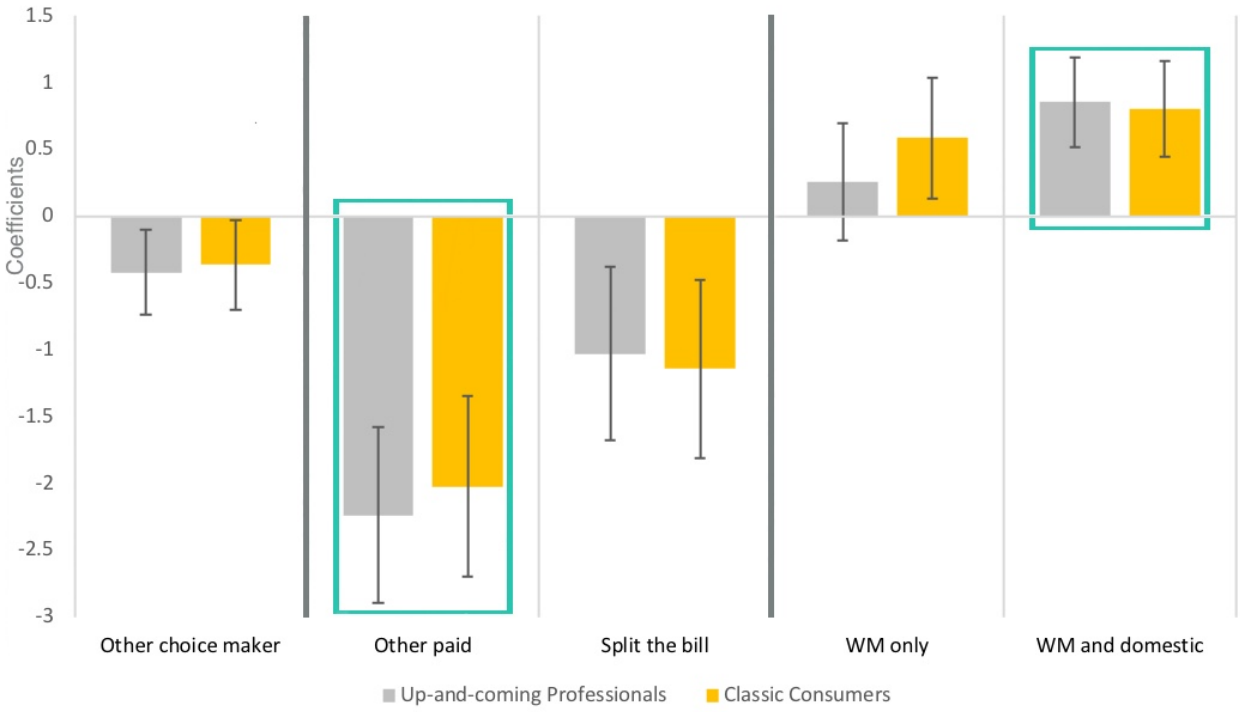


Figure 4.4 Multinomial results depicting differences between consumer groups in their behaviour at wild meat restaurants, with the y-axis showing differences from the respective reference levels with respect to three factors. The two groups shown are Up-and-coming Professionals and Classic Consumers, with Students as the reference level. Of the three factors shown, two relate to respondents' agency [who chose the restaurant - the respondent (reference level) or another; and who paid - respondent (reference level), another person, or the bill was split] and one relates to Consumption Habits [what meat was eaten in the meal - Domestic meat (reference level), wild meat only, or wild meat and domestic meat]. Statisically significant results are highlighted in teal boxes. Wild meat is abbreviated as WM. Bars represent the Standard Error.

4.4 Discussion

Previous studies have identified one primary wild meat consumer group in Vietnam, characterised as wealthy, educated, middle-aged men. Here, I use data collected from people known to have frequented wild meat restaurants in the year to demonstrate that there is more heterogeneity amongst wild meat consumers than was previously known. While it is highly probable that one of the target groups I identified through the cluster analysis, Classic Consumers, is the consumer group other studies described in HCMC as well as other localities in Vietnam (Do et al. 2011; Drury 2011; Sandalj et al. 2016; WWF 2017), I identified two more consumer groups in HCMC. I have also gained insights into the demographic, psychographic and behavioural profiles of three different consumers groups, using a food-choice framing. This lays the foundations for evidence-based behaviour change interventions for these audiences. Considering multiple attributes of consumers enabled me to gain a deeper understanding of the context in which wild meat is consumed in HCMC. This contrasts to segmentation studies which focus solely on demographic and geographic information to target consumers (Kitunen et al. 2019).

Results reveal that not all consumers have the same agency when consuming wild meat at a restaurant. In particular, Students lack agency in the choice of restaurant and tend not to pay the bill either (Table 4.2). Previous research conducted in HCMC (Do et al. 2011) identified individuals from 26 – 35 years of age as a consumer group for wildlife products generally, including wild meat. This age group matches the majority of the Up-and-coming Professionals group. Individuals in this group are more likely than Students to pay the bill at the restaurant, indicating they have the financial means to pay for a potentially expensive meal and suggesting they have more agency. Demographic

characteristics of Classic Consumers match descriptions of previously identified wild meat consumers (Do et al. 2011; Drury 2011; Sandalj et al. 2016; WWF 2017). However, an interesting nuance is that, although Classic Consumers have a lower income than the Up-and-coming Professionals, they are just as likely to pay for the meal themselves. They also typically consume wild meat at these restaurants, which is more expensive than other meats (Drury 2011; WWF 2017). This suggests that, contrary to previous studies, wild meat is not solely a delicacy consumed by wealthy individuals; although differences with other studies may be also attributed to regional differences throughout the country (Table 4.2; Drury 2011; Taylor 2013; Sandalj et al. 2016).

A third of all consumers claim not to have chosen to go to a wild meat restaurant. Two factors may explain this: (i) consuming wild meat in HCMC and/or going to wild meat restaurants is a sensitive activity and perhaps individuals would rather not take responsibility for having done so (Sandalj et al. 2016; Chapter 3), or (ii) some individuals who frequent wild meat restaurants are invited by someone else and are treated to the meal (Drury 2011; WWF 2017). Results suggest that this second explanation is likely for Students who have less agency in the choice of restaurant, and while I aimed to design this study to minimise response bias, it is still possible that social desirability bias influenced some respondents. Past research has determined that men are more likely to consume wild meat than women in Hue and Hanoi, and wildlife products in general in HCMC (Do et al. 2011; Drury 2011; WWF 2017), which aligns with my sample being male-biased.

Findings that Taste was the most important food attribute echoes research conducted on wild meat consumption in Sub-Saharan Africa where various studies, particularly in urban settings, have identified taste as a primary driver for wild meat preference. In these settings, wild meat is also preferred over domestic meat and frozen domestic meat because it is perceived as organic, fresh and healthier (Chausson et al. 2019), drawing additional parallels with perceptions in Vietnam. Drury (2009) argues that Hanoians consider wild meat delicious not only due to the physical qualities of the meat but also because of its association with power and wealth, due to its rarity and price. Other studies have discussed the social consequences of consuming wild meat in Vietnam as a key motivation driving consumption, since engaging in this activity communicates one's prestige and social leverage (Drury 2011; Shairp et al. 2016). These studies reinforce the literature arguing that social activities and interactions with food consumption are determinants of food choice (Rozin & Vollmecke 1986; Desmet & Schifferstein 2008). However, my results demonstrate a low proportion of individuals value food's *Rarity* and a low proportion choose a wild meat restaurant because of *Reputation*. Differences to past studies (i.e., Drury 2011) might also be affected by the cultural differences between regions in Vietnam, or by the economic development which the country has seen since these previous studies were conducted (Taylor 2013). Thus, I suggest exploring the external stimuli driving wild meat consumption further in future research.

The food attribute ratings, based on the last time a wild meat restaurant was visited, indicate that overall the expectations of a high proportion of consumers were not met for many. This was the case for three of the most highly valued attributes, *Taste*, *Quality* and *Freshness*. This is an opportunity for the design of behavioural interventions; potentially,

providing alternative, more satisfying, experiences may draw people away from wild meat restaurants (Table 4.2). These findings also pose the question of why people continue to consume wild meat if important attributes of the meat itself are considered to be mediocre.

In line with previous findings that wild meat is typically consumed at restaurants (Do et al. 2011; Drury 2011; Sandalj et al. 2016), I did not find evidence for a substantial take-away element to consumption. Therefore, I suggest that behavioural interventions to curtail the consumption of wild meat in HCMC should be tailored to the various social contexts in which wild meat restaurants are visited (Table 4.2). I found an inconsistency in that a third of all consumers claimed to typically eat other types of food rather than wild meat at a wild meat restaurant. However, when asked to list the species consumed the last time a wild meat restaurant was visited, only 5% of respondents indicated they had consumed types of food other than wild meat. There are several potential explanations for this. It may be an artefact of the timing of my study, perhaps the last visit was for a particular occasion in which customers were more likely to eat wild meat (although I was not aware of such an occasion in the calendar). Question placement may have contributed to this result, in that the question inquiring about the type of food typically consumed was early in the questionnaire, while the question regarding which species were consumed was later (Appendix 4.1). Thus, it is possible respondents felt more comfortable to divulge this information further along in the questionnaire. Finally, it is well known that responses to 'typical' questions about consumption do not always align well with responses to specific questions about the last consumption event, indicating

reporting biases which might relate to the mismatch between people's conceptions of their behaviour and their actual behaviour (Stockwell et al. 2004).

Regardless, my results show that consumers are likely to consume other meats alongside wild meat. Given that consumers of wild meat already do this, there is an opportunity to design demand reduction interventions in a positively-framed way that encourages a shift using descriptive norms rather than prohibiting a behaviour (Schultz 2011; Thomas et al. 2017). This has been effective in public health in promoting healthy behaviours. For example, Thomas et al. (2017) found posters emphasizing that a majority of people eat vegetables with their meal led to an increased proportion of meals purchased with vegetables in workplace restaurants in the UK. It may be particularly powerful in a restaurant setting because people can observe the behaviour of others and use it to guide their own behaviour (Table 4.2).

Table 4.2 Insights from my findings which could inform potential behavioural interventions to reduce the consumption of wild meat in Ho Chi Minh City, Vietnam

Research insight	**Advise for potential interventions**	**Suggested actions**
Students are likely treated to wild meat restaurants by older relatives and it is possible they do not consume wild meat unless they are invited to do so by family members.	Students might not be in a situation where refusing to consume wild meat is socially acceptable. Messages aiming to convince this group to reduce their consumption at the restaurant are likely futile.	Conduct further research to determine if it is socially acceptable for this group to refuse invitations to wild meat restaurants or to influence their family's restaurant choice, or choice of dish. Focus interventions on older relatives who pay for the meal.
Classic Consumers consume wild meat despite not having a high income, unlike Up-and-coming Professionals.	These consumers might be more habitual and their wild meat consumption behaviour might be harder to change than the other two groups.	Investigate whether Classic Consumers consume wild meat, despite having a low income, because they eat cheaper dishes or because they are hard-to-shift consumers. If the latter, this group might need more coercive measures (e.g., enforcement).
High expectations of food attributes (*Taste, Freshness, Quality, Health value*, and *Price*) pertaining to a meal at a wild meat restaurant are not being met.	Focus on positively framing these same attributes (*Taste*, *Quality* and *Freshness*) linked to different types of food, and highlight the consistency with which a high expectation will be met.	Through social research (e.g., focus groups, interviews with restaurant staff, and restaurant-goers) identify other food types that are considered to meet the described attributes.
Although highly valued, *Taste*, *Quality* and *Freshness*, were not consistently rated positively, suggesting that qualities related to the meat itself are not the only motivation for consumption	Behavioural interventions might be more successful in addressing the consumption of wild meat if they consider the food internal stimuli and the food external stimuli.	Investigate the extent to which food-external stimuli (e.g., a tradition of consuming wild meat, and the anticipated social consequences of consuming these products) can compensate for lack of food-internal satisfaction.
Consumers currently eat other types of food in wild meat restaurants or a combination of other food types and wild meat.	Focus on descriptive social norms to highlight those customers who order other types of food.	Test positive messaging focusing on descriptive norms with relevant consumer audiences. Ensure (via pre-testing) that messages will not inadvertently advertise wild meat to consumers.
Purchasing wild meat at a restaurant for consumption elsewhere is not a highly prevalent behaviour.	Focus on consumption of wild meat in the social context of visiting wild meat restaurants in HCMC.	Test various types of behavioural interventions/messages addressing consumption of wild meat at restaurants. Support local authorities to limit the supply of species served and consumed at wild meat restaurants, particularly those that are threatened and protected by national law.

I identified several animals consumed as wild meat in HCMC. Wild pig is the species consumed most by respondents in the study in HCMC, which was also found in Hanoi and Hue (Do et al. 2011; Drury 2011; Sandalj et al. 2016; Shairp et al. 2016; WWF 2017). Whether the meat served is wild boar, farmed boar, domestic or feral pig, is unknown and may vary between restaurants and/or cities. Further research is needed to establish if and to what extent wild animals, such as wild boar, are being laundered through commercial captive breeding facilities to better understand the relationship between legal and illegal wild meat trade in the country. Other species commonly consumed are deer, porcupines and snakes, which are probably supplied by wildlife farms (WCS 2008; Do et al. 2011; Drury 2011; Sandalj et al. 2016; Shairp et al. 2016; WWF 2017). Species that do not appear to be as commonly consumed in this study, but have also been recorded in previous studies, are civets (Viverridae *sp.*), turtles (Testudinidae *sp.*), and pangolins (Do et al. 2011; Drury 2011; Sandalj et al. 2016; WWF 2017). Leopard cats (*Prionailurus bengalensis*) and bamboo rats (*Rhizomyini*), while still present in the three cities, appear to be consumed less frequently both in this study and others (Do et al. 2011; Drury 2011; Sandalj et al. 2016; WWF 2017).

The results presented here and those from existing studies conducted elsewhere in Vietnam demonstrate demand for wild meat affects a wide range of species, some of which are likely being supplied by wild populations, thus providing an incentive for hunting and poaching in the country and elsewhere in Southeast Asia. Considering *Variety of Options* was identified as an important attribute, it is expected that restaurants will continue supplying various species in order to stay competitive, thus confirming a risk for a wide variety of taxa in Vietnam and potentially neighbouring countries. While some

of the wild species served at restaurants are most likely supplied from farms (WCS 2008), there is evidence that some farms have laundered wild-caught animals as captive-bred, which has contributed to declines in wild populations (e.g., porcupines; Brooks et al. 2010). Other studies in Hue and HCMC have identified a preference for wild-caught animals over farmed wildlife (Sandalj et al. 2016; Shairp et al. 2016). However, preferences for wildlife species are not dichotomous (e.g., wild vs. farmed) and various other factors require due consideration (e.g., price and availability among others; see Hinsley & 't Sas-Rolfes 2020). Considering the relatively high proportion of respondents who claimed to have consumed species of concern the last time a restaurant was visited, I conclude that consumption of wild meat in HCMC could be leading to the overexploitation of native wildlife. It is also possible that the consumption prevalence of each animal is underestimated in this study due to the sensitivity of consumption of at least one species group (pangolins), perhaps leading respondents to under-report consumption in direct questions (Chapter 3). This speaks to a general limitation of this work: although my study was designed to minimise response bias, it is possible that respondents still altered some of their answers due to the sensitivity of the topic.

In this chapter I have sought to provide insights into the heterogeneity of wild meat consumers in HCMC, Vietnam, in order to offer recommendations for future research and conservation practice. Even though the three consumer groups I identified are consuming wild meat similarly and for similar reasons, they differ in their demographic characteristics and in the manner in which they engage with wild meat restaurants. Thus, approaches developed to reduce the consumption of wild meat in HCMC will need to be tailored to each consumer group to increase their likelihood of being effective.

4.5 Acknowledgements

I would like to thank my team of Research Assistants in Ho Chi Minh City: Ngọc Phú, Lê Long, Phạm Ngọc Bích, Châu My, Hoàng Nhi, Khưu Thị Hạnh, and Đinh Thị Hải Liên for their hard work and dedication.

4.6 Supplementary Materials

Appendix 4.1 Questionnaire

Appendix 4.2 Variables combined for analysis

Appendix 4.3 Breakdown of species categories

Appendix 4.4 Additional descriptive graphs

5 CHAPTER 5

Designing celebrity-endorsed behavioural interventions in conservation

5.1 Introduction

Changing human behaviour is crucial to halting the deterioration of the natural environment (Schultz 2011). The need to implement behavioural interventions to combat environmental problems is not new (Saunders et al. 2006; Wright et al. 2015) and such interventions have become prevalent in the last decade regarding consumption of illegally traded wildlife, particularly in East and Southeast Asia (Veríssimo & Wan 2018). However, the uptake of best practice among implementers, including conducting consumer research to understand behavioural motivations, segmenting audiences, following behaviour change models, and conducting rigorous evaluation, is still limited in this area (Greenfield & Veríssimo 2018; Olmedo et al. 2017).

Mirroring the increase in celebrity endorsement in commercial marketing globally (Tanaka et al. 2015), the use of celebrities in the environmental conservation sector has increased in the last three decades (Brockington 2015b; Doyle et al. 2017). Whether celebrity-associated interventions are effective at achieving their stated objectives remains an open question and calls have been made for further research to guide celebrity selection and influence mechanisms (Roy & Mishra 2018; Moraes et al. 2019). However, the review of environmental campaigns conducted in Chapter 2, found no

evidence that endorsement is effective in achieving stated objectives, including influencing human behaviour. This is potentially because these campaigns generally lack appropriate project design, theories of change, and evaluation. There is also a dearth of accessible reporting on how celebrities are being used in these campaigns (Chapter 2).

Focussing specifically on biodiversity conservation, the need to employ behavioural science techniques to design, implement, and evaluate behaviour change interventions has been recognised (Stern 2000; Greenfield & Veríssimo 2018; Kidd et al. 2019). By contrast, the use of celebrity endorsement in these interventions has not been robustly tested or even discussed (Eren-Erdogmus et al. 2016; Ho et al. 2020). To fill this gap, I present a guide for decision-making relating to conservation interventions that seek to change behaviour using celebrity endorsement. Celebrities are commonly used in wildlife demand reduction efforts in Asia (USAID 2016; Voices for Wildlife 2018; WildAid 2018) and I apply this guide to a case study focused on a demand reduction campaign for wild meat, with particular reference to pangolin meat in HCMC. I then discuss the application of the guide to conservation interventions more broadly.

5.2 A guide for promoting Behavioural Change through Celebrity Endorsement

To employ the proposed guide, it is necessary to identify a conservation issue for which there is robust evidence that behavioural change is needed, and demonstrate that celebrity endorsement is the most suitable means of triggering a change in behaviour. As a first step, it is essential for intervention designers to have an in-depth understanding of the system in which the behaviour of interest takes place; ideally this would be obtained through audience research (Smith & Strand 2009; Michie et al. 2011). This understanding

should provide evidence that a celebrity endorser is an appropriate messenger for a given target audience. I demonstrate in my case study how this evidence can be obtained. Additionally, I encourage practitioners to embed their planning decisions into a Theory of Change, in order to demonstrate how and why they expect that celebrity endorsement will lead to the desired change (Brittain et al. 2020). Once these pre-conditions have been met, the guide aims to help practitioners and researchers make decisions regarding how to use celebrity endorsement in an intervention in order to achieve a desired behavioural change (Figure 5.1).

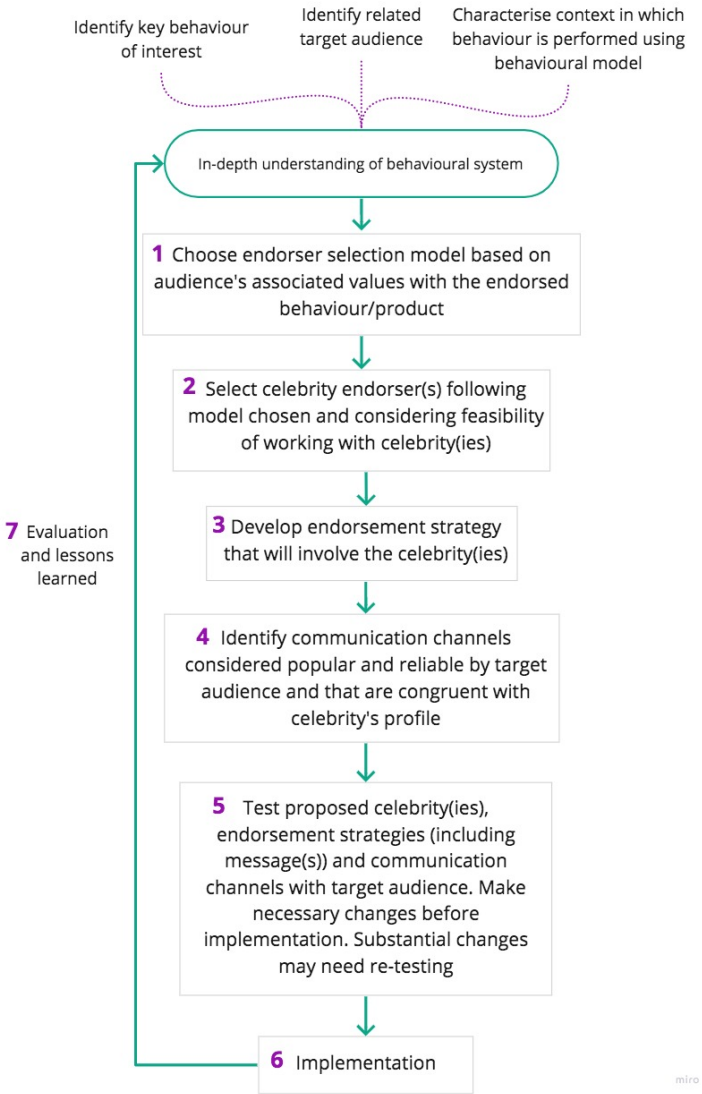


Figure 5.1 Guide for decision-making for celebrity-endorsed behavioural interventions in environmental conservation.

5.2.1 Steps 1 & 2: Model and endorser selection

Various models to guide endorser selection have been developed, tested, and applied in different fields (e.g., commercial marketing, public health; Hoffman & Tan 2015; Wang & Scheinbaum 2018). An understanding of the product or behaviour being endorsed and the target audience's relationship with the behaviour that the intervention seeks to change should guide the choice of model. This is essential to enable practitioners to decide whether it would be more effective to use an endorser with expertise on the product itself (e.g., a doctor promoting the use of a medicine), an endorser who evokes a certain image promoting a behaviour (e.g., a successful businessman promoting donations for a charitable cause), a physically attractive celebrity advocating for a particular lifestyle (e.g., a famous actress endorsing the use of re-usable cups to avoid single-use plastic), or other types of endorsement (Schimmelpfennig & Hunt 2020).

The next step is to select an endorser based on a robust understanding of the system of the targeted behaviour. Selecting the most appropriate (e.g., credible, attractive, congruent) endorser requires research on the target audience for the behavioural intervention (Bergkvist & Zhou 2016). In-depth target audience research is necessary to understand the values associated with the particular behaviour and the attributes evoked by different endorsers from the point of view of the target audience (Moraes et al. 2019; Veríssimo et al. 2020b). This knowledge is necessary to shortlist celebrities who might qualify as effective endorsers for a particular intervention; implementers should not assume they understand how the target audience perceives a celebrity. Nor can it be assumed that popularity (e.g., a celebrity with a large number of followers on social media or who is well recognised by an audience) is equivalent to trustworthiness, being

liked, or representing the ideal image of the target audience, which are attributes that are known to affect endorser effectiveness (Brockington 2014). Even if a celebrity appears to have all the right attributes, it does not mean the individual is relevant to any and every product or behaviour (Roy & Mishra 2018).

5.2.2 Step 3: Endorsement strategy

Once the type(s) of endorser has been chosen, the next step is to choose the form of endorsement that the celebrity will engage in to effectively communicate with the target audience. In their review of celebrity endorsement, Ambroise and Albert (2019) discuss five different forms of endorsement. These are: i) advertising disseminated in the media to inform or persuade; ii) brand/product placement, i.e., displaying promoted elements in spaces not necessarily dedicated to commercial communication; iii) creation or use of celebrities' personal brands; iv) sponsoring an event/product/brand to benefit from the celebrities' image and commercial potential; and v) conducting public relations activities, in which celebrities reach out to other elites (e.g., government leaders) to influence beliefs, opinions and actions (Ambroise & Albert 2019).

To identify the most appropriate strategy in a given endorsement scenario, an evidence-based understanding of how the endorsement is expected to lead to the desired change in behaviour – a Theory of Change – is crucial. Developing a Theory of Change is necessary in order to be explicit about how and why a change is expected to happen, and how the actions being undertaken will lead to the desired change. It also makes clear the assumptions underlying the presumed causal links between actions and outcomes. A

Theory of Change must be informed by robust insights into the system in which the target audience performs the focal behaviour (Margoluis et al. 2009).

5.2.3 Step 4: Communications Channel

Information regarding the most effective communication channel(s) is needed to deliver an effective endorsement strategy. Effective communication channel(s) are those that ensure the target audience will both be exposed to the intervention and have a high likelihood of considering the information contained within it to be reliable; thus, target audience research is required to elicit information on the use and perceptions of various communication channels, including the perceived reliability of the medium (Veríssimo et al. 2020b; Doughty et al. 2021). Understanding of the congruence of different channels with candidate celebrity endorsers is also required; high congruence will convey a message more genuinely (Appendix 5.1).

5.2.4 Step 5 & 6: Testing

The next step is to test the selected celebrity(ies), endorsement strategy, and communications channels with the target audience. This can elicit insights into the potential outcome of the celebrity endorsement and is recommended for messaging and communications strategies in the social marketing and behavioural interventions literature (Olmedo et al. 2017; Smith & Strand 2009). It can help to ensure there is a match between the celebrity and the product or behaviour being endorsed, and between the celebrity and the target audience. Testing can also help determine whether unintended consequences might ensue. These might include feelings that the individual is overexposed in advertisements, the presence of the celebrity overshadowing the

message, or the involvement of the celebrity provoking suspicion or mistrust (Muda et al. 2012; de los Salmones & Dominguez 2016; Duthie et al. 2017). Finally, testing can also detect if there is reactance, also known as defiant behaviour, among the target audience. This refers to a perceived loss of agency or autonomy after being exposed to a message, typically communicated by an untrusted source and indicates the message, endorser, or both, are not appropriate (Mols et al. 2014). Testing the intervention elements with members of the target audience enables these issues to be uncovered and necessary changes made before implementation.

Using a general causal model as an example of a Theory of Change, I show how the steps presented in Figure 5.1 can guide intervention design to demonstrate how and why the desired impact will be achieved (Mayne 2017; Brittain et al. 2020). I also indicate how the steps described above can reduce the risk of unsupported assumptions in the casual links between actions and the short-term outcome (Figure 5.2). The assumptions linking the short-term outcome to the long-term outcomes and impact need to be challenged before embarking on a celebrity-endorsed behavioural change intervention, requiring a broad understanding of the context within which the behavioural system is embedded.

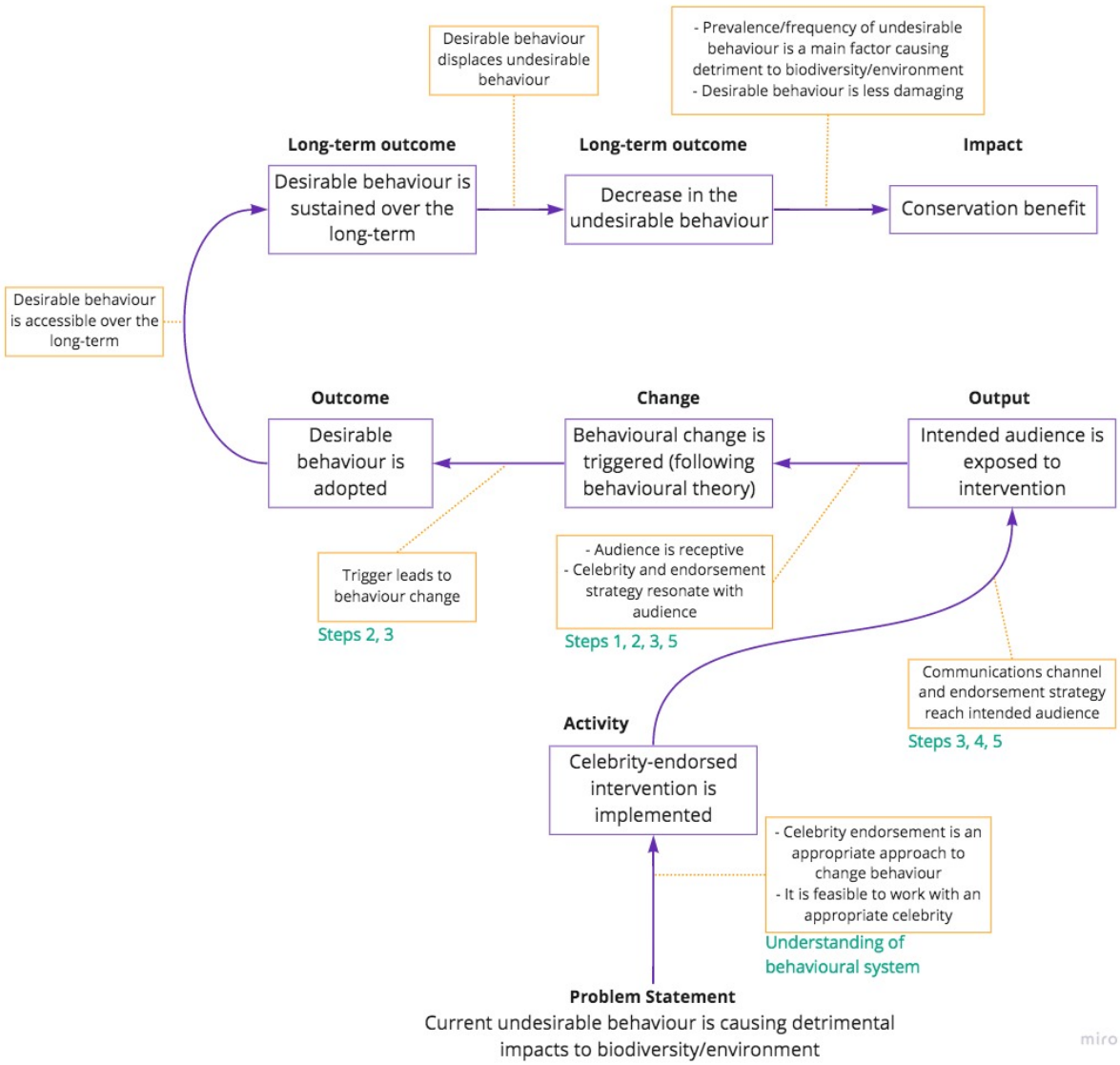


Figure 5.2 Example of how the guide can inform a Theory of Change for an intervention that seeks to achieve behavioural change using celebrity endorsement. Yellow boxes indicate the assumptions in the causal links; and green text shows which steps from Figure 5.1 can help reduce the risk presented by assumptions (Step 1: Endorser model selection; Step 2: Celebrity endorser selection; Step 3: Endorsement strategy development; Step 4: Communication channels identified; Step 5: Testing with target audience).

5.3 Case study

In this section I implement the proposed guide, integrating evidence from my case study to develop an intervention to reduce wild meat consumption in HCMC with particular reference to pangolin meat.

5.3.1 Problem Statement

Pangolins are a group of species threatened by overexploitation for illegal trade and consumption; it is estimated that the equivalent of 715,000 pangolins were trafficked globally from 2010 to 2019 (Challender et al. 2020). While all eight pangolin species are protected under national legislation in most range states and included in Appendix I of CITES, meaning there is an international ban on commercial trade in wild-sourced pangolins and their parts, illegal trade and consumption continue (Burgess et al. 2020). Overexploitation has led to severe population declines in parts of East and Southeast Asia (Challender et al. 2020). Trade data suggest that large quantities of pangolin scales and whole animals are traded illegally to Vietnam from within Southeast Asia (scales and meat) and from a range of African countries (scales) (Heinrich et al. 2017; Ingram et al. 2019). For these reasons, demand reduction has been recognised as a priority intervention that could mitigate the threat pangolin species face resulting from overexploitation (CITES 2016).

5.3.2 Behavioural System

Existing research provides evidence of pangolin meat consumption in urban centres of Vietnam (Drury 2011; Sandalj et al. 2016; Shairp et al. 2016). However, these studies did not account for potentially biased responses related to the purchase and consumption of pangolin products being illegal in Vietnam (Chapter 3). I therefore estimated the prevalence of consumption of pangolin meat in HCMC using a specialised questioning method designed to elicit more accurate responses when a behaviour is sensitive, the unmatched count technique (UCT), and compared the results to those obtained from direct questioning (see Chapter 3 for full results). The results indicate that there is active

consumption of pangolin meat in HCMC with a prevalence of 7% (±SE 5.7%). The UCT elicited a higher prevalence estimate than direct questions, indicating that consuming pangolin meat is a sensitive behaviour. Given that the city has a population of 8.4 million people, these results suggest that 170,000 people a year could be consuming pangolin meat. This evidence suggests that consumption of pangolin meat by individuals in HCMC ought to be addressed, which would contribute to improving the conservation status of pangolins in Vietnam and likely Southeast Asia.

5.3.3 Target audience

To gain further insights into the consumption of pangolin meat in HCMC, I conducted a study with respondents who had consumed meat from wild animals (hereafter referred to as wild meat) in restaurants in the city (see Chapter 4). I used a conceptual framing from the food-choice literature, with a focus on the consumption of wild meat in general, avoiding direct reference to pangolin meat consumption due to the known sensitivity of this topic (Chapter 3). I characterised and segmented wild meat consumer groups using demographic and psychographic variables, identifying three consumer groups: Up-and-coming Professionals, Classic Consumers, and Students. While I found no significant differences between the groups' psychographic characteristics, they differed in their demographic profiles, agency (the power to change their own behaviour) in restaurants, and wild meat consumption habits (see Chapter 4 for complete results).

Social marketing literature suggests focusing on a high-impact behaviour to achieve desirable outcomes (Schultz 2011; Lede et al. 2019). In my demand reduction case study, this is the likelihood of ordering wild meat at a restaurant, as opposed to an alternate

dish. Among the identified consumer groups, Classic Consumers are comprised mostly of individuals who have received a basic education (completed high school, secondary or vocational school), earn 5–10 million Vietnamese Dong (VND) per month and are 36 – 55 years old. Classic Consumers were found to be significantly more likely than Students to pay for a meal at a wild meat restaurant and to order a combination of wild meat and meat from domestic animals (e.g., beef) than the latter option alone (Chapter 4). Classic Consumers therefore have agency to select restaurants that serve wild meat, the ability to pay for meal, and are likely to eat wild meat in these restaurants (Chapter 4). For these reasons I chose this group as my target audience.

To gain further insight into this group's wild meat consumption in restaurants, I conducted focus group discussions (FGD) with members of this group (see Appendix 5.1 for methods and results). This qualitative study confirmed the results of the broader survey in Chapter 4. Both studies highlighted the importance of food-internal attributes (the physical qualities of food such as taste, smell, texture) in driving wild meat consumption. The FGD allowed a deeper and richer understanding of the reasons for ordering and eating wild meat, for this consumer group. The main reason for consuming wild meat, which the FGD participants highlighted, was to 'change taste', referring to eating something novel and different rather than 'ordinary' dishes consumed regularly. Other reasons were the taste of the meat itself and food-external attributes (socially ascribed perceptions of consumption), such as wild meat being more 'exciting' than other types of food, which not everybody consumes, and the meat being a constituent of a meal bought to show respect to special guests. Wild meat's good pairing with alcohol and perceptions of it being healthier when compared to meat from domestic animals (due to

the belief that domestic animals are fed growth promoters) were also reasons for consumption.

Echoing findings from Chapter 4, wild meat consumption was described as a social activity which people partake in with others. While the restaurants which Classic Consumers usually frequent tend to serve wildlife alongside other dishes, offering special dishes like wild meat was particularly expected when treating business partners, bosses or clients as a way of showing respect. When eating out with friends or colleagues, a restaurant could be selected more casually (Appendix 5.1). I consider both these social contexts in the design of the behavioural intervention and selection of celebrity endorser.

5.3.4 Behaviour change model

I considered a range of behavioural models for this case study (Appendix 5.2). I selected the COM-B model (West & Michie 2020), which contends that three elements must be present for a behaviour to occur; capability, opportunity and motivation (Figure 5.3). Capability is the physical and psychological capacity to carry out a behaviour; opportunity refers to the social and physical factors outside of the individual, that render the behaviour possible; and motivation is defined as the brain processes that lead to a behaviour, including emotions and impulses (automatic) and evaluation and planning (reflective). Results summarised here (and presented in full in Chapter 4 and Appendix 5.1) demonstrate that consumption of wild meat is not an automatic behaviour, but rather a choice that consumers make in the face of alternative restaurants and dishes – thus, a reflective behaviour. Wild meat is already consumed in the same social context as other types of food (Chapter 4). Qualitative results further support this being a reflective

behaviour, given that price was identified as a barrier to consumption; consumers must decide whether to order wild meat or not depending on its price and their disposable income (Appendix 5.1). Exploring my behavioural system with the COM-B model enabled me to identify an entry point – targeting consumers' reflective choice of wild meat vs. potential alternatives in a restaurant setting.

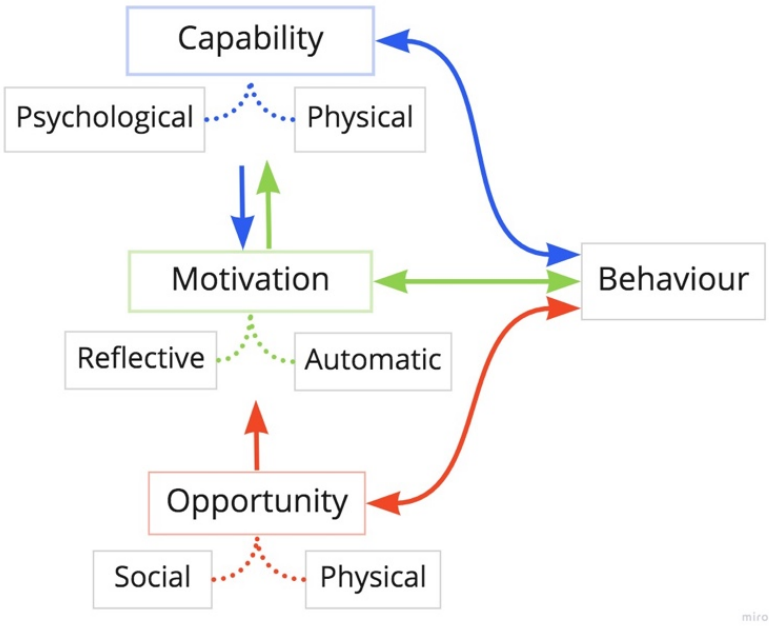


Figure 5.3 COM-B model where Capability is comprised of the psychological and physical capacities to enact a behaviour; Motivation is the brain processes that lead to the behaviour, either automatic, or reflective; Opportunity comprises the social and physical factors from the individual's environment that make the behaviour possible. Adapted from West & Michie (2020).

These foundational insights bring us to the celebrity endorsement guide (Figure 5.1), with my problem statement, behaviour to be modified, target audience and focal behaviour all identified, based on empirical research within the study system.

5.3.5 Step 1: Celebrity endorsement selection model

Several models and theories have sought to explain how celebrity endorsement can persuade intended audiences (Table 5.1). These models provide evidence that celebrities can be effective in persuading people to change behaviour if they possess key attributes. To test whether wild meat consumers consider celebrities to possess these attributes, I conducted a quantitative exercise and follow-up qualitative research (Appendix 5.1 & 5.4). The quantitative exercise entailed asking wild meat consumers to list well-known individuals who possess attributes described in celebrity models (e.g., being trustworthy (Table 5.1)). Respondents were then asked to rank shortlisted individuals according to who was more strongly associated with each attribute (see Appendix 5.1 & 5.4). My findings suggest that celebrities could be effective messengers to address Classic Consumers' reflective motivation when consuming wild meat at restaurants, given that several famous individuals were perceived to possess messenger attributes found to influence behaviour.

I evaluated a range of models and theories for celebrity endorsement effectiveness ahead of their application in this case study (Table 5.1). All of the models considered contain elements applicable to my case study (i.e., they highlight celebrity attributes that resonate with my target audience) and could therefore be applied in an intervention to reduce consumption of wild meat. However, the source-credibility, source-attractiveness, meaning transfer models, and the match-up hypothesis, all suggest single determinants of the effectiveness of the celebrity endorsement. These are (respectively) credibility, attractiveness, socially ascribed meanings and images, and congruence. In my case study, my evidence suggested that celebrity attributes pertaining to all of these models may

play a role in influencing the target audience (i.e., perceived credibility, likability, congruence with the target audience and product endorsed, and images associated with the celebrities; Appendix 5.1). Therefore, I consider the value-proposition centred framework, which combines all of the previously mentioned models, as the most appropriate to guide celebrity selection in this case study (Table 5.1).

Table 5.1 Models and theories of celebrity endorsement effectiveness considered for celebrity selection in the case study and their applicability regarding the five celebrities tested in my study (based on celebrities listed in a survey of wild meat consuming HCMC adult residents – see Appendix 5.1 for details).

Model	Brief overview	Applicability to case study
Source-credibility model (Hovland & Weiss 1951; Hovland et al. 1953)	Proposes the effectiveness of an endorser or messenger depends on the individual's perceived level of expertise (knowledge, experience and skills) in relation to the endorsed item and trustworthiness (honesty and believability).	Insights gathered from FGDs suggest that Classic Consumers value the knowledge that the celebrities I tested have regarding certain food dishes. Particularly, Viet Huong, Tran Thanh, Hoai Linh and Truong Giang were discussed as knowledgeable about food dishes.
Source-attractiveness model (Friedman & Friedman 1979; McGuire 1985)	Holds that the physical attractiveness, familiarity (audience's knowledge about the messenger as a result of repeated coverage and media attention), similarity (resemblance perceived between the endorser and audience) and likability (liking the endorser's lifestyle and conduct) of an endorser will render their influence more effective.	Individuals from the target audience were familiar with all five celebrities but appeared to like Hoai Linh in particular. Physical attractiveness was not mentioned regarding any of the tested celebrities.
Match-up hypothesis (Mowen et al. 1979)	Suggests an endorser will be most effective when there is perceived congruence between the brand/product, the endorser, and the target audience.	There appeared to be perceived congruence between four of the five celebrities and food. However, not all four celebrities seem to be congruent with all types of food dishes or all types of restaurants. Two of the four celebrities appeared to be more congruent with the target audience. The fact that these distinctions were made suggests that relevance to a proposed alternative to wild meat dishes, the social context, and to respondents themselves, is important to Classic Consumers.
Meaning transfer model (McCracken 1989)	Captures the celebrity endorser's cultural meanings which accumulate through their fame (e.g., performances, achievements, etc.) and are tied to the values and culture	Certain celebrities appear to have socially ascribed images and meanings that are connected with the type of food participants suggested they should endorse. This was mentioned and discussed by Classic Consumers, suggesting that these images and meanings

	in which they have gained this fame, and then transfer onto the products and brands they endorse.	are noticeable to the target group and could generate dissonance if endorsement and images are not aligned to the message.
Value-proposition centred framework (Schimmelpfennig & Hunt 2020)	Contends that no single model of celebrity endorsement effectiveness is sufficient to explain endorsement strategies as advertisements have been designed using various endorsement concepts. This framework encompasses the four models presented above to guide effective endorsement strategies.	Given that all of the considered models could be applied in my case study, the value-proposition centred framework appears to be most suitable for my case study.

Schimmelpfennig and Hunt (2020) propose a value proposition-centred approach which takes into consideration intangible values that may be placed on an idea, brand or product (e.g., emotional or expressive values). To identify an effective endorser, they put forward five value propositions of the product endorsed: 1) provides best performance – which describes a strategy for products for which the main value is qualitative or technical superiority, in which case the endorser must possess expertise in the product promoted; 2) enhances physical attractiveness – for attractiveness-related products where the physical attractiveness of the endorser enhances their credibility; 3) creates a positive affect in a nominal decision – in a low cognitive involvement decision (such as purchasing fast-moving consumer goods), the choice of product will create positive feelings when associated with celebrity endorsement due to the purchaser's liking for the endorser; 4) crafts a unique experience via endorser attributes – such that the celebrity endorser and the product promoted are congruent and therefore the endorser renders the advertisement more acceptable for the audience; and 5) enables the consumer to build their persona – where purchasing a product serves to reinforce one's own identity and group membership and the celebrity's socially ascribed meanings are in line with this identity, thus, reinforcing a consumer's motivation to purchase (Figure 5.4).

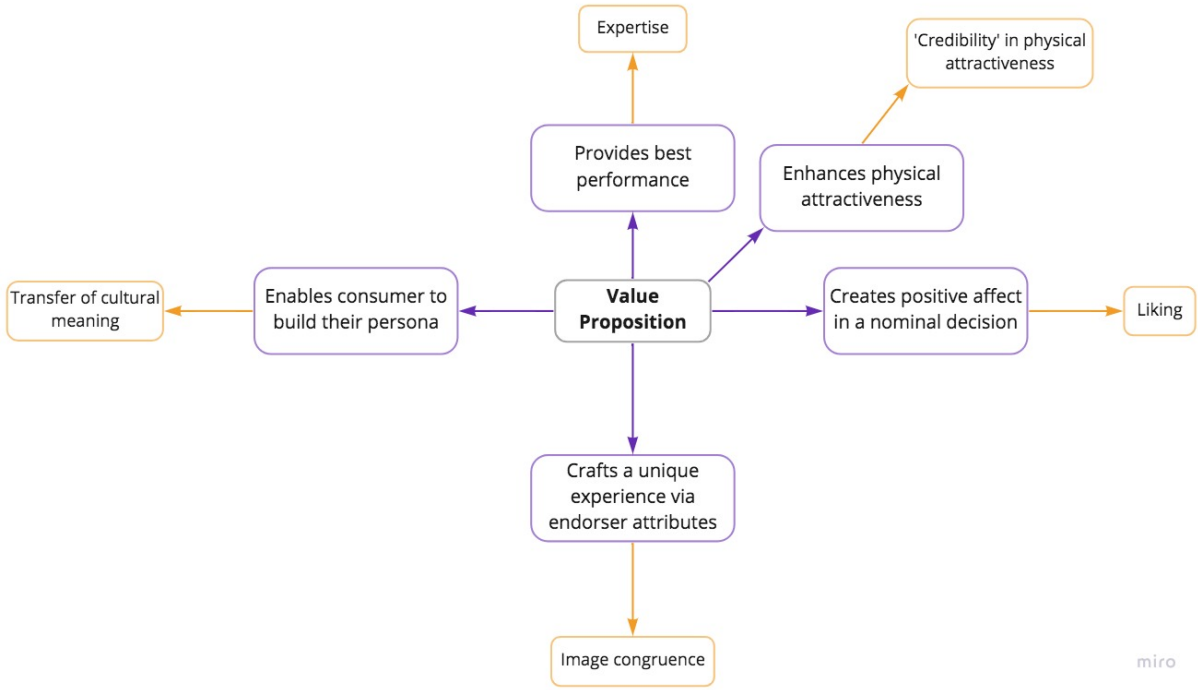


Figure 5.4 Value-proposition centred framework depicting five potential propositions (purple) and their respective celebrity endorsement strategy (yellow). Adapted from Schimmelpfennig and Hunt (2020).

5.3.6 Selecting a value proposition

I shortlisted celebrities who could potentially be effective in delivering messages to influence consumption of wild meat in HCMC, following the five elements of the value proposition model (Appendix 5.1 & 5.4). I used insights from the FGD to consider how my intervention could use celebrity endorsers to put forward a substitute to wild meat that would resonate with Classic Consumers. I discarded *enhances physical attractiveness* since there is no evidence to suggest motivation to consume wild meat is associated with physical appearance (Appendix 5.1). I also discarded *creates positive affect in a nominal decision* as this is described as effective in situations of low cognitive involvement (Schimmelpfennig & Hunt 2020). Although my results indicate consumers are sometimes

treated to a wild meat meal, and therefore do not make the choice themselves (Chapter 4), Classic Consumers tend to actively choose wild meat restaurants and/or order wild meat.

I considered the proposition of *enables consumer to build persona*, as FGD results show wild meat consumption is sometimes described as a way to show off; this has been described as a motivation for wild meat consumption in past research (Drury 2011; Sandalj et al. 2016). However, food-internal attributes of the consumption experience were discussed at greater length in my qualitative study (Appendix 5.1) and were identified as the main reason wild meat was consumed in my previous Chapter. Additionally, evidence does not suggest wild meat consumers consume these dishes as means to identify themselves or demonstrate group membership, as is described under this proposition (Schimmelpfennig & Hunt 2020). Therefore, this proposition was also discarded.

The results of the FGD indicate that a knowledge of or close association with food was important to Classic Consumers, which relates to the proposition *provides best performance*. This evidence suggests that the most important attribute driving consumption of wild meat is taste (Chapter 4) and that an alternative must satisfy the desire to 'change taste' from ordinary, frequently consumed food. Hence, an alternative would need to be promoted as having a better, more novel, or at least similar taste, to wild meat. Shortlisted celebrities who were perceived as persuasive were also considered trustworthy and were associated with dishes that are congruent with their image (Appendix 5.1). This congruency speaks to the final proposition of *crafts a unique*

experience via endorser attributes, which takes its conceptual construct from the match-up hypothesis and contends that congruence between the endorser, the audience and the concept endorsed will render the message more likely to be accepted by the target audience (Table 5.1). Perceptions of trustworthiness —being honest and believable— follows the *provides best performance proposition*, which is grounded in the source-credibility model, holding that endorsers who are perceived to be credible will contribute to an advertisement's effectiveness (Table 5.1). For these reasons, my intervention design combines the *provides best performance* and *crafts a unique experience via endorser attributes* propositions. The first proposition will guide the selection of attributes that need to be highlighted through my endorsement (i.e., taste, 'change taste') and celebrity attributes (i.e., trustworthiness), and the second will guide the selection of wild meat alternatives and the celebrities closely associated with them.

5.3.7 Step 2: Celebrity endorser selection

The FGD indicated that the attributes which must be made salient in the endorsement of an alternative are: reasonable price, atmosphere, service, taste, suitability for the social context of 'boozing', and a restaurant's expertise in specialising in a single dish. A suggested alternative that fits these attributes was said to be a variety of food grilled or barbequed in the southern Vietnamese style. Due to this food style's affordability and popularity, participants stated that the most suitable celebrity to endorse it would be Hoai Linh as these attributes are congruent with perceptions associated with him (Figure 5.5; Appendix 5.1 Table 3). While other specific dishes were linked to Hoai Linh, because of the importance of 'change taste', I selected grilled food as this refers to a range of food including meat (but not wild meat). In addition, Hoai Linh was considered honest,

believable, persuasive, was strongly linked to the alternative proposed here and has demonstrated congruence with the target audience (Figure 5.5). This demonstrates Hoai Linh has the appropriate image to endorse the alternative of grilled food to Classic Consumers (*crafts a unique experience via endorser attributes* proposition) and reflect its desirable attributes (*provides best performance* proposition).

Viet Huong, who was also considered trustworthy and persuasive, was associated with a specialty of the Mekong Delta, Chau Doc fish and snail vermicelli. This dish was felt to be tasty and reasonably priced. Viet Huong was also associated with rice noodle soup and a snail restaurant but due to the associations of the first dish with multiple attributes, I selected Chau Doc fish and snail vermicelli as an alternative that could be effectively endorsed by Viet Huong (Appendix 5.1 Table 3). The strong association of Viet Huong with this dish and her congruence with the social context and image of exploring novel dishes indicates Viet Huong also has the expertise to promote important qualities of the alternative (*provides best performance* proposition) and has the correct image to do so (*crafts a unique experience via endorser attributes* proposition). However, it is unclear whether there was a perceived congruence between her and the target audience, given that participants in my qualitative study did not appear to relate to her in the same way as Hoai Linh (Figure 5.5).

Tran Thanh was associated with dishes that also match perceptions of his personality as an endorser; novel, unique, special and expensive dishes, such as crabs and rare snails. Although he is associated with seafood, which is more likely to satisfy the desire to 'change taste', negative perceptions of him and his influence, combined with the

alternatives associated with him being expensive led me to decide against Tran Thanh as a potential endorser for the intervention (Figure 5.5). Evidence from the qualitative study also indicates that he is unlikely to resonate with Classic Consumers and that his presence in an endorsement would suggest the advertisement speaks to a younger, or perhaps more affluent, audience. Furthermore, while some consumers of wild meat in HCMC may be wealthy, my research shows around half of Classic Consumers earn an average income (5-10 million VND (General Statistics Office 2019; Chapter 4)) and my qualitative results suggest a high price is a barrier for wild meat consumption (Appendix 5.1). Thus, my results indicate promoting an affordable alternative to wild meat, rather than an expensive dish, will be more effective in reducing consumption. I also discarded Truong Giang because participants had negative perceptions of him (Figure 5.5, Appendix 5.1, Table 5.3). Neither Tran Thanh not Truong Giang were considered persuasive by the target audience; both were said to be likely to influence young people instead and, due to their ownership of restaurants, it was suggested their endorsement of food would be met with suspicion. My Tam was the only celebrity who was not considered to be relevant to food endorsement, thus she was not considered further (Appendix 5.1).



Figure 5.5 Comparison of four celebrities considered for intervention to reduce wild meat consumption in HCMC, showing attributes associated with the celebrity model in Figure 5.4 (blue), perceptions and images associated with the celebrity (green) and type of food they were associated with (purple).

5.3.8 Step 3 & 4: Endorsement strategy and communication channels

As part of the qualitative study, participants were requested to discuss the activities celebrities should engage in order to endorse potential alternatives to wild meat. The activities described included celebrities recording their exploration of alternate dishes on video and sharing their genuine opinion on camera. Considering the five strategies of celebrity endorsement presented in the decision guide, the activities suggested fit under strategy i) - advertising disseminated in the media to inform or persuade (Ambroise & Albert 2019).

Viet Huong was known to have reviewed restaurants on her YouTube channel and Facebook page. Given her videos appear to have been well received by the focus group participants, I propose Viet Huong's endorsement strategy ought to be via a video similar to those she has produced in the past. Although FGD results indicate YouTube and Facebook are not perceived as reliable channels, both platforms are known to be the channels on which Viet Huong shares her content. Therefore, her presence in a video and dissemination via her own YouTube channel and Facebook page should prove the advertisement's authenticity. Furthermore, FGD results show Facebook and YouTube are the channels most frequently used by the target audience, therefore it is very likely Classic Consumers would be exposed to this endorsement.

Hoai Linh was perceived as more traditional and was associated with the official communication channel in Vietnam; television. I propose a similar strategy to that for Viet Huong but focused on grilled food in the southern style to be broadcast on television and later disseminated on Facebook. The endorsement would benefit from the reliability

of being broadcasted on television, and would later reach a wider audience on the social media platform, increasing the likelihood of reaching the target audience. Figure 5.6 summarises evidence-based decisions made following the guide and how research results were integrated into the guide to develop two potential interventions.

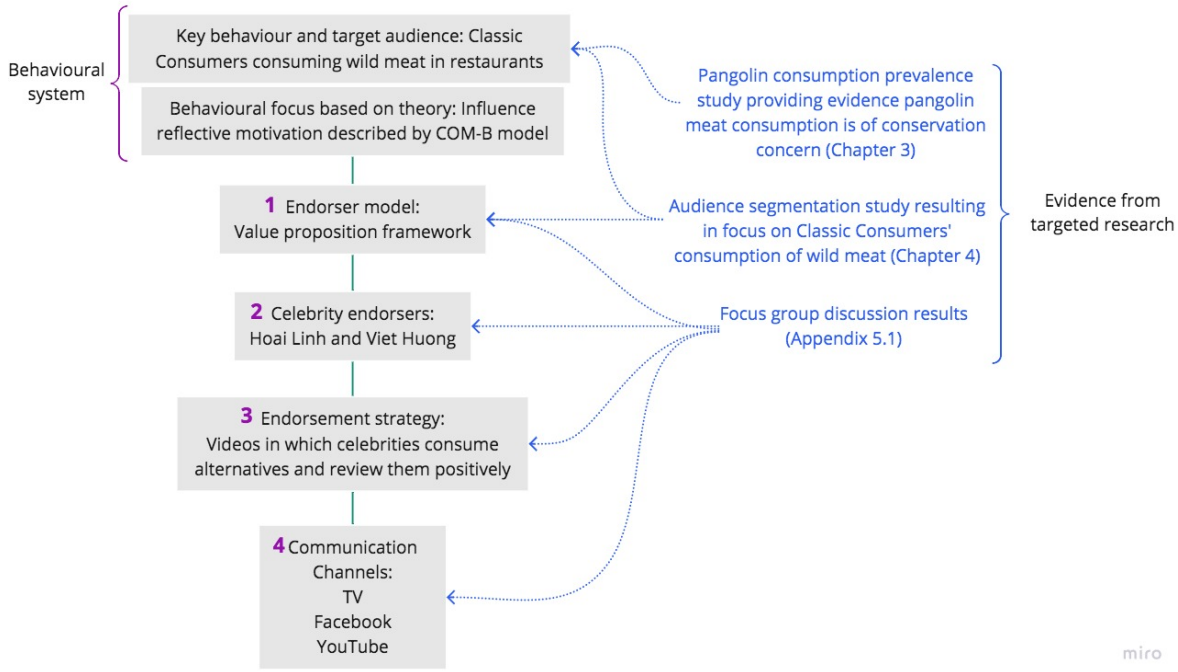


Figure 5.6 Decisions made following the first four steps of the guide (shown in grey) for a celebrity-endorsed wild meat reduction intervention supported by evidence from three studies (shown in blue).

The insights gained from the empirical research enabled me to develop two potential intervention concepts, which would address the consumption of wild meat in restaurants in HCMC (Table 5.2). The proposed interventions address wild meat consumption at the personal level, targeting the motivation factors described by the COM-B model (West & Michie 2020). By promoting alternative restaurants and dishes, I aim to target the reflective processes of ordering wild meat by highlighting the attractive attributes of

alternatives through celebrity endorsement. The only barrier detected in association with wild meat consumption was price; a high price was said to limit Classic Consumers' frequency of wild meat consumption. Concerns about wild meat being fake, knowledge that wild animals consumed might be raised on farms, awareness of illegality and wildlife declines due to overexploitation were not deterrents of consumption (Appendix 5.1). Therefore, these elements are not referenced in my proposed interventions.

Table 5.2 Proposed intervention concepts developed following the value proposition model (Schimmelpfennig & Hunt 2020) and FGDs results (Appendix 5.1). Following the provides best performance *proposition I identified the alternative dishes' attributes that must be made salient and the alternatives themselves. Following the* crafts a unique experience via endorser attributes *proposition I identified the celebrities, alternative dishes, and communication channels.*

	Alternative dish and attributes highlighted	**Celebrity**	**Communications Channel**
Proposed Intervention 1	Viet Huong chooses to eat a special dish from the Mekong Delta (Chau Doc fish and snail vermicelli), instead of wild meat in a restaurant that resembles the outdoors in this region (e.g., open, garden-style, casual). She gives her opinion on the dish highlighting its tastiness (different from ordinary), the specialty of the restaurant, the atmosphere and reasonable price	Viet Huong	Broadcasted live on her YouTube channel and shared on her Facebook page
Proposed Intervention 2	Hoai Linh chooses a southern-style grilled food restaurant instead of one serving wild meat. The restaurant is garden-style and casual and he selects it to 'change taste'. Hoai Linh eats one or two dishes and highlights its good and different taste from everyday food, its freshness, good pairing with alcohol, reasonable price, restaurant atmosphere and quick service	Hoai Linh	Broadcasted on television and disseminated through his Facebook page

Evidence indicates positively-framed messages, e.g. focusing on benefits of an alternative, are more likely to be effective than those that stigmatise a behaviour or attempt to instil a sense of shame or guilt by telling an audience not to do something, e.g. don't eat wild meat (Schultz 2011; Mols et al. 2014). Such negative messages might trigger reactance which could lead members of the target audience to defy the message (Mols et al. 2014). Therefore, both interventions suggested in Table 5.2 are framed in a positive way.

5.3.9 Step 5 and 6: Testing and implementation

The next step in the guide (Figure 5.1), is to test the proposed interventions with Classic Consumers. This is required to confirm that the advertisements resonate with the target audience and to ensure the alternatives are suitable for the various contexts in which wild meat is consumed (i.e., casually with friends and colleagues and to treat business partners and clients) (Brown et al. 2008).

In my case study, the next step would be to test the impact of the selected endorsers; particularly whether an endorsement by Hoai Linh would be considered 'too common' for the business context and whether Viet Huong's endorsement is likely to be effective considering that my qualitative study did not detect congruence with the target audience (Appendix 5.1). Additionally, testing will indicate whether promoting an alternative would be effective in decreasing wild meat consumption (i.e., the extent to which the short-term outcome would lead to the long-term outcome).

Testing the proposed intervention concepts allows for the development of a detailed Theory of Change that maps out how the endorsement strategy, message and celebrity endorser are expected to shift Classic Consumers' decisions regarding what type of food to eat (wild meat vs. alternative) in specific contexts. A Theory of Change also includes indicators to be measured at every step to allow for monitoring of the intervention and ensure that conditions for the desired behavioural change are being met (Center for Theory of Change 2021).

5.4 Conclusion

There is a recognised need for guidance on the implementation of celebrity endorsement in conservation interventions (Ho et al. 2020). Although various endorser selection models have been used in other fields to guide celebrity engagement, this practice remains limited in conservation (Chapter 2). Here I sought to incorporate behavioural theory and celebrity selection models and strategies to provide a decision-making guide for practitioners and researchers through the development of celebrity-endorsed interventions that aim to change behaviour. I highlight the importance of conducting targeted research to ensure decisions are evidence-based at every step of the guide, and I demonstrate how research results can be integrated through a case study.

Application of the guide would not have been possible without carrying out multiple studies specific to my case study in HCMC, prior to the celebrity testing itself. Conducting various stages of research is time consuming and requires funding and capacity for data collection and analysis. However, this research forms the foundation of effective design, implementation, and evaluation of behavioural interventions. Too often interventions

lack underpinning research, which means that their impact is both potentially limited and not easily quantified (Michie et al. 2011; Kidd et al. 2019).

While I have applied the guide to a behavioural change intervention to reduce the consumption of wildlife products, it is widely applicable within conservation. Even though celebrity endorsement has become popular in the context of wildlife trade and consumption, there are a number of other biodiversity and broader environmental problems which have seen an increase in celebrity endorsement, including climate change (Doyle et al. 2017). Using this decision guide would enable interveners to plan the use of celebrities strategically, thereby maximising the likelihood of influencing human behaviour and achieving conservation and environmental objectives. For example, the guide could be used to design interventions that promote the adoption of sustainable practices such as eating environmentally-friendly diets, opting for a waste-free lifestyle, improving energy and water use, among others. More broadly, application of the guide in environmental conservation and beyond, will contribute to knowledge generation on celebrity endorsement. This has been called for across a wide range of disciplines which draw on the theory and practice of behavioural science (Eren-Erdogmus et al. 2016; Knoll & Matthes 2017).

5.5 Supplementary Material

Appendix 5.1 Focus group discussions Methods and Results
Appendix 5.2 Behaviour change models considered for case study
Appendix 5.3 Focus group discussion guide
Appendix 5.4 Celebrity ranking
Appendix 5.5 Codebook used for thematic analysis

6 CHAPTER 6

Pre-test and proposed planning for a celebrity-endorsed behavioural intervention

6.1 Introduction

Behavioural interventions aiming to reduce consumption of illegally traded wildlife products have faced challenges and limitations in their design. Specifically, these interventions have lacked measurable objectives, Theories of Change, targeted research, evidence-based messaging, adequate indicators of success, and robust monitoring and evaluation (Olmedo et al. 2017; Greenfield & Veríssimo 2018). More broadly, interventions seeking to influence behaviour to achieve conservation objectives, including those using celebrity endorsement, have lacked appropriate project design (e.g., Hether 2018; Chapter 2). These limitations are problematic for conservation practice as they make it challenging to achieve conservation objectives and establish whether they have been met (Margoluis et al. 2009; Veríssimo & Wan 2018; Chapter 2).

Interventions in other fields often use Theories of Change (ToCs) to help them in planning and design. A ToC explores and identifies the short and long-term objectives needed to reach the desired outcomes and project impact and the pre-conditions required for each objective (Center for Theory of Change 2021). This process generates insights into the design features that are needed in a given intervention and helps identify assumptions being made regarding the casual links connecting one project element (e.g., outputs) to

another (e.g., outcomes), as well as those from the larger project context and environment (e.g., political will), thus improving project planning (Brittain et al. 2020; Cartwright et al. 2020; Rice et al. 2020). Mayne (2017) describes two types of ToC assumptions: rationale assumptions, which identify the underlying premises on which the intervention is founded; and causal link assumptions which are events or conditions needed for a causal link in a ToC to be realised; if these do not hold, the expected result of those links will not take place. At-risk assumptions are those that have not been evidence by research, represent potentially large gaps in the design of the intervention and threaten its implementation; these should be closely monitored and might require the design of projects to be adapted if they do not hold (Mayne 2017; Rice et al. 2020).

The use of ToCs has been limited in past conservation efforts, with practitioners' anecdotal evidence and past experience playing a much too important role in guiding project design (Salafsky et al. 2002; Margoluis et al. 2009; Baylis et al. 2016). Fortunately, the use of ToCs is gaining traction in conservation science and practice, particularly for projects that require changes in human actions (e.g., Biggs et al. 2016; Eshoo et al. 2018; van Eeden et al. 2021). ToCs have been promoted as tools to improve conservation interventions in this next decade (Rice et al. 2020). The need for ToCs has also been highlighted for behavioural interventions and celebrity-endorsed conservation projects as the rationale for using celebrities is often weak and evidence to show if and how their endorsement is expected to lead to the desired change is notably lacking (Aunger & Curtis 2016; Chapter 2).

A robustly designed ToC should include every significant intermediate pre-condition between the implementation and impact so that project implementers have a realistic notion of the steps needed to achieve the final result (Cartwright et al. 2020; Center for Theory of Change 2021). Having to consider all the pre-conditions necessary for each change to take place, and the assumptions that are at play, helps implementers define a realistic timeframe within which results can be expected (Margoluis et al. 2013). To develop a ToC for a given purpose, it is essential to have agreed on the aims and intended results of the intervention or project with all relevant stakeholders, particularly actors who will implement the project and those who may benefit from it (Cartwright et al. 2020; Rice et al. 2020). A robust design should present a plausible, practical and realistic intervention with a solid basis for monitoring and evaluation, that if implemented as designed, should achieve the intended outcomes (Mayne 2017; Koleros & Mayne 2019).

Developing a ToC also aids in the articulation of indicators to monitor implementation, assess whether the intervention is on track, and helps identify evaluation questions (Mayne 2017; Cartwright et al. 2020; Center for Theory of Change 2021). Measuring indicators throughout the project's life allows implementers to gauge progress more effectively by providing more detail on the pathways to impact (Margoluis et al. 2013; Cartwright et al. 2020). Indicators should measure results that clearly relate to the intervention's activities, goals and objectives (Stem et al. 2005). They should be SMART; specific (defining the population they will collect data on), measurable (indicating the target to be reached and a threshold for success), achievable and realistic, and time-bound (Center for Theory of Change 2021). Identifying indicators generates insights into the data that will be needed to measure them and to inform decisions regarding adaptive

management (Margoluis et al. 2013). For example, if indicators are not met it might be due to theory failure, where the logic from one project step (e.g., output) to another (e.g., outcome) was incorrect, or it could be due to a program failure, where the project was not executed as planned (Margoluis et al. 2013). If issues do arise, different adaptations of the project will be required depending on which of these issues needs addressing.

Social marketing theory contends that advertisement or other marketing communication ideas must be pre-tested as prototypes before being launched; this is done in commercial marketing to test new products and services where mock-ups are created and tried out in samples of target audience members (Smith & Strand 2009). This testing enables evaluation of the advertisement strategy before implementation, thereby ensuring the different elements of the advertisement or concept (i.e., messenger, message, channel used) will resonate with the target audience and are likely to achieve the desired outcome (Smith & Strand 2009).

To help fill the knowledge gap on the effectiveness of celebrity endorsement as a component of behavioural interventions to achieve wildlife product demand reduction, I pre-tested the effectiveness of selected celebrities in a case study focused on reducing consumption of wild meat in HCMC, Vietnam. There are eight key steps for planning and implementing celebrity-endorsed interventions (Figure 6.1; Chapter 2). I focused here on steps 1-4 as it was beyond the scope of this research project to deliver and evaluate a campaign.



Figure 6.1 Steps for the design and implementation of evidence-based celebrity-based interventions. Developed and applied for the scoping literature review in Chapter 2.

Research conducted for previous chapters helped me to identify a behaviour of interest, i.e., consumption of wild meat in HCMC, with particular reference to pangolin meat, and a target audience whose prevalence of, and agency towards, consumption, made it a priority group for a demand reduction intervention. The selected target audience was Classic Consumers who are middle-aged men who have completed basic education and earn an average income (Chapter 3; Chapter 4). Following the guide developed in Chapter 5 to aid in the design of celebrity-endorsed behavioural interventions, I generated two potential intervention concepts.

In this Chapter I sought to test the proposed intervention concepts to inform intervention design for my case study. To my knowledge, this is the first study that has tested a wild

meat demand reduction intervention concept in Vietnam; the insights should be useful for future behavioural interventions. To ground the suggested intervention design in evidence, I developed a ToC to map out the steps required to lead to a reduction in wild meat consumption in HCMC using a celebrity-endorsed intervention. I identify indicators to be measured if the intervention were to be implemented in HCMC and discuss the implications of pre-test results on the intervention, and finish by reflecting on the benefits of testing and developing a robust intervention plan.

6.2 Methods

6.2.1 Focus Group Discussions

The intervention concepts were pre-tested in a FGD with members of the target audience in May 2021. As the recommended number of participants for a FGD is six or eight (Newing et al. 2010), and I was only able to run one FGD, I did not consider this sample large enough to carry out pilot testing. Instead I sought to create a discussion of participants' views on the celebrity endorsements, the messages to be delivered, alternatives to the wild meat dishes presented, and communications channel used. Participants were selected based on whether they fitted the target audience profile and were recruited in public areas near known wild meat restaurants in HCMC in May 2021. The FGD comprised of six participants, was conducted in Vietnamese and moderated by a professional Vietnamese facilitator who fitted the target audience's profile, which was expected to make participants feel comfortable and enable open discussion. My local partner, Huong Dao, and I observed the discussion online (simultaneous English translation was provided). This research was approved by the University of Oxford's

Social Sciences and Humanities Interdivisional Research Ethics Committee (R59702/RE005).

Two potential interventions were presented to participants. Both included trustworthy celebrity endorsers who were congruent with the focal behaviour and the dishes promoted to the target audience, based on the results of surveys presented in Chapter 5. These were Viet Huong, a female Master of Ceremonies (MC) and comedian, and Hoai Linh, a male comedian (Chapter 5). The two concepts were developed following the value proposition framework. The propositions used were: *provides best performance* and *creates unique experience via endorser attributes*, which are grounded on the source-credibility model and match-up hypothesis (Schimmelpfennig & Hunt 2020; Chapter 5). Endorsers, alternatives, reasons to select alternatives and communication channels were all selected in accordance with these two propositions (Appendix 6.1).

The FGD script focussed on exploring the comprehensibility, appeal and relevance of the concepts proposed (Andreasen 2002; Smith & Strand 2009). The discussion aimed to gain insights into whether the alternative dishes were at least equally appealing as wild meat dishes and identify which proposition was most likely to be effective in changing the behaviour of my target audience in the main contexts in which wild meat is consumed; casually with friends and with business clients (Appendix 6.2). Additionally, I sought to test whether common pitfalls with celebrity advertisement would be avoided; e.g., mismatch between product endorsed and/or target audience and celebrity, celebrity presence overshadowing the message, feelings of mistrust towards the celebrity due to overexposure in the media or suspicion of their involvement, and reactance due to a

perceived loss of autonomy or agency after being exposed to a message from an untrusted source (Miciak & Shanklin 1994; Muda et al. 2012; Mols et al. 2014; de los Salmones & Dominguez 2016; Duthie et al. 2017). As project scope allowed for the execution of only one FGD, the results are summarised following a thematic analysis approach. I did not use a second reliability coder because the FGD was intended to serve as an example of testing a real-world intervention and not full-scale testing (Vaismoradi et al. 2016).

6.2.2 Theory of Change Development

The FGD results were used to inform a ToC for implementation of one of the interventions and for the purposes of this chapter, I assumed that the intervention and associated monitoring and evaluation would be implemented over a period of 12 months.

Following guidance from the conservation, behavioural and programme evaluation literature (i.e., Mayne 2017; Brittain et al. 2020; Cartwright et al. 2020; Rice et al. 2020), I first established the desired *Impact* of this wild meat demand reduction intervention, then defined the pre-conditions required for the *Impact*, as the *Long-term Outcome* and *Long-term Goal,* and the further pre-conditions for these to take place. Following the behavioural model selected for this case study, the COM-B model, I determined the *Reflective Motivation Change* that needs to occur to lead to the desired initial behaviour change or *Early Outcome* (Mayne 2017). I mapped the *Outputs* that are expected to lead to a change in behaviour and the *Activities* that should be carried out to deliver those *Outputs*.

I clarified the assumptions that were being made at each step of the ToC, considering those related to *Outputs, Goals, Outcomes* and *Impact*, and those from causal links and the wider environment in which the intervention would take place. I particularly sought to identify at-risk assumptions that have not been substantiated with prior research. Assumptions relating to the target audience's use of the communications channel and message resonance and/or reactance can be substantiated by previous research, and are therefore not at-risk assumptions. However, whether a celebrity would agree to endorse the intervention, and if they would remain engaged throughout implementation and avoid behaving in a way that undermines their endorsement efforts or intervention message in their personal or professional life, are both at-risk assumptions. This risk has been highlighted with regards to celebrity endorsement generally, even when a celebrity has agreed to endorse a product or brand (Tanaka et al. 2015; Ilicic et al. 2016). A further at-risk assumption is that the proposed alternative to consumption of wild meat will remain available and easily accessible to Classic Consumers in HCMC. If the opportunity to engage in the promoted behaviour is obstructed, the target audience will not be able to perform or sustain the new behaviour (Sridharan & Nakaima 2019).

6.2.3 Indicator Development

Intervention indicators were developed with *Outputs* (reach of the message), *Outcomes* (indications of behaviour change) and *Impact* in mind (Stem et al. 2005; Center for Theory of Change 2021).

In order to measure message reach, the communication channel selected, its own reach and usual performance (e.g., average number of views and engagement), should be

considered. For this case study, this would be the chosen celebrity's Facebook page and additional relevant social media (e.g., YouTube channel; Chapter 5). An intervention could aim to define a threshold reach based on similar numbers of views and engagement (shares, comments) to those usually attained by the celebrity's content, or implementers could invest in promoted content on Facebook to reach a higher number of people and specific demographics (e.g., Doughty et al. 2020). The quantification of reach should focus on the numbers that pertain to the target audience because this would confirm that the communications channel selected was effective.

Following this step, an intervention should measure recall of the target audience, which refers to the proportion of viewers that is able to recall the message correctly; this would confirm that the target audience was receptive to the message, that viewers were not distracted by the celebrity presence (e.g., Duthie et al. 2017), and that message exposure was not in vain (Doughty et al. 2021). Additionally, reported changes in *Outcome* indicators can be more directly attributed to intervention messages if those same individuals can recall the message communicated (e.g., Thomas et al. 2017). The recall level of an intervention message can be notably lower than the reach attained. In a similar case study of wildlife product consumption reduction in Singapore, while 479,258 individuals were reached on social media, only 11% of the target audience surveyed accurately recalled the message (N = 50 of target audience members out of a total sample of 2,116 individuals surveyed; (Doughty et al. 2021)). Hence, indicators of recall should be kept realistic.

Following *Output* indicators (reach and recall), the next indicator measures whether those who retained the message were triggered to perform the behaviour promoted (Mayne 2017). The initial response to the intervention can be recorded through behavioural intention, which does not refer to actual behaviour but rather whether someone has the intention to act. Behavioural intention is often measured as a proxy for actual behaviour in conservation interventions because it is easier to measure (e.g., via surveys). Research in commercial marketing on the effect of media exposure leading to purchases found roughly only 20% of individuals exposed to various advertisements demonstrated intentions to purchase (Abhishek et al. 2012). These intentions will not necessarily translate into behaviour; the behavioural literature has recorded a gap between intention and actual behaviour known as the intention-behaviour gap (Ajzen and Fishbein 2005). This exists for, but is not limited to, environmentally sustainable behaviours (Lede et al. 2019; Nguyen et al. 2019). Evidence from the behavioural field suggests a substantial proportion of individuals who report an intention will not perform the behaviour. For general behaviours, not related to food consumption or environmentally sustainable behaviours, it has been reported that on average only 45–60% of individuals will act accordingly to their stated intention (Ajzen and Fishbein 2005).

When setting an indicator for actual behaviour change, the drop-off from individuals who were reached, to those who recall the message, to those who report intention, to those who actually act, must be considered. There are also known challenges in achieving sustained behaviour change, thus, a drop-off in individuals who continue the new behaviour over time must also be considered if long-term behaviour change will be measured (Smith et al. 2008; Alcott & Rogers 2014). This has been highlighted as a

challenge in other fields, including public health, where even individuals who sign up to programmes to avoid facing illnesses as serious as heart attacks will not continue the promoted behaviour after a few weeks of intervention exposure (Kwasnicka et al. 2016; Sridharan & Nakaima 2019). I based my estimates of the likely drop-off of individuals who sustain a change in their behaviour on an example from the public health field, which indicates half of participants in exercise programs drop out in the first three to six months (Sullum et al. 2000). Therefore, I estimate 50% drop-off at every measurement of sustained behaviour over time.

To evaluate whether later steps in the ToC, such as the *Outcome,* have been achieved, implementers can triangulate indicator results with various sources of data. For example, self-reported use or consumption of a resource or product can be supported by data available on actual consumption of the resource/product (e.g., Walton & Hume 2011). If these data are not available, implementers can use Key Informant Interviews (KIIs) with important stakeholders (e.g., Walton & Hume 2011; Doughty et al. 2021). Finally, to evaluate the final *Impact,* for my case study, ideally an indicator would show that wildlife of concern no longer faces the threat of hunting for urban consumption as wild meat in HCMC. However, it was out of this project's scope to produce a baseline of species populations in the wild or to estimate the level of hunting pressure each faces specifically for consumption as food in urban centres. Therefore, for this proposed intervention it would not be possible to assess whether the hoped-for reduction of wild meat consumption in HCMC would lead to decreased hunting pressure or species recovery in Vietnam.

To estimate the number of individuals for which the proposed intervention could aim to change consumption behaviour, I roughly estimated the number of Classic Consumers in HCMC based on the representative sample of the city used in Chapter 3, which estimated the prevalence of consumption of pangolin meat, scales and wine. As demographic statistics available for HCMC do not provide data on key demographic characteristics of Classic Consumers (i.e., income, education level), I was not able to rely on this information to calculate the number of my target audience residing in HCMC (General Statistics Office 2019). Therefore, I identified the number of individuals who fitted the most prevalent criteria of Classic Consumers (age, gender, income and education level; Chapter 4) within my representative sample (N = 1,200) in Chapter 3. The total number of Classic Consumers was 55 individuals, which represents 4.5% of the total sample. I extrapolated to the current HCMC population of 8,837,544 people (World Population Review 2021), given that the sample was designed to be representative of the city. I therefore roughly estimated the total number of Classic Consumers in HCMC to be about 400,000.

6.3 Results

6.3.1 Pre-testing the endorsement concepts

The concepts tested with Classic Consumers consisted of proposed advertisements in which the celebrity (Hoai Linh in one concept and Viet Huong in the other) is looking for a restaurant to go to with friends, encounters a restaurant where wild meat is served, rejects this option and chooses one of the two alternatives instead – Hoai Linh selects barbequed food (BBQ) and Viet Huong selects Chau Doc, a specialty dish from the Mekong Delta region with vermicelli noodles, fish and snails. These concepts are based

on insights gained in Chapter 5 about what alternatives might substitute best for wild meat.

FGD results suggested that both concepts resonated with participants in that they were perceived as coherent, did not incite confusion or reactance, and were understood to be aimed at an audience similar to their profile: middle-aged men. There was no indication that the alternatives to wild meat consumption proposed by Viet Huong and Hoai Linh respectively did not match images associated with the celebrities, and both individuals were perceived positively. This suggests that the *provides best performance* and *creates unique experience via endorser attributes* propositions were effective in guiding the development of a concept that would be accepted by the target audience. However, although Hoai Linh was thought to be more popular than Viet Huong, he was reportedly involved in a recent scandal which meant FGD participants deemed him inappropriate for this intervention (Appendix 6.3; see this Appendix for full FGD results).

While the dishes endorsed appeared to be congruent with the celebrities and liked by Classic Consumers, they were not perceived to be appealing enough to replace the consumption of wild meat dishes. Specifically, the alternatives were not considered special enough, out of the ordinary, fancy, and the restaurants did not appear to offer the atmosphere desired for meals with business clients (Figure 6.2).



Figure 6.2 Visual summary of similarities and differences of the two alternatives proposed instead of wild meat in the FGD with Classic Consumers. The themes around each of the two alternatives (BBQ and Chau Doc) are their specific characteristics, while the blue circles at the bottom are consistent themes for both.

While some participants preferred BBQ, given that this alternative would offer a variety of dishes and the opportunity to enjoy the meal with friends and alcohol as a prolonged social activity, others considered BBQ restaurants to be very common in HCMC and thought the Mekong Delta specialty, Chau Doc, was preferable given it is a regional specialty and thus, more special. However, neither alternative was thought to be special or fancy enough to treat business clients. Participants stated that the restaurant serving wild meat which was rejected by the celebrities in both concepts, would offer special

dishes and private rooms which are desired for meals with business clients and would be chosen for this purpose (Appendix 6.3).

The contrast of a high price for wild meat and a reasonable price for the alternatives presented in both concepts did not capture participants' attention and was therefore not convincing either. Additionally, the celebrities' rejection of a restaurant that serves wild meat was not considered emotional and noticeable enough. As a result, the rejection of wild meat by Viet Huong and Hoai Linh was not picked up by participants. These results indicate that neither celebrity would be persuasive in this instance within the pre-tested concepts. The alternatives proposed would not effectively replace wild meat, the reasons for rejecting the wild meat restaurants were not convincing, and the celebrities' rejection of these restaurants was not noticeable (Appendix 6.3). Furthermore, participants were aware that only certain wild animals are protected and are illegal to serve and eat; a number of species such as deer and boar are known to be farmed commercially and therefore legal to consume. Suggestions were provided for alternative concepts that might be more effective in convincing other Classic Consumers not to consume wild meat (Table 6.1).

Table 6.1 The suggestions made by FGD participants for a more persuasive intervention concept to reduce consumption of wild meat in HCMC.

	Suggestion
Celebrity	Must be a man given that men are likely to fit the context better
Alternative	Special food, e.g., shrimp, prawn, steak, fish. Served in private rooms with expensive drinks, i.e., wine
Message	Celebrity encounters a wild meat restaurant, is shown the menu listing protected animals. Celebrity is shocked these are served and states their reputation would be threatened if they ever ate such dishes. Chooses the proposed alternative instead

Overall the FGD results indicate it would be necessary to identify another suitable, male celebrity for this particular intervention. Participants considered that Hoai Linh may have been an appropriate choice before his reported scandal, but not since.

6.3.2 Theory of Change

The FGD results suggest that for this intervention it would be necessary to identify and test a new celebrity, a new alternative, and a modified concept. Nonetheless, it is possible to develop a ToC to aid in the design and planning of an intervention that seeks to achieve a reduction in Classic Consumers' consumption of wild meat in restaurants in HCMC. Following the guidance on ToC development described in the Methods section, I created a ToC in which the final *Impact* is to decrease hunting pressure on wildlife of concern in Vietnam for consumption as wild meat in HCMC. I focus on wildlife of concern specifically because some animals served as wild meat in restaurants are legally supplied by commercial farms in Vietnam or their populations are not threatened by poaching (Chapter 4; Appendix 4.3). I then describe the proposed intervention *Outcome* and all the

pre-conditions, *Long-term Goals*, *Outputs* and *Activities* needed for the *Outcome* to be achieved (Figure 6.3), and the assumptions present (Table.6.2).

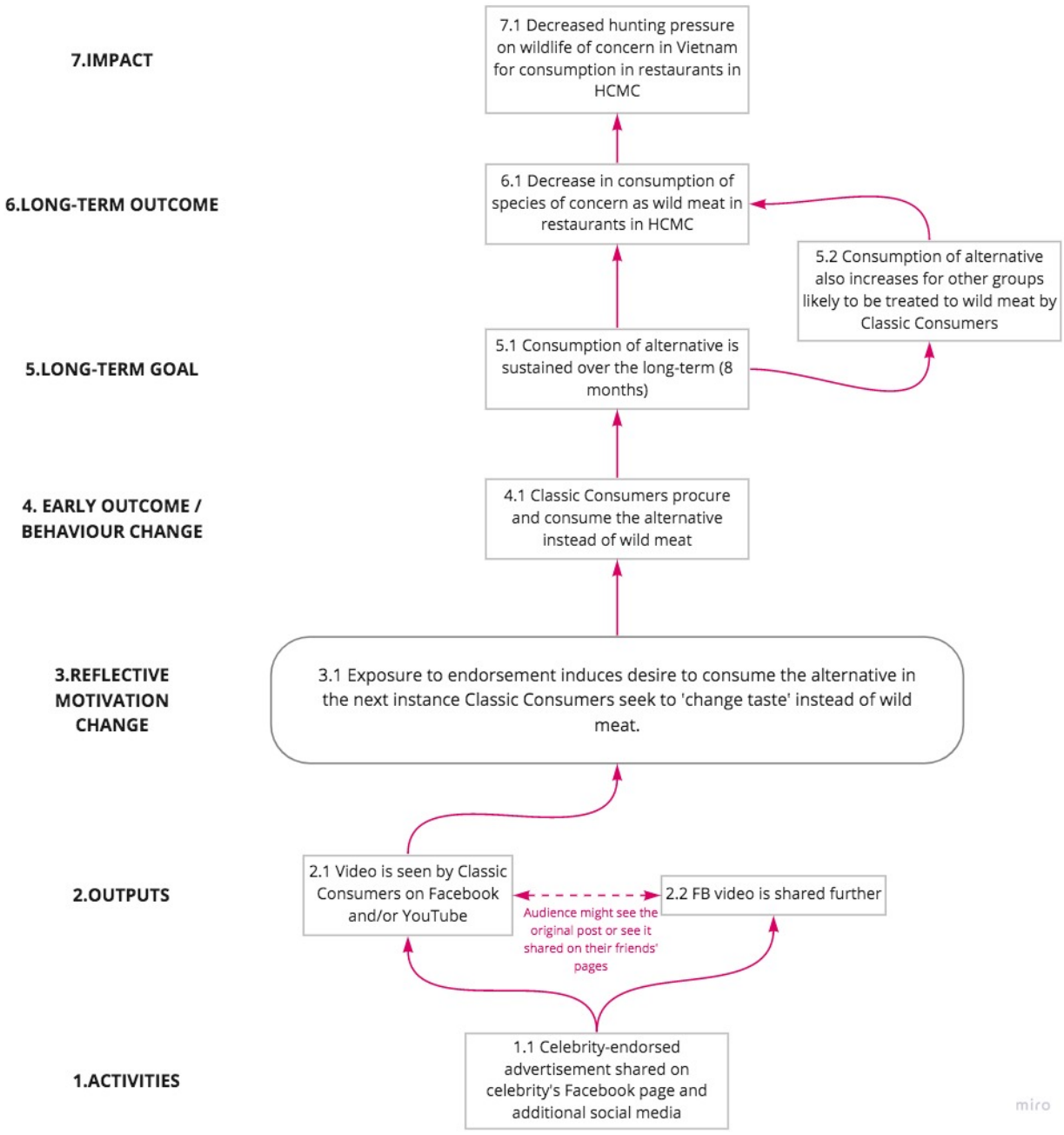


Figure 6.3 Theory of Change proposed for a celebrity-endorsed intervention to reduce Classic Consumers' wild meat consumption in restaurants in HCMC.

Table 6.2. Assumptions made in the causal links and stages of a Theory of Change for a proposed celebrity-endorsed intervention to reduce Classic Consumers' wild meat consumption in restaurants in HCMC. At-risk assumptions that have not been evidenced by research are underlined.

Theory of Change Stage	Assumptions
Pre-Intervention	1. Research conducted for this case study has identified a celebrity and an alternative that can realistically replace wild meat in the long-term for Classic Consumers 2. Celebrity is willing to participate in the intervention. Project team has access to their Facebook page analytics. Their endorsement is affordable
→Link between Activity 1.1 and Output 2.2	Celebrity's Facebook followers share the video further.
Output 2.1 and 2.2	Message is considered reliable
→Link between Outputs 2.1 and Reflective Motivation Change 3.1	1. Advertisement catches Classic Consumer's attention and interest 2. Classic Consumers are receptive 3. Message and/or endorsement does not incite reactance
→Link between Reflective Motivation Change 3.1 and Early Outcome 4.1	Classic Consumers' desire to consume alternative remains salient after exposure to message
Early Outcome 4.1	1. Alternative satisfies desire to 'change taste' and meets other expectations (quality, freshness, price, restaurant atmosphere, service) 2. Alternative displaces wild meat consumption at the individual level
→Link between Early Outcome 4.1 and Long-term Goal 5.1	Continued interest in alternative/desire to consume again
Long-term Goal 5.1	1. Alternative remains accessible and readily available 2. Alternative continuously satisfies Classic Consumers 3. Celebrity remains engaged in endorsement 4. Celebrity does not display unpopular or erratic behaviour that alienates target audience and/or creates negative associations with endorsement
Long-term Goal 5.2	Classic Consumers treat their younger relatives, friends, colleagues and business partners to the alternative as they would to a wild meat meal
→Link between Long-term Goal 5.1 and 5.2 and Long-term Outcome 6.1	1. Consumption of alternative displaces consumption of wild meat at the group level 2. Wild meat consumption does not extend to other contexts
→Link between Long-term Outcome 6.1 and Impact 7.1	Consumption as wild meat in restaurants is a main contributing threat to species of concern in Vietnam

6.3.3 Indicators of Success

Indicators required to demonstrate that an intervention designed with the proposed ToC (Figure 6.3) is on track are presented in Table 6.3. For the proposed intervention, a one-year implementation period is assumed in which I suggest two monitoring surveys and a final evaluation at project end (Figure 6.4).



Figure 6.4 Proposed timeline for an intervention to reduce consumption of wild meat in restaurants in HCMC. The intervention is implemented for 12 months, at which time the final evaluation would take place.

Based on an estimated population of Classic Consumers of 400,000 individuals, estimated indicators for *Outputs* (recall), *Reflection Motivation Change* (behavioural intention), *Behaviour Change* (consumption of alternative), *Long-term Goal* and *Long-term Outcome* (sustained consumption of alternative instead of wild meat) are presented using measures or proportions from other studies that show the drop-off of individuals in the pathway to behaviour change (Table 6.3). If the indicators articulated are met and all the ToC assumptions hold, a potentially realistic drop-off of Classic Consumers along the intervention implementation pathway indicates the intervention could change the consumption behaviour of around 1,000 target audience members (Figure 6.5).

Table 6.3 Proposed indicators for the implementation of an intervention to reduce Classic Consumers' consumption of wild meat in HCMC.

Indicators	Monitoring Stage	Measure
Output 2.1: Original post on celebrity's Facebook page reaches a number of views comparable to similar posts in the first 2 months after implementation	Monitoring Survey 1	Facebook metrics (i.e., number of views of) from celebrity's page show the original video has a comparable number of views
Output 2.2: Original post on celebrity's Facebook page and other social media (if applicable) is shared by their followers a comparable number of times to other posts within 2 months after implementation		Post shares from celebrity's page indicate a similar share rate to similar posts, based on engagement rate from their usual content
Outputs 2.1 and 2.2: Of the representative sample surveyed in Monitoring survey 1, at least 11% of respondents can recall the advertisement within 2 months after implementation		At least 11% of the representative sample of Classic Consumers surveyed can describe the advertisement content, the celebrity, their reaction to seeing protected animals served as wild meat and the alternative endorsed
Reflective Motivation Change 3.1: At least 20% of Classic Consumers surveyed in Monitoring survey 1 report future intention to consume the proposed alternative in the next 2 months.		Monitoring survey 1 results indicate Classic Consumers intend to consume the alternative in contexts relevant to wild meat consumption, eliciting differences between already-alternative-consumers and non-consumers. Frequency and prevalence of alternative consumption and last time of consumption are recorded to be used as baseline for future indicators
Early Outcome 4.1: At least 45% of respondents who stated future intention to consume alternative in Monitoring survey 1, have eaten the alternative in the same contexts than wild meat within 4 months of implementation	Monitoring Survey 2	Monitoring survey 2 results show 45% of Classic Consumers surveyed report consuming the proposed alternative. Frequency and last time of consumption are recorded.

Long-term Goal 5.1: At least 50% of Classic Consumers who consumed the alternative, have sustained consumption since		Half of Classic Consumers who state in Monitoring survey 2 that they have consumed the alternative in the last 4 months, also report consuming it at least as frequently as wild meat (compared to baseline from 2019 – Chapter 4), which should demonstrate an increase from Monitoring survey 1 baseline.
Long-term Goal 5.1: At least 25% of Classic Consumers who consumed the alternative within the first 4 months after implementation, have sustained their consumption in contexts relevant to wild meat over the last 8 months since implementation	Evaluation	Evaluation results indicate an increased consumption of the alternative over the last 8 months compared to baseline from Monitoring survey 1. This increased consumption should represent at least a quarter of those who reported consumption in Monitoring survey 2.
Long-term Outcome 6.1: At least a 0.25% decreased consumption among Classic Consumers of wild meat of concern in restaurants in HCMC		Evaluation results indicate a reduction in the frequency of consumption of wild meat among Classic Consumers, compared to 2019 baseline (Chapter 4). Triangulation with KII at restaurants also indicate a reduction in visits to the restaurants and/or a reduction in orders of species of concern
Impact 7.1: Wildlife of concern in Vietnam no longer faces the threat of hunting for consumption as wild meat		It was beyond this project's scope to produce a baseline of species populations in the wild and level of hunting pressure. Thus, this cannot be measured

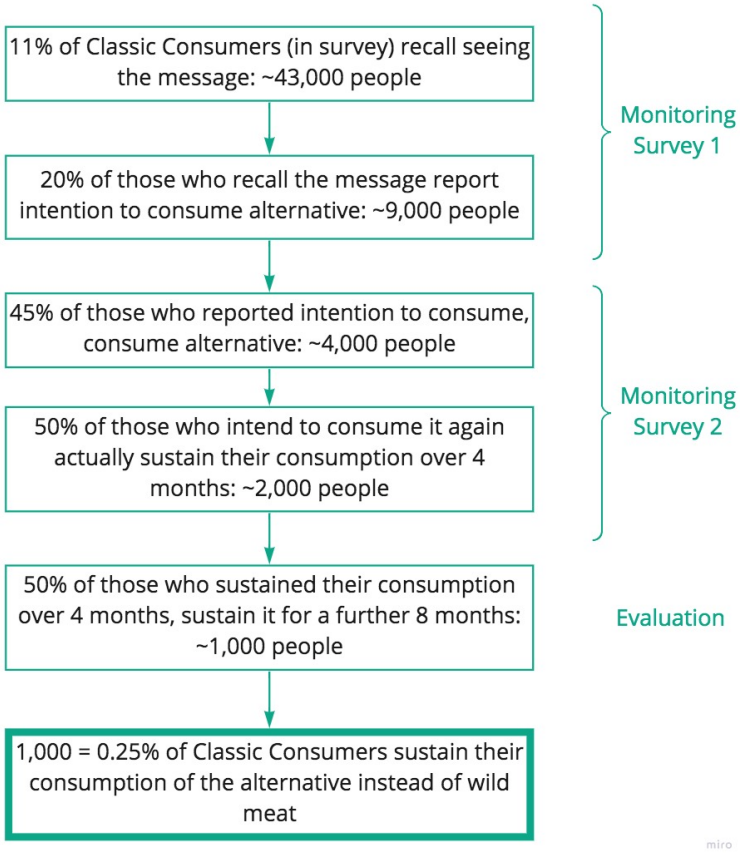


Figure 6.5 Proportions of Classic Consumers likely to drop-off along the implementation of an intervention to reduce consumption of wild meat in HCMC.

6.4 Discussion

The pre-testing of the celebrity endorsement concept outlined in Chapter 5 offered key insights into the design and implementation of a wild meat reduction intervention. If such an intervention were to be implemented in HCMC, the pre-testing results suggest that it should use a male celebrity without a recent scandal, who is congruent with a fancier alternative dish, and ensuring the celebrity's reaction to wild meat being served in a restaurant is stronger and more emotional. The celebrity, suggested message and channel should be tested again or piloted at scale with members of the target audience. It is also essential to determine the best time of the day or days of the week in which

Classic Consumers might be particularly receptive to food content messages, as results suggest this will impact whether they engage with the video advertised (Appendix 6.3). In addition, due to Classic Consumers' knowledge of the illegality of consuming certain species over others (which corroborates results from Chapter 5), a wild meat demand reduction intervention should focus on reducing consumption of species protected by Vietnamese law rather than wild meat generally. Research for this case study indicates there are at least two species groups of undeniable concern consumed in restaurants in HCMC: pangolins and the Annamite striped rabbit (*Nesolagus timminsi*) (Chapter 4). An intervention could focus on these species as protected animals which are illegal to sell and consume. Although a high price was found to be the only barrier to wild meat consumption in earlier research (Chapter 5), results presented here suggest paying a higher price for a fancier alternative, particularly in the context of eating with business clients, would be preferred over the original concept. This preference for expensive food has been noted in previous studies of wild meat consumption in Vietnam (e.g., Drury 2011; Shairp et al. 2016).

The pre-testing also reaffirms the results of the qualitative research conducted in Chapter 5, in which participants suggest interventions should focus on deterring wild meat consumption. While emotional deterrents using pictures of injured or dead wild animals, or the knowledge that wildlife is threatened, have not led to a change in behaviour in Vietnam (Vu & Nielsen 2018; Glenn et al. 2019; Chapter 5), other deterrents suggested by FGD participants were health concerns and legal penalties. There is currently no available evidence that suggests wild meat consumption has led to illness or disease risk in Vietnam; results from Chapter 5 even indicate participants were not aware of links

between the COVID-19 outbreak and wild meat consumption for example, despite other recent studies having found the opposite (WWF 2020). Findings from Chapter 5 suggest that penalties or a reduction in the availability of wild meat products could lead to consumption reduction. However so far, the legal repercussions of purchasing and/or consuming protected wild animals or limiting the availability of wild meat in Vietnam appear to have largely failed to change behaviour (Nguyen 2008; Drury 2009; Sandalj et al. 2016).

Despite the pre-testing not providing clear evidence on whether the tested celebrities would be persuasive or not, without this study it would not have been possible to know that the proposed alternatives are not likely to replace wild meat consumption and that the message was not convincing, even though the alternatives were based on previous discussions with members of the target audience. This emphasises the importance of multiple rounds of testing of intervention concepts and campaign elements with the target audience prior to implementation (Smith & Strand 2009). While this might be time-consuming and resources in conservation are usually limited, there is no substitute for evidence to support robust intervention design. If either proposed intervention concept tested in this Chapter were implemented without testing, the intervention would have failed and valuable resources would be wasted. Recent calls have been made within the conservation field to report on failed projects as incredibly useful lessons can be drawn from failures (Catalano et al. 2019). There are examples from the public health literature where studies of interventions that found no significant results have been published and made available (Firestone et al. 2017). Sharing and reporting such results can ensure approaches that have not worked are not implemented again to no avail. The pre-test of

concepts presented in this Chapter demonstrates that much can be learned from such attempts.

The dangers of working with celebrities have been outlined in the commercial marketing, development and conservation literatures (Bradshaw et al. 2007; Wheeler 2012; Anderson 2013; Tanaka et al. 2015). Although no intervention was implemented, this case study confirms the risks of enlisting celebrity endorsers given the reported scandal one of my two proposed celebrities became involved in. Two days before the FGD took place in May 2021, news stories broke in Vietnam regarding a recent scandal involving Hoai Linh. It was reported that he raised a substantial amount of money to aid people whose lives had been impacted by floods, but he failed to distribute the funds and remained silent about the matter until he was questioned about it by the press. The comedian blamed delays in distributing the funds due to the COVID-19 pandemic but it is still unclear where the funds are and if or when they will be delivered (Tuoi Tre 2021). Hoai Linh endorses multiple products and brands in Vietnam and his behaviour might jeopardise how trustworthy he is perceived to be, how much people relate to and like him, and therefore how much they trust the products, brands or ideas he endorses (Ford 2018). Examples of this are highlighted in the commercial marketing literature where celebrities who have been involved in personal scandals, such as Tiger Woods, have caused problems for the brands they endorse even resulting in market-value declines (Ilicic et al. 2018; Ford 2018).

Although the proposed intervention would need design changes, I developed and present a ToC that includes steps lacking in other celebrity-endorsed conservation interventions

(e.g., assumptions, indicators (Olmedo et al. 2017; Chapter 2)). This process demonstrates the benefits of utilising such tools because they can aid in thinking about potential risks and problems that may arise. While the proposed ToC has some at-risk assumptions, the majority of assumptions can be substantiated by the research carried out previously. Ideally, the chosen celebrity would be approached and engaged as part of the planning and design process. A limitation of this stage in my case study is that due to limited availability at the time of the research of my local project partner, Save Vietnam's Wildlife, I was not able to develop the ToC with the project team; however, final project *Impact*, intended *Outcomes* and *Activities* had been agreed upon at the start of the case study development in 2018.

Articulating indicators for the ToC objectives allows implementers to set realistic targets for demand reduction interventions. The final number of Classic Consumers who can be expected to change their behaviour within a year in this case study was about 1,000 people in a city of nearly 9 million inhabitants. As shown in other demand reduction studies for wildlife products, being able to detect those whose behaviour has changed in representative samples is extremely difficult (Doughty et al. 2021). To maximise the likelihood of encountering respondents who have changed their behaviour, monitoring surveys and evaluation can focus solely on members of the target audience. However, this approach will miss recording any collateral changes in other consumer groups; such trade-offs must be considered when designing evaluations. Even with a focus just on Classic Consumers, behavioural change by just 0.25% of a study population may well be impossible to detect with any realistic statistical power. Given that the impact of a single intervention will likely be small, there is a need to explore the potential of triggering a

larger cumulative impact by using several separate, but linked, interventions. This approach is referred to as promoting a complex contagion, in which a target audience receives the same message or complementary messages from various sources and multiple angles, thereby reinforcing the message and promoting more extensive and sustainable behavioural change (de Lange et al. 2019).

It is unlikely that a reduction in wild meat consumption in HCMC alone would achieve the desired *Impact* in the ToC, as wild animals shipped into Vietnam are also destined for other urban centres (e.g., Hanoi, Hue, Da Lat, Hai Phong) and consumed for other purposes including medicinal and for curios (Drury 2011; Sandalj et al. 2016; WWF 2017). While a reduction in consumption of wild meat in HCMC could have a substantial impact, particularly on species of concern such as pangolins and wild rabbits, the challenges of achieving a sustained behaviour change must be considered (Sridharan & Nakaima 2019). Nonetheless, efforts in other urban centres are required to curb consumption of species at risk, in order to achieve the desired change at the national level.

Behavioural interventions seeking to reduce consumption of wild meat or other wildlife products, must also be aware of confounding factors that could result in attribution challenges. For instance, other interventions implemented within a similar timeframe, national legislation, an economic recession, a significant decrease in wild animal supply could all increase the difficulty of attributing results to a specific intervention (Jeffreys 2016). Past demand reduction evaluations for illegally traded wildlife products in Vietnam and China have claimed success in changing an audience's consumption behaviour

without acknowledging that other events at the same time could have contributed to the detected changes (Jeffreys 2016; Olmedo et al. 2017).

If a future conservation project seeking to address consumption of wild meat in HCMC has the scope to limit the availability of species of concern in restaurants, or can support the implementation of penalties for those selling or buying/consuming these species, these activities could be added as a second pathway to the proposed ToC. The second pathway could map out activities and outputs relating specifically to law enforcement efforts and could then link to the proposed *Outcome* and *Impact* presented in this Chapter. Multiple-pathway ToCs, or actor-based ToCs, and have been used in other contexts to illustrate various pathways to reach the desired change (Koleros & Mayne 2019), and could be designed to address the consumption of other consumer groups identified in HCMC (Chapter 4). Multiple ToCs could also be designed at the local level in various urban centres where consumption of wild meat has been identified, with various pathways (i.e., demand reduction and law enforcement); while each could have its own activities, objectives and set of actors, they could all aim to contribute to the same final impact (Rice et al. 2020).

This project did not have the capacity to establish a baseline of wild species populations, overall poaching rate, and/or poaching rate specifically for consumption as wild meat in urban centres including HCMC. Failure to measure biological or environmental outcomes of behavioural interventions is a shortcoming of these types of projects and in conservation more broadly (Veríssimo et al. 2018). Environmental impacts ought to be measured over the long term, as changes in consumption in an urban centre would not

translate to an immediate increase of the size of wild animal populations. This timeframe may be well beyond a project timeline or funding cycle and it would therefore be impossible for implementers to demonstrate the desired environmental impacts were achieved within the project lifetime. Even though this research project did not have the scope to produce a baseline with which to compare any impacts of a decreased consumption of animals of concern as wild meat in HCMC, a decrease in hunting could be recorded through other avenues. These could include collaboration and data sharing with environmental police to get access to records of animal trafficking close to, or on routes leading to, HCMC, KIIs with communities living adjacent to protected areas and national parks in source areas, and KIIs with actors in the supply chains. Other difficulties relate to the trafficking of animals from other countries to satisfy demand in Vietnam, thus supply chains may be very hard to trace. Evidence shows that wild animals are trafficked to Vietnam from neighbouring countries (e.g., Cambodia, Laos PDR (Nash 1997; Gray et al. 2017)), as well as from other continents (e.g., from Africa (Heinrich et al. 2016)). Fortunately, new technologies (e.g., DNA testing) can aid researchers in determining routes from source to end-point to have a more feasibly-measured impact of interventions (Wasser et al. 2007). The wider application of these technologies could greatly aid the evaluation of efforts to tackle the illegal international wildlife trade.

In this Chapter, I have sought to demonstrate the pre-implementation steps a real-world celebrity-endorsed behavioural intervention ought to complete, using my wild meat consumption reduction case study in HCMC. Project resources only allowed for the execution of one FGD and ideally, more FGDs would have been conducted to gain a more robust understanding of Classic Consumers' reactions to and opinions on the celebrity

endorsement, the message, communication channels and alternatives promoted. The stages presented here follow various rounds of qualitative and quantitative research conducted in HCMC, without which this final stage would not have been possible. While the results do not offer a straightforward answer regarding the effectiveness of celebrity endorsement, I show how project design and social marketing tools can be applied to behavioural intervention development for wildlife products.

6.5 Supplementary Materials

Appendix 6.1 Concepts tested in FGD

Appendix 6.2 FGD guide

Appendix 6.3 FGD results

7 CHAPTER 7

Discussion

7.1 Addressing Thesis Objectives

In this thesis I sought to explore the role and effectiveness of celebrity endorsement in demand reduction campaigns for wildlife products traded illegally by addressing five objectives. My first objective was to produce a knowledge base on the use of celebrity endorsement in environmental conservation campaigns, including those that aimed to achieve a reduction in consumer demand for illegally traded wildlife products. This was accomplished in the scoping review conducted for my second Chapter. The review established that there currently is no evidence to support the premise that celebrity endorsement is effective in achieving conservation campaign objectives. I identified key gaps in the design and evaluation of celebrity-endorsed campaigns, which informed the selection of the literature that needed to be consulted in my later chapters to test celebrity effectiveness in a conservation intervention.

To fill these evidence gaps, I tested celebrity endorsement in a demand reduction case study in a major urban centre, HCMC. Existing trade research and previous consumption studies have identified Vietnam as a critical consumer market for various illegally traded wildlife products, including threatened native species (e.g., Annamite-Stripped Rabbit (Tilker et al. 2020)), those native to Asia (e.g., Asiatic bears, tigers (Davis et al. 2019a;

Davis et al. 2020a)), and species native to Africa (e.g., rhinos (Milliken & Shaw 2012)). Initially, this case study focused on the consumption of pangolin products because wild populations in Asia and Africa are threatened by overexploitation for illegal consumption and trafficking, which is mainly destined for Vietnam and China (Challender et al. 2020). Thus, I sought to build an understanding of the behavioural system of pangolin consumption in HCMC.

My third Chapter obtained evidence on the consumption of three pangolin products — meat, scales and wine— and provided insights into characteristics of consumers of these products, thus achieving my second objective. The implementation of a sensitive questioning technique, the Unmatched Count Technique, allowed me to establish that pangolin consumption is a sensitive behaviour, as this method elicited a higher prevalence of consumption for all three pangolin products than direct questions. While these prevalence estimates are likely to be more reliable than those from previous pangolin consumption studies conducted in Vietnam and elsewhere, which did not account for the sensitive nature of the behaviour, it unveiled challenges regarding direct discussion of pangolin consumption in the next stages of intervention design. To move forward, I focused my case study on wild meat consumption in HCMC more generally, because interventions to reduce consumption of wild meat would include pangolin meat.

Research conducted for my fourth Chapter, with HCMC residents who had consumed wild meat in the last year, confirmed that directly admitting to wild meat consumption is not sensitive, unlike pangolin meat. I used audience segmentation methods from marketing research to identify three different wild meat consumer groups and offered

insights into behavioural techniques to address demand for each group. This research provided evidence that consumers of wild meat are not as homogenous as previously described in the literature and should therefore not be targeted with blanket demand reduction strategies. This Chapter provided essential understanding of the case study's behavioural system, specifically concerning the target audience for any intervention, and thus fulfilled the first part of my third objective and informed the research design in the following Chapter.

In Chapter 5, I completed my third and fourth objectives. I presented additional qualitative research results that determined potential alternatives to wild meat consumption, assessed whether celebrities can be effective influencers in this system, and followed an evidence-based selection of potential celebrity endorsers. I proposed a guide for decision-making in celebrity-endorsed behavioural conservation interventions. This guide was informed by the gaps identified in past conservation campaigns endorsed by celebrities and by the project design, celebrity, behavioural and conservation literatures. I integrated results from my case study's behavioural system presented in Chapters 3 and 4 and my qualitative research findings into the guide and used it to develop potential intervention concepts to address wild meat consumption in HCMC.

My final research Chapter tested the intervention concepts proposed in Chapter 5. Although adaptation and additional testing of a final concept would be necessary for real-world implementation, I suggested an intervention design to reduce consumption of wild meat among the selected target audience, fulfilling my fifth and final thesis objective. The suggested intervention addresses the design challenges identified in celebrity-endorsed

campaigns in Chapter 2 and provides an example of a ToC and a monitoring and evaluation plan for such an intervention. The implementation of this intervention design would enable practitioners to determine whether celebrity endorsement is effective in influencing the target audience's wild meat consumption, which the design of past celebrity-endorsed conservation campaigns does not allow.

In the next sections I draw out some emergent themes from my thesis and discuss ways forward for behavioural interventions to address wildlife consumption of concern, particularly regarding celebrities.

7.2 The need for improved design of celebrity-endorsed conservation interventions

Celebrity-endorsed conservation interventions have generally lacked adequate project design which has impaired monitoring, evaluation, and potentially their likelihood of achieving conservation objectives (Chapter 2). Notably lacking are a rationale for using celebrity endorsement, theories of change that explain how endorsement is expected to help achieve desired outcomes, and research underpinning intervention design. The presumed power of celebrities in influencing audiences has been noted in the conservation literature (e.g., Turner 2016; Craig 2018), in international development (e.g., (Brockington 2014) and in commercial marketing (e.g., Bergkvist & Zhou 2016; Wang & Scheinbaum 2018). However, it is critical that initiatives are robustly designed so implementers can determine whether celebrity-endorsed efforts are actually effective. To develop an evidence-based pathway that illustrates how a celebrity intervention is

expected to influence a group of people, empirical audience research is crucial. Selecting a specific target audience and making decisions regarding intervention design based on that particular group is essential to increase the likelihood of success and enable evaluation (Veríssimo et al. 2020b). There may be a lot of variation in celebrity perceptions from one audience to the next, hence interventions that aim to target the general public with the same celebrity(ies) will most likely fail to get the message across effectively to some, or possibly across all, audience groups.

Current celebrity-endorsed conservation interventions are also lacking research guiding celebrity selection. Despite theoretical models guiding messenger selection in other fields (e.g., commercial marketing (Hovland & Weiss 1951; Friedman & Friedman 1979)), evidence-informed selection has not been applied in conservation initiatives. There are feasibility considerations, such as which celebrity it is possible and affordable to work with, which play an important role in campaign development, and messenger selection and implementation. Nonetheless, selection of an endorser cannot be made opportunistically or based on assumptions that any and every celebrity will generate the same reaction from various audiences, or even the expected reaction from one audience. As demonstrated in the qualitative research stages in Chapter 5 and 6, celebrity lifestyle, personality, gender, associated images, and public information, may all affect how famous individuals are perceived. Additionally, due to the nature of the messages communicated, level of knowledge on a certain topic, and other factors, celebrities might not be the most effective messengers or endorsers in some cases (e.g., Duthie et al. 2017). A robust intervention design should demonstrate why and how an endorser was selected and how this endorsement is likely to lead to the desired outcome. Conservation

organisations which are approached by a celebrity or have connections that enable them to access a celebrity should not just use that celebrity in their campaigns uncritically; given the time and effort involved in cultivating relationships and implementing campaigns, they should still consider whether the benefits of embarking on an intervention endorsed by that celebrity has a positive benefit-cost ratio. The approach outlined in this thesis to design and plan celebrity-endorsed intervention can also guide thinking in cases where an organisation has an existing relationship with a celebrity or is approached by one.

Related to the lack of ToC in celebrity-endorsed interventions, is the limited application of monitoring and evaluation. Evaluation efforts have prioritised measuring outputs, such as intervention reach, instead of outcomes and impact (e.g., Hether 2018). While celebrity involvement in a campaign might generate more media attention and publicity, exposure to a message does not indicate the recipients have undergone an attitudinal or behavioural change and thus exposure cannot be considered a measure of effectiveness (Anderson 2011; Doughty et al. 2021). Reach – the number of viewers of a message – indicates project progress and demonstrates implementation but should not be the sole metric of campaign success (Anderson 2013). Such evaluation measures have rendered it impossible to determine whether celebrity endorsement has been effective in conservation. Furthermore, currently-reported metrics have not allowed outcome attribution – assessment of whether celebrity presence in an intervention was the key catalyst of, or contributed to, the change recorded (e.g., Walton & Hume 2011; Shortis 2015). This attribution is a critical component of assessing celebrity effectiveness. Ideally, demonstrating effectiveness would indicate that the celebrity's role as a messenger

incited the desired change. This could be determined in an evaluation survey or through qualitative research at the end of a project inquiring which intervention elements were perceived as most credible, convincing, were most memorable, liked, inspiring, or similar (e.g., Doughty et al. 2021). Attribution of outcomes is a generally recognised challenge in campaign evaluation and will likely remain so in the future. Implementers should be aware of and acknowledge similar efforts or potential influences and changes in the environment (e.g., legislation, availability of products) that their target audience might have been exposed to during the same time period, as these confounding factors could impact results (e.g., Jeffreys 2016; Thomas-Walters et al. 2020).

Substantial improvements need to be made in the design of future celebrity-endorsed conservation interventions. As Brockington (2014, page 101) noted, 'the popular belief in the power of celebrity which motivates these interventions makes for a poor guide as to how to use it'. Robust design of future celebrity interventions will allow for the generation of knowledge on the use of celebrity endorsement and its effectiveness in the conservation field; this thesis contributes to that knowledge.

7.3 Challenges in the exploration of alternatives for wildlife products

In the proposed intervention concept for the case study presented in this thesis (Chapter 6), an alternative to wild meat is put forward to achieve a reduction in wild meat consumption. Two potential alternatives were tested with members from the target audience. Although the decision to select these options was grounded in empirical research, neither alternative was considered a suitable substitute for the consumption of

wild meat, particularly in the context of dining at restaurants with business clients (Chapter 6). The idea of promoting alternatives to wildlife products for conservation purposes is that the substitute is perceived as comparable to the original product and could therefore satisfy demand for that product (Nicholson and Snyder 2011). Within the context of illegally traded wildlife products, researchers suggest that redirecting demand to alternatives might be more successful in ultimately reducing demand for wildlife products, rather than attempting to eliminate the behaviour (Moorhouse et al. 2020). Reasons for this include centuries-old cultural beliefs and practices that may be driving motivations for consumption, social legitimacy supporting the behaviour, and consumers' needs and/or wants that still need to be satisfied (van Vliet et al. 2016; Moorhouse et al. 2020; Thomas-Walters et al. 2021) or a combination of these. Focusing on the benefits of an alternative instead of emphasising negative information about the sustainability or acceptability of using a wildlife product may also avoid unintended messaging consequences such as raising the profile of the wildlife product, making its use or consumption appear more salient than it is (Davis et al. 2020b).

7.3.1 Alternative experiences

While alternatives to wildlife products have been put forward to reduce the consumption of threatened species (e.g., Broad & Burgess 2016; Moorhouse et al. 2020), the case study in this thesis was different in that the alternative to wild meat was presented as part of an experience; eat a tasty dish in a restaurant with an enjoyable atmosphere and with the option of private dining. The different elements of this experience were drawn from research findings in Chapter 4. Thus, the concepts tested in Chapter 6 put forward the entire restaurant experience, of which the alternative to wild meat was an integral

part. To my knowledge existing promotion of alternatives to wildlife products has not considered the context in which a product is acquired, used and/or consumed, in order to present the alternative as an experience.

Alternatives have been proposed for illegally traded wildlife products to date including synthetic products created as substitutes for traditional medicine products like bear bile and rhino horn (Boatright et al. 2009; Chen 2017). Herbal alternatives to animal products used for medicinal purposes have also been recommended to curtail demand for bear bile (Kikuchi 2012); and alternatives made from non-threatened animal products, such as horse hair, have been put forward as substitutes for rhino horn (Mi et al. 2019). However, unexpected adverse consequences may arise from promoting synthetic or herbal alternatives. For example, it is possible that some consumers would still be willing to pay a premium price for the real, non-synthetic, product, therefore driving continued unsustainable demand (e.g., Dutton et al. 2011; Moorhouse et al. 2020). However, there are other factors including social acceptability, availability and illegality that may play a role in product preferences (Hinsley & 't Sas-Rolfes 2020). Additionally, it is important to consider unintended consequences for other species. For example, if herbal alternatives are promoted, increased harvesting could, at least in theory, lead to the overexploitation of plant species (Broad & Burgess 2016).

Thomas-Walters et al. (2021) describe five motivations for consuming wildlife products; experiential, social, functional, financial and spiritual. This list could be a useful guide to differentiate which products are more likely to be part of an experience which would substitute effectively for a wildlife product. For example, while results from Chapter 4

suggest consumption of wild meat in restaurants in HCMC has experiential or social motivations, products used for medicinal purposes, like pangolin scales, are described as satisfying a functional motivation (Thomas-Walters et al. 2021). Future research into wildlife product alternatives could explore whether alternatives used to satisfy each of these motivations might be more effective if presented as part of a wider experience and which experiences these might be. However, because various motivations drive consumption of a single wildlife product (e.g., sea horses (*Hippocampus* sp.) (Thomas Walters et al. 2020a); rhino horn (Vu & Nielsen 2018)), alternative products or experiences would have to be tested for each motivation. It was beyond the scope of my research to explore whether wild meat could be disentangled from the experience of going to a restaurant in different social contexts. There may also be other alternative experiences that could be promoted to satisfy some of the motivations for wild meat consumption, beyond restaurants, and further research could determine what these might be. However, none were elicited in my study that would be feasible in the cultural and social context HCMC wild meat consumers were operating in.

7.3.2 Alternative dishes

The alternative dishes I tested in Chapter 6 were a variety of grilled food (which would presumably include meat from domestic animals such as beef, pork, chicken, duck) and freshwater fish and snails. Both alternative dishes were promoted in open, out-door and casual restaurants which offered the option of private dining. These alternative experiences were selected based on the qualities of wild meat and restaurants appreciated by Classic Consumers; however, if such an intervention was to be implemented in HCMC, there ought to be further consideration of these alternative

dishes from an environmental sustainability perspective, so as not to cause indirect harm to other threatened species. Attempting to reduce consumption of meat from wild animals could very likely have trade-offs resulting in environmental, health and/or social consequences associated with the production of meat from domestic animals and sourcing of seafood. The rearing of domestic animals as sources of meat is currently one of the leading causes of deforestation, greenhouse emission, and unsustainable water use, particularly for the production of beef (de Vries & de Boer 2010). The production of poultry and pork also has substantial environmental impacts and there are concerns associated with zoonotic diseases, particularly in Southeast Asia (e.g., avian influenza (Fournie et al. 2013), swine flu (Trevennec et al. 2011)).

Seafood was brought up as an alternative to wild meat in both rounds of qualitative research (Chapter 5 and 6), but there are a number of issues with fishing practices and seafood consumption. Fishing is far from sustainable in many instances in Southeast Asia and in particular, Vietnam's seafood industry faces considerable sustainability challenges (Pomeroy et al. 2007; Marschke & Betcherman 2016; Pomeroy et al. 2016). Additionally, seafood consumption has been linked to disease risk in Vietnam as a result of environmental pollution (Nguyen et al. 2021) and fishing practices in the region have been associated with slave labour (Marschke & Vandergeest 2016). At the time of writing Chapter 5 and developing potential concepts for a wild meat demand reduction intervention, I considered seafood to have more potential for unintended negative consequences than meat from terrestrial domestic animals because of the sustainability issues, social and potential health consequences, in addition to drawbacks involved with aquaculture including impacts on surrounding water quality and eutrophication (Edwards

2015). However, neither domestic animals nor seafood are risk-free alternatives and both present environmental and ethical issues which might result in unintended feedbacks. These direct or indirect effects of reactions to an intervention can undermine conservation goals, such as potentially driving the unsustainable, unhealthy and socially undesirable sourcing of seafood in my case study. Understanding and planning for these unintended feedbacks is essential for the design and evaluation of conservation interventions (Larrosa et al. 2016).

Another possible alternative for wildlife products in Vietnam that deserves ethical and conservation consideration is products from commercially farmed wild animals (Damania & Bulte 2007; Dutton et al. 2011). Farming wildlife has been proposed as an alternative to demand reduction initiatives and enforcement efforts that seek to halt the trade in wildlife, because the provision of farmed wild animals is expected to satisfy users' demands without the need to exploit wild populations (Bulte & Damania 2005). Wildlife farming has met resistance from some conservationists as poor regulation of farms can cause severe impacts on the wild populations as a result of sourcing initial stock from the wild; this has been the case for Sika deer (*Cervus nippon pseudaxis*) (WCS 2008) and the Siamese crocodile (*Crocodylus siamensis*) (Murphy et al. 2004) in Vietnam. Ongoing laundering of wild animals has been observed (e.g., porcupines in Vietnam (Brooks et al. 2010)). Wildlife farming also has the potential to stimulate demand to a level where it cannot be satisfied by farmed specimens in the short term, potentially resulting in higher rates of exploitation from wild populations (Bulte & Damania 2005; Rizzolo 2021).

However, in some contexts where the farmed substitute is considered equal or better than the wild product by users/consumers, wildlife farming has been successful in contributing to the recovery of wild populations (e.g., caimans in Brazil used for the caiman skin trade (Nogueira & Nogueira-Filho 2011)). Whether a farmed substitute is considered comparable to the wild product by consumers in regard to the qualities and attributes valued in the wild product, and can therefore satisfy market demand, is a key criterion to assess when evaluating the possibility of farming wildlife as a conservation tool (Tensen 2016). If this criterion, among others, is not met, it is likely that a legal market would be created with the farmed substitute running parallel to the illegal market for the product sourced from the wild (Phelps et al. 2014). However, consumer preferences are not solely based on whether a wildlife product is farmed or sourced from the wild and these preferences cannot be assumed to be homogenous within a population and may vary for individuals over-time (Hinsley & 't Sas-Rolfes 2020).

The question of whether farmed wildlife products would be considered appealing by wild meat consumers in Vietnam remains unclear and difficult to predict. For pangolins in particular, Challender et al. (2019), explored the feasibility of farming and found that the evidence around perceptions of quality of farmed specimens compared to wild-caught pangolins was uncertain. Ultimately, this study concluded that pangolin farming would probably not displace wild-sourcing and thus would be unlikely to have a positive conservation impact. Evidence from previous studies conducted in Vietnam suggests that consumers prefer meat from wild animals as they are believed to taste better and be more potent or nutritious than their farmed counterparts (Drury 2011). Qualitative results from Chapter 5 indicate that wild meat consumers are aware that restaurants

serve meat from farmed wild animals, and that they are unconcerned that the meat is not sourced from the wild. However, it was beyond the scope of my research to investigate their preferences between farmed and wild animals and how these may vary depending on the species.

The lack of adequate monitoring and enforcement of farms in Vietnam (WCS 2008; Brooks et al. 2010) is another unmet criterion for wildlife farming to be an effective conservation tool, according to criteria developed by Phelps et al. (2014) and Tensen (2016). Without the personnel and financial resources, and commitment from government agencies in Vietnam, I do not believe it would be advisable to put forward farmed wildlife as an alternative for wild meat. It may appear to be the most adequate substitute as it is readily available, is already consumed, and to some extent could probably satisfy the cultural and social value of wild meat consumption. However, it is possible that if a wild option is consistently or occasionally available it would be preferred, therefore providing on-going incentives for poaching. Without proper monitoring of farms, the supply chain to restaurants, the restaurants themselves and regular assessments of animal populations in the wild, commercial farming could cause more harm to biodiversity. Additionally, the animal welfare aspect of wildlife farms must also be considered if putting this alternative forward (Gratwicke et al. 2008; Davis et al. 2016). Poor welfare of wild animals in commercial farms in Vietnam has been recorded in particular for Asiatic bears (Narayan et al. 2018). A recent study found that bears rescued from farms suffer from high levels of stress, from physiological and psychological trauma from being farmed for their bile, and it is possible their health and distorted behaviour

never recover (Narayan et al. 2018). For these reasons, I do not consider farmed wildlife to be an ethical or effective alternative to wild meat.

At the moment, I do not believe there is an ideal alternative dish to wild meat in HCMC, in the social restaurant contexts described in this thesis, or Vietnam generally. If proper monitoring and management of commercial wildlife farms were to be put in place, perhaps with a certification scheme to encourage consumers to opt for the farmed product, farmed wildlife might be the option that most closely satisfies consumers' needs and desires. Such certification practices are gaining some traction in Vietnam for aquaculture products, which could also be put forward as an alternative to wild meat in the future (Xuan 2021). It is possible that it is not worth aiming to eliminate demand for wild meat altogether but instead it would be more effective to focus conservation efforts on reducing demand of protected and threatened species and supporting initiatives that aim to supply wildlife products sustainably and ethically. The effectiveness of such efforts, and any others, ought to be tested, evaluated and audiences monitored to determine whether any substitute proposed (as part of an alternative experience or otherwise) could in fact replace consumption of wildlife species of conservation concern. The selection of substitutes should be explored and decided on a case-by-case basis as product users/consumers and purposes for use might vary greatly. The availability and accessibility of alternative products might also be very different from one context to the next, therefore, similar to demand reduction campaigns, blanket approaches are not advised and instead, evidence-based and tailored decisions should be made.

7.4 Challenges of measuring illegal behaviour

A recognised challenge in conducting research to address the consumption of illegally traded wildlife products is that illegality can render the use or consumption of a product socially undesirable, thus resulting in research subjects being unwilling to admit to performing the behaviour of interest (Tourangeau et al. 2000). As discussed in Chapter 3, there are other reasons besides illegality why discussing a behaviour may be sensitive (e.g., some topics might be considered inappropriate to discuss with strangers, or respondents might align their answers to what is socially desirable); these are likely to result in response bias which can lead to unreliable estimates of behaviour prevalence. Research into the consumption of illegal products is therefore increasingly being designed to mitigate social desirability bias (Nuno & John 2015; Davis et al. 2020c; Jones et al. 2021). However, there are a number of limitations with techniques that seek to achieve this.

Using one such method (UCT), in Chapter 3 I obtained evidence of pangolin consumption, but the large standard errors in the estimates meant that my results may not be that useful as a baseline for a final evaluation of the effectiveness of an intervention. If the confidence intervals of the baseline prevalence estimates overlap with those of the evaluation prevalence, the method will not distinguish a difference between the two, therefore making it impossible to determine whether there was a change in consumption post-intervention. Implementing UCT has other challenges, including being unable to distinguish an estimate from zero when there is very low behaviour prevalence (which links to the issue of large confidence intervals). The implementation of UCT in my third Chapter worked well with respondents but it took several weeks to select control items

of varying prevalence in HCMC. Even after multiple rounds of opportunistic testing of control items and two rounds of questionnaire piloting, if conducted again, different control items for pangolin wine ought to be chosen. At the time, this product was treated as a recreational beverage but its low prevalence of consumption and large standard error suggest that perhaps the control items with which pangolin wine was listed caused confusion or aroused suspicion amongst respondents. It is possible that different results would have been elicited if pangolin wine was presented with control items used as medicinal tonics (e.g., Ginseng wine). Additionally, while the trust in UCT regarding safeguarding respondents' answers appeared high, the method was understood by and implemented more easily with respondents in urban districts who were perceived as better educated by Research Assistants.

There are other techniques that can be used to mitigate response bias but these are subject to their own sets of limitations. For example, limitations with the Randomised Response Technique (RRT) include difficulties in implementation as respondents have to conduct randomisation themselves (Hubbard et al. 1989), can be time consuming, and similarly to UCT, might require several rounds of piloting (Ibbett et al. 2021). The ballot-box method is unsuitable in places with low literacy and amongst populations that have negative perceptions of elections (Bova et al. 2018; Arias et al. 2020); and the bean count method only allows a restricted number of questions to be asked (Jones et al. 2021). An initial understanding of the context in which the potentially-sensitive behaviour takes place, as well as testing in the study site with the population of interest, can help practitioners choose the most suitable method for their research. Guidelines for conservation practitioners and researchers have been developed for the implementation

of UCT (Hinsley et al. 2019; Olmedo et al. 2019), RRT (Ibbett et al. 2021) and the ballot-box method (Arias et al. 2020).

An ethnographic approach to investigating the illegal wildlife trade, particularly the corruption facilitating these illicit activities, has been used in recent years (e.g., van Uhm & Moreto 2018). Ethnographic research has its roots in the anthropological field, encompasses research conducted while embedded in the research context and/or with the research subjects (Atkinson 2001; Ryan 2017), and has potential for further application to tackle the illegal trade in wildlife. This research, however, presents challenges in producing a quantitative baseline and calculating the proportion of a study population that changed their preferences or actions post-intervention, thus complicating evaluation. Ethnographic research and other qualitative methods might be better suited to gaining further insights into use or acquisition of wildlife products, tracing supply chains, and identifying key actors and systems. Quantitative techniques are likely to be more useful in producing baselines for comparisons with evaluations. A higher certainty of any changes in consumption could be elicited by triangulating responses with other data (e.g., nominative technique (Davis et al. 2020c)), but further research is needed in this area.

7.5 Celebrity endorsement risks

Using celebrities is not a risk-free approach as their personal lives can negatively impact or overshadow their endorsements (Tanaka et al. 2015). An unexpected scandal arose around one of the celebrities selected for testing; Hoai Linh (Chapter 6). His reported

involvement in raising funds for flood relief efforts and failing to deliver the money raised, led to negative perceptions of the comedian and disappointment from his fans. This scandal took place nearly two years after the research stage in 2019, when Hoai Linh was ranked by respondents who had consumed wild meat in the previous year as the most trustworthy celebrity, the one with the best reputation, most admirable and most able to represent respondents and their peers (Appendix 5.4). In December of 2020 the first round of qualitative research was conducted in which Hoai Linh was the celebrity most positively described by Classic Consumers. Therefore, an intervention concept was developed around his attributes and congruence with a potential wild meat alternative and experience (Chapter 5). Two days before the concept was tested in May 2021, news of the scandal broke, raising questions about his trustworthiness, affecting his public perception and thus impacting this case study's concept.

Although Hoai Linh was never approached as part of this project, his actions provide a reminder of the risks a celebrity's personal life can inflict on a project. Scandals can easily lead to negative perceptions of a celebrity; this seems to be the case in Vietnam as other celebrities discussed with Classic Consumers (i.e., Truong Giang and Tran Thanh) were said to be involved in scandals and were negatively perceived as a result (Chapter 5). Negative information relating to celebrities has the risk of being associated with the brands or products they endorse (Agnihotri & Bhattacharya 2016), thereby rendering the endorsement counterproductive. Enlisting celebrities for their endorsement in an intervention introduces the risk of going through an entire research and design process, spending valuable time and resources into the development of a concept centred around the celebrity, only to have to go back to the drawing board and select a new endorser if

the first one engages in unacceptable behaviour or actions that go against the product or idea endorsed. There is also the possibility that a celebrity engages in erratic behaviour after an intervention has been launched, which would likely lead to more problems and the need for damage control. Even if a famous individual is fully committed to a campaign or a cause, the lack of control of their personal lives makes this risk hard to avoid.

A potential approach that could present fewer risks, due to lower levels of publicity about the celebrity's support for a cause, could be making use of celebrities' access to people and places. The research conducted for Chapter 2 uncovered examples of celebrity work where famous individuals were personally committed to pursuing conservation goals and were motivated to reach out to other celebrities and politicians to achieve these goals. Examples of celebrities making use of their access to elites include Jacques Cousteau reportedly achieving commitments from the French, Australian and United States governments to protect the Antarctic ecosystem (Shortis 2015) and James Cameron's involvement in increasing support for indigenous rights in light of a development project in the Amazon (Jampolsky 2012). These instances suggest that if a celebrity is personally interested in contributing to a cause, their involvement can be a powerful tool, as genuine commitment to the issue and motivation would be ensured. Additionally, the celebrity's fans or followers do not necessarily have to be the target audience from whom a change is desired. For example, the celebrity could make use of their network to reach and engage with other celebrities or to gain access to policy – and decision – makers with the aim of making changes at a higher level. This strategic use of famous individuals has been described before but its full potential perhaps has not yet been realised (Brockington 2014; Turner 2016; Ambroise & Albert 2019). Naturally, this

depends on the level of interest, motivation, availability and commitment of individual celebrities and this is likely a reason why these opportunities are scarce. However, this could be a way in which celebrities who approach organisations, or those who have an existing relationship with organisations, are engaged in conservation efforts, rather than in public-facing campaigns seeking to influence behaviour of multiple audiences. However, it is likely that opportunities for celebrities to engage with policy and decision makers are more limited in countries like China and Vietnam where censorship and control of the press and media are highly prevalent (Reporters Without Borders 2021). Nonetheless, practitioners might consider other ways in which celebrity engagement can operate to achieve conservation goals.

7.6 Setting realistic expectations for demand reduction interventions

Although demand reduction efforts based on behavioural theory and techniques have been deemed necessary in combatting the illegal wildlife trade (Veríssimo et al. 2020a; Nielsen et al. 2021), conservationists must be realistic about how much can be expected from these initiatives. Achieving a reduction in consumption is a very challenging process and can take a long time, particularly when the practices a project seeks to change are embedded in cultural traditions or beliefs (Moorhouse et al. 2020; Rizzolo 2020). Behavioural interventions in other fields, for example in public health, which typically receive more funding than conservation projects, sometimes report a very small or even a non-significant level of change (Firestone et al. 2017). A one-off demand reduction intervention – common for illegal wildlife trade – will realistically only achieve a change in a small proportion of people in the target audience, if at all, and implementers should not

expect more. It will likely take years and multiple interventions aimed at various levels (e.g., different consumer audiences, law enforcers, suppliers, etc.) to achieve a larger and sustained change (e.g., Salazar et al. 2018).

Underlining this point, the ToC and indicators presented in Chapter 6 show that even a robust intervention design, underpinned by in-depth research, cannot realistically aim to change the behaviour of a large group of people given the resources available to most conservation projects and the timeframe of typical interventions in conservation. My calculations suggested that realistically, only 0.25% of the total number of Classic Consumers in HCMC (around 1,000 individuals) might reduce their consumption of wild meat in restaurants within a year of implementation. Even evidence-based interventions with an impressive reach might still struggle to demonstrate the impact of a change in behaviour within the target population (e.g., Doughty et al. 2021). Practitioners and donors must be aware of this so unrealistic intervention goals do not set up demand reduction interventions for guaranteed failure. This can disincentivise the development of ToCs, measurement of realistic indicators of success, final project evaluation and ultimately, reporting of intervention results. Even if interventions do not achieve the level of change expected, it is crucial that results are reported and made available to others, in order to improve the knowledge base in the field (Catalano et al. 2019).

Limiting the supply of a wildlife product, or increasing the barriers to procurement, use and consumption can contribute to curtailing demand. Findings from my case study suggest that strict penalties on the consumption of wild meat could be a deterrent for this behaviour (Chapter 5). Target audience members were also aware that certain

species (e.g., rhinos) are illegal to use/consume while others (i.e., wild pig, deer) are farmed and legal to eat in restaurants. While no participants in the qualitative research stages spoke of their own consumption of illegal and protected species, such as pangolins, their awareness of its illegality does not guarantee they do not consume or have never consumed it. Therefore, it is necessary for wildlife protection legislation to be enacted, and importantly, for the risk of detection to be high, to introduce true deterrents for users/consumers (Leader-Williams & Milner-Gulland 1993). Limiting the availability of meat from wild animals offered at restaurants could be a key mechanism through which law enforcement impacts upon demand, as consumers felt it was the restaurant's responsibility to ensure the law was being adhered to, as opposed to consumers being responsible for ensuring the products that they were eating were legally acquired (Chapter 5). This provides evidence that local law enforcement has a place, and is required, in demand reduction for wildlife products in Vietnam. These efforts are often hindered in Vietnam by corruption at various levels of authority. TRAFFIC, the wildlife trade monitoring NGO, implements a twin-track approach to tackling demand reduction in which they both seek to reduce demand through interventions with consumers, while also lobbying governments to strengthen law enforcement efforts to restrict consumer choice (TRAFFIC 2016). Demand reduction interventions should be part of a wider landscape of conservation efforts, which may include the promotion of sustainably-sourced wildlife products, restricting the availability of illegal products, and introducing legal deterrents for those performing the illegal behaviour. Law enforcement efforts, such as those restricting availability of animals of conservation concern served as wild meat, or implementing financial penalties on restaurants and consumers who continue to serve/eat these animals, can work synergistically with the intervention plan proposed in

Chapter 6. As described, these efforts can be outlined as a different pathway in the proposed Theory of Change to achieve the desired impact.

7.7 Future research

There are various opportunities for future research focused on celebrity endorsement in the biodiversity conservation field. First, celebrity-endorsed interventions ought to be designed such that their impacts can be measured to determine effectiveness, contributing to field-wide knowledge; approaches to do this have been presented in this thesis. Second, other celebrity endorsement strategies, such as making use of their access to people and places or conducting public relations activities, as described by Ambroise and Albert (2019), should be implemented strategically and robustly (with a detailed ToC) so they can be monitored and evaluated to assess effectiveness in achieving objectives. Third, celebrity influence via social norms, which has been discussed in commercial marketing (Hanna et al. 2018), is another avenue in which celebrity endorsement can be used to achieve conservation objectives. Celebrities can contribute to shifts in social norms at the wider societal level or within a target audience when they fit a certain image or are associated with a specific identity. This enables them to activate in-group norms, thereby influencing people in that group, who subscribe to the same identity, to change their behaviour (Cascio et al. 2015; Lede et al. 2019). Naturally, this approach assumes there are social norms associated to a behaviour and that there is a salient group identity; the presence of both of these in any context should be evidenced by research.

Fourth, the conservation field, particularly efforts involving communication campaigns, including those endorsed by celebrities, could greatly benefit from further research into campaign attribution. Conservation practitioners can look to other fields to assess whether final outcomes or impacts can be attributed to specific campaigns (e.g., public health (Kincaid & Do 2006)). These methods could be applied to explore whether final results can be attributed to the celebrity presence, rather than the message or other campaign elements. Such research could make a substantial contribution to determining what types of campaigns are effective in varying contexts.

Lastly, social media has given rise to influencers who have not acquired fame in traditional ways; other fields (e.g., commercial marketing) have begun research in this arena to explore how influential these individuals can be (e.g., Sokolova & Kefi 2020). The role these influencers can play, or might already be playing, in raising awareness of conservation issues and/or promoting environmentally friendly behaviours, offers a range of opportunities for interventions to target multiple audiences. The selection of these influencers should follow messenger selection approaches based on audience research (e.g., Chapter 5) and be evaluated to determine the potential of this approach. The concept of 'celebrity' may continue to evolve with the development and changes in popularity of media channels and technology; these changes may bring more opportunities for conservation researchers and practitioners to find new messengers, platforms and approaches to achieve conservation objectives. However, the foundational need for proper design, monitoring and evaluation will remain regardless of the message, medium and messenger being deployed.

Likewise, there are a number of opportunities for future research into approaches to address consumption of illegally traded wildlife products. Promoting alternatives for wildlife products, as part of an experience or for the product by itself, ought to be tested in different contexts following a robust intervention design. The motivations driving use or consumption can be used as a guide to assess whether an alternative might be more successful if presented as an experience rather than by itself. It is possible that other experiences could be put forward as alternatives to wild meat consumption in restaurants in HCMC and generally in Vietnam, and thus, this warrants more exploration and testing. Additionally, further research into potential alternative dishes instead of wild meat could be conducted in Vietnam. Specifically, the unintended feedbacks of promoting various alternatives can be investigated to inform the selection of an alternative that is less likely to cause harm, or that would cause less harm than others.

Preferences for wild meat from wild specimens versus farmed specimens, and the associated attributes, could also be explored in-depth in HCMC and other urban centres in Vietnam, particularly for species considered rare or known to be illegal and protected (e.g., pangolins). This could be complemented by research into certified sustainably-sourced products (e.g., commercially farmed) and the interest in certification from audiences who currently consume wild meat. Naturally, any certification scheme would require strict control of the sourcing and supply chain. Thus, support for law enforcement and other local agencies will likely be needed and future research should consider the feasibility of what this entails.

Several methodological questions arose in this research regarding robust estimates of consumption prevalence of illegal products. Future research could explore how baselines can be compared to post-intervention evaluations when sensitive questioning techniques might produce large standard errors (e.g., Thomas-Walters et al. 2020). Investigations into how quantitative and qualitative data (e.g., ethnographic research) can be merged to get a full understanding of the behavioural system, are also needed. Other types of data, such as information collected by local environmental police, of from key informants such as restaurant staff or shop keepers (e.g., Doughty et al. 2021) could be identified in different contexts to triangulate baseline or evaluation findings. Additional challenges were identified when considering impact measurement of biodiversity targets; research into potential methods that could be applied to address this would also be useful to assess results of demand reduction interventions. Types of data that could be used include data obtained from forest guards, and local ecological knowledge of communities living near protected areas (e.g., Archer et al. 2020).

7.8 Conclusion

This thesis has filled knowledge and research gaps on the use of celebrity endorsement in campaigns that seek to reduce demand for illegally traded wildlife products. The lessons outlined throughout are applicable beyond interventions aiming to address consumption of wildlife products and beyond behavioural interventions in conservation. This research has made analytical contributions in its analysis of gaps in the literature regarding celebrity endorsement. Empirical contributions include providing more reliable evidence of active consumption of pangolin products in HCMC with the application of a sensitive

questioning technique that has not been used for pangolin consumption before; providing behavioural insights into the consumption of wild meat for various consumer groups using a target audience segmentation approach; and identifying potential alternatives to wild meat consumption and potentially influential celebrities for wild meat consumers. Novel conceptual contributions are the combination of behavioural models and celebrity influence models and the guide for practitioners and researchers to design celebrity-endorsed interventions robustly. I have shown in an applied case study how a celebrity-endorsed campaign should be designed to maximise its effectiveness in achieving conservation objectives and to assess whether celebrity endorsement can be an effective tool to influence human behaviour to achieve conservation goals more broadly. These contributions can help practitioners to avoid implementing interventions based on wishful thinking and spending limited resources on efforts that cannot be evaluated and/or that are not likely to bring us closer to conserving biodiversity.

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APPENDICES

APPENDIX 2.1

Databases used for scoping review searches

English	Spanish	French	Portuguese	Vietnamese	Chinese
Web of Science	Web of Science	Web of Science	Web of Science	Web of Science	Web of Science
Web of Science Database: Web of Science Core Collection (All years 1900-2019): Science Citation Index Expanded (SCI-EXPANDED) – 1900-present; Social Sciences Citation Index (SSCI) – 1900- present; Arts & Humanities Citation Index (A&HCI) –1975-present; Conference Proceedings Citation Index-Science (CPCI-S) –1900-present; Conference Proceedings Citation Index- Social Science & Humanities (CPCI-SSH) –1900-present; Book Citation Index-Science (BKCI-S) – 2005-present; Book Citation Index- Social Sciences & Humanities (BKCI-SSH) – 2005-present; Emerging Sources Citation Index (ESCI) –2015-present					
Scopus	Scopus	Scopus	Scopus	Scopus	Scopus
ProQuest	ProQuest	ProQuest	ProQuest	ProQuest	ProQuest
ProQuest Databases: American Periodicals; Annual Register: A Record of World Events; British Periodicals; FIAF International Index to Film Periodicals Database; Periodicals Archive online; Periodicals Index online; PRISMA Database; ProQuest dissertations & Theses: UK & Ireland; ProQuest dissertations & Theses global; Proquest Historical Newspapers: Chicago Defender; Proquest historical newspapers: the guardian and the observer; Proquest historical newspapers: The Irish times and the weekly Irish times; Proquest historical newspapers New York Amswerdam news; Proquest historical newspapers the New York times with index; PRoquest historical newspapers Pittsburgh courier; Proquest historical newspaper the scotsman; Proquest historical newspapers the times of India; Proquest historical newspapers the Washington post; Education collection; International bibliography of the social sciences; Politics collection; Social science database; Sociology collection; The vogue archive					
Open Grey	Open Grey	Open Grey	Open Grey	Open Grey	Open Grey
Google Scholar	Google Scholar	Google Scholar	Google Scholar	Google Scholar	Google Scholar
	Revista Española de Investigaciones Sicológicas – http://www.reis.cis.es/REIS/html/index.html			Tài nguyên số, Trường Đại học Kinh tế, Đại học Quốc gia Hà Nội - http://dl.ueb.edu.vn	Baidu Scholar - https://xueshu.baidu.com/
	Dialnet – https://dialnet.unirioja.es/			Thư viện Quốc gia Việt Nam - http://nlv.gov.vn/	Sogou Scholar - http://scholar.sogou.com/
				Thư viện Học liệu Mở Việt Nam - http://voer.edu.vn	CNKI – https://www.cnki.net/
				Tạp chí Khoa học Việt Nam Trực tuyến -	CQVIP – http://www.cqvip.com/

				http://www.vjol.info/index.php/index/index	
				Đại học Quốc gia Hà Nội, Trung tâm Thông tin - Thư viện - http://find.lic.vnu.edu.vn/primo_library/libweb/action/search.do	Wanfang Data – http://www.wanfangdata.com.cn/index.html

APPENDIX 2.2

Translated searches. To conduct the searches the text in the second column was combined with 'AND' and then with each of the phrases in the fourth column.

	ENGLISH		
1	(Celebrit* OR "Very Important Person" OR "famous individual*" OR superstar* OR "household name*" OR "famous pe*" OR ambassador* OR "famous face*" OR "famous name*" OR influencer$ OR "role model$")	AND	(environment* OR conservation)
2		AND	impact$ AND (environment* OR conservation)
3		AND	marketing AND (environment* OR conservation)
4		AND	(campaign$ OR advert*) AND (environment* OR conservation)
5		AND	(endorsement OR advoca* OR support*) AND (environment* OR conservation)
6		AND	(campaign$ OR advert*) AND (endorsement OR advoca* OR support*) AND (environment* OR conservation)
7		AND	(evaluat* OR effect*) AND (environment* OR conservation)
8		AND	(campaign$ OR advert*) AND (endorsement OR advoca* OR support*) AND (evaluat* OR effect*)
9		AND	(campaign$ OR advert*) AND (attitude OR behavio$r OR awareness)
10		AND	"behavio$r* intention"
11		AND	(environment* OR conservation) AND "social norm$"
12		AND	(environment* OR conservation) AND "behavio$r* change"

	FRENCH		
1	(Célébrité OR personnalité OR VIP OR "personne très importante" OR "gens connus" OR "personne connue" OR "individu connu" OR "personne célèbre" OR "gens célèbres" OR "individu célèbre" OR superstar OR vedette OR "nom connu" OR "nom très connu" OR "nom prestigieux" OR "nom reconnu" OR ambassadeur OR ambassadrice OR représentant OR "visage connu" OR "visage célèbre" OR "nom célèbre" OR "personne influente" OR "individu influent" OR modèle OR exemple)	AND	(environnement OR nature OR conservation OR protection OR préservation)
2		AND	impact AND (environnement OR nature OR conservation OR protection OR préservation)
3		AND	marketing AND (environnement OR nature OR conservation OR protection OR préservation)
4		AND	(campagne OR pub) AND (environnement OR nature OR conservation OR protection OR préservation)
5		AND	(endossement OR défenseur OR plaidoyer OR promotion OR défense OR soutenir OR appuyer OR soutien OR appui) AND (environnement OR nature OR conservation OR protection OR préservation)
6		AND	(campagne OR pub) AND (endossement OR défenseur OR plaidoyer OR promotion OR défense OR soutenir OR appuyer OR soutien OR appui) AND (environnement OR nature OR conservation OR protection OR préservation)
7		AND	(évalu OR bilan OR effet) AND (environnement OR nature OR conservation OR protection OR préservation)
8		AND	(campagne OR pub) AND (endossement OR défenseur OR plaidoyer OR promotion OR défense OR soutenir OR appuyer OR soutien OR appui) AND (évalu OR bilan OR effet)
9		AND	(campagne OR pub) AND (attitude OR comportement OR sensibilisation OR conscien OR notoriété)
10		AND	"intention comportementale"
11		AND	(environnement OR nature OR conservation OR protection OR préservation) AND "norme sociale"
12		AND	(environnement OR nature OR conservation OR protection OR préservation) AND ("changement de comportement" OR "modification du comportement" OR "modification des comportements")

	PORTUGUESE		
1	(Celebr* OR idolo OR VIP OR "pessoa muito importante" OR famos* OR personalidade OR mediatic* OR "pessoa conhecida" OR estrela OR vedeta OR "nome conhecido" OR "nome familiar" OR embaixa* OR "cara conhecida" OR exemplar* OR "bom exemplo" OR influenciador$)	AND	(ambient* OR natur* Or biodivers*)
2		AND	((ambient* OR natur* Or biodivers*) AND (conserv* OR prote* Or preserv*)))
3		AND	((ambient* OR natur* Or biodivers*) AND (impact* OR marketing Or campanha OR publicidad* OR anúnci* OR propaganda OR comercia*)))
4		AND	((ambient* OR natur* Or biodivers*) AND (apoi* OR endoss* OR defensor OR promotor OR porta-voz)))
5		AND	((ambient* OR natur* Or biodivers*) AND (promov* OR avalia* OR estima* OR efeito OR resultado)))
6		AND	((ambient* OR natur* Or biodivers*) AND (atitud* OR opinião OR "ponto de vista" OR comportament* OR conducta OR actuação)))
7		AND	((ambient* OR natur* Or biodivers*) AND (("intenç* comportamenta*" OR "norma* socia*") OR "regra* socia*")))
8		AND	((ambient* OR natur* Or biodivers*) AND ("mudança* de comportamento" OR "mudança* comportamenta*" OR "alteraç* de comportamento" OR consciênc* OR sensibiliz* OR reconhec* OR noç*)))

	SPANISH		
1	(Celebridad* OR exito* OR prestigio* OR estrella* OR famos* OR personaje* OR renombre OR artista* OR celebrit* OR personalidad*)	AND	(“medio ambiente” OR naturaleza)
2		AND	“(cuidado OR conservacion) del medio ambiente”
3		AND	Impacto$ AND (“medio ambiente” OR naturaleza)
4		AND	Marketing AND (“medio ambiente” OR naturaleza)
5		AND	(campaña$ OR propaganda$ OR "segmento comercial") AND ("medio ambiente" OR naturaleza)
6		AND	(endoso$ OR auspicio$ OR apoyo OR promocion*) AND ("medio ambiente" OR naturaleza)
7		AND	(campaña$ OR propaganda$ OR "segmento comercial") AND (endoso$ OR auspicio$ OR apoyo OR promocion*) AND ("medio ambiente" OR naturaleza)
8		AND	(evaluacion* OR efecto$ OR resultado$) AND ("medio ambiente" OR naturaleza)
9		AND	(campana$ OR propaganda$ OR "segmento comercial") AND (endoso$ OR auspicio$ OR apoyo OR promocion*) AND (evaluacion* OR efecto$ OR resultado$)
10		AND	(campana$ OR propaganda$ OR "segmento comercial") AND (comporamiento OR conducta OR percepcion OR conciencia)
11		AND	"intencion de comportamiento"
12		AND	("medio ambiente" OR naturaleza) AND "norma$ social*"
13		AND	("medio ambiente" OR naturaleza) AND ("cambio de conducta" OR "cambio de comportamiento")

	VIETNAMESE		
1	(Người nổi tiếng OR "Người có tầm ảnh hưởng" OR "nhân vật nổi tiếng" OR siêu sao OR "danh nhân" OR đại sứ OR "gương mặt nổi tiếng" OR “nhân vật tiêu biểu”)	AND	(môi trường OR bảo tồn)
2		AND	(ảnh hưởng) AND (môi trường OR bảo tồn)
3		AND	(truyền thông) AND (môi trường OR bảo tồn)
4		AND	(chiến dịch OR quảng cáo) AND (môi trường OR bảo tồn)
5		AND	(khuyến khích OR cổ động OR ủng hộ)
6		AND	(chiến dịch OR quảng cáo) AND (khuyến khích OR cổ động OR ủng hộ) AND (môi trường OR bảo tồn)
7		AND	(đánh giá OR ảnh hưởng)
8		AND	(chiến dịch OR quảng cáo) AND (khuyến khích OR cổ động OR ủng hộ) AND (đánh giá OR ảnh hưởng)
9		AND	(chiến dịch OR quảng cáo) AND (khuyến khích OR cổ động OR ủng hộ) AND (đánh giá OR ảnh hưởng)
10		AND	(“ý định hành vi”)
11		AND	(môi trường OR bảo tồn) AND (“chuẩn mực xã hội”)
12		AND	(môi trường OR bảo tồn) AND (“thay đổi hành vi”)

	CHINESE (Simplified)		**(Databases: Scanned top 100 results by Relevance due to a high amount of unrelated records)**
1	**Version A (Google Scholar, ProQuest, Web of Knowledge, Scopus):** (名人 OR 明星 OR 重要人物 OR "著名 人" OR "知名 人" OR "出名人" OR 巨星 OR 大使) **Version B (CQVIP –** *specified filter "M=" by Title and Keywords***):** (M=(名人 OR 明星 OR 重要人物 OR (著名 人) OR (知名 人) OR (出名 人) OR 巨星 OR 大使)) **Version C (CNKI):** ((名人) 或者 (明星) 或者 (重要人物) 或者 (著名 人) 或者 (知名 人) 或者 (出名 人) 或者 (巨星) 或者 (大使)) **Version D (Baidu Scholar, Sogou Scholar):** (名人|明星|重要人物|"著名 人"|"知名 人"|"出名 人"|巨星|大使)	AND 并且 & *	A: (环境 OR 生态 OR 保护 OR 环保) B: (M=(环境 OR 生态 OR 保护 OR 环保)) C: ((环境) 或者 (生态) 或者 (保护) 或者 (环保)) D: (环境|生态|保护|环保) E: (环境+生态+保护+环保)
2		AND 并且 & *	A: (动物 OR 野生动物保护) B: (M=(动物 OR 野生动物保护)) C: ((动物) 或者 (野生动物保护)) D: (动物|野生动物保护) E: (动物+野生动物保护)
3		AND 并且 & *	A: (影响 OR 效应 OR 结果 OR 成果) B: (M=(影响 OR 效应 OR 结果 OR 成果)) C: ((影响) 或者 (效应) 或者 (结果) 或者 (成果)) D: (影响|效应|结果|成果) E: (影响+效应+结果+成果)
4		AND 并且 & *	A: (影响 OR 效应 OR 结果 OR 成果) AND (环境 OR 生态 OR 保护 OR 环保) B: (M=(影响 OR 效应 OR 结果 OR 成果)) AND (M=(环境 OR 生态 OR 保护 OR 环保)) C: ((环境) 或者 (生态) 或者 (保护) 或者 (环保)) D: (影响|效应|结果|成果) & (环境|生态|保护|环保) E: (影响+效应+结果+成果) * (环境+生态+保护+环保)

5	**Version E (Wanfang Data):** (名人 + 明星 + 重要人物 + "著名人" + "知名 人" + "出名 人" + 巨星 + 大使)	AND 并且 & *	A: (影响 OR 效应 OR 结果 OR 成果) AND (动物 OR 野生动物保护) B: (M=(影响 OR 效应 OR 结果 OR 成果)) AND (M=(动物 OR 野生动物保护)) C: ((影响) 或者 (效应) 或者 (结果) 或者 (成果)) 并且 ((动物) 或者 (野生动物保护)) D: (影响|效应|结果|成果) & (动物|野生动物保护) E: (影响+效应+结果+成果) * (动物+野生动物保护)
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7		AND 并且 & *	A: (销) AND (动物 OR 野生动物保护) B: (M=(销)) AND (M=(动物 OR 野生动物保护)) C: (销) 并且 ((动物) 或者 (野生动物保护)) D: (销) & (动物|野生动物保护) E: (销) * (动物+野生动物保护)
8		AND 并且 & *	A: (活动 OR 行动 OR 宣传 OR 广告) AND (环境 OR 生态 OR 保护 OR 环保) B: (M=(活动 OR 行动 OR 宣传 OR 广告)) AND (M=(环境 OR 生态 OR 保护 OR 环保)) C: ((活动) 或者 (行动) 或者 (宣传) 或者 (广告)) 并且 ((环境) 或者 (生态) 或者 (保护) 或者 (环保)) D: (活动|行动|宣传|广告) & (环境|生态|保护|环保) E: (活动+行动+宣传+广告) * (环境+生态+保护+环保)
9		AND 并且 & *	A: (活动 OR 行动 OR 宣传 OR 广告) AND (动物 OR 野生动物保护) B: (M=(活动 OR 行动 OR 宣传 OR 广告)) AND (M=(动物 OR 野生动物保护)) C: ((活动) 或者 (行动) 或者 (宣传) 或者 (广告)) 并且 ((动物) 或者 (野生动物保护)) D: (活动|行动|宣传|广告) & (动物|野生动物保护) E: (活动+行动+宣传+广告) * (动物+野生动物保护)
10		AND 并且 & *	A: (代言 OR 宣传 OR 支持) B: (M=(代言 OR 宣传 OR 支持)) C: ((代言) 或者 (宣传) 或者 (支持)) D: (代言|宣传|支持) E: (代言+宣传+支持)

11		AND 并且 & *	A: (活动 OR 行动 OR 宣传 OR 广告) AND (代言 OR 宣传 OR 支持) AND (环境 OR 生态 OR 保护 OR 环保) B: (M=(活动 OR 行动 OR 宣传 OR 广告)) AND (M=(代言 OR 宣传 OR 支持)) AND (M=(环境 OR 生态 OR 保护 OR 环保)) C: ((活动) 或者 (行动) 或者 (宣传) 或者 (广告)) 并且 ((代言) 或者 (宣传) 或者 (支持)) 并且 ((环境) 或者 (生态) 或者 (保护) 或者 (环保)) D: (活动|行动|宣传|广告) & (代言|宣传|支持) & (环境|生态|保护|环保) E: (活动+行动+宣传+广告) * (代言+宣传+支持) * (环境+生态+保护+环保)
12		AND 并且 & *	A: (活动 OR 行动 OR 宣传 OR 广告) AND (代言 OR 宣传 OR 支持) AND (动物 OR 野生动物保护) B: (M=(活动 OR 行动 OR 宣传 OR 广告)) AND (M=(代言 OR 宣传 OR 支持)) AND (M=(动物 OR 野生动物保护)) C: ((活动) 或者 (行动) 或者 (宣传) 或者 (广告)) 并且 ((代言) 或者 (宣传) 或者 (支持)) 并且 ((动物) 或者 (野生动物保护)) D: (活动|行动|宣传|广告) & (代言|宣传|支持) & (动物|野生动物保护) E: (活动+行动+宣传+广告) * (代言+宣传+支持) * (动物+野生动物保护)
13		AND 并且 & *	A: (评 OR 效) B: (M=(评 OR 效)) C: ((评) 或者 (效)) D: (评|效) E: (评+效)
14		AND 并且 & *	A: (活动 OR 行动 OR 宣传 OR 广告) AND (代言 OR 宣传 OR 支持) AND (评 OR 效) B: (M=(活动 OR 行动 OR 宣传 OR 广告)) AND (M=(代言 OR 宣传 OR 支持)) AND (M=(评 OR 效)) C: ((活动) 或者 (行动) 或者 (宣传) 或者 (广告)) 并且 ((代言) 或者 (宣传) 或者 (支持)) 并且 ((评) 或者 (效)) D: (活动|行动|宣传|广告) & (代言|宣传|支持) & (评|效) E: (活动+行动+宣传+广告) * (代言+宣传+支持) * (评+效)
15		AND 并且 & *	A: (活动 OR 行动 OR 宣传 OR 广告) AND (态度 OR 行为 OR 意识 OR 认识 OR 了解) B: (M=(活动 OR 行动 OR 宣传 OR 广告)) AND (M=(态度 OR 行为 OR 意识 OR 认识 OR 了解)) C: ((活动) 或者 (行动) 或者 (宣传) 或者 (广告)) 并且 ((态度) 或者 (行为) 或者 (意识) 或者 (认识) 或者 (了解))

			D: (活动|行动|宣传|广告) & (态度|行为|意识|认识|了解) E: (活动+行动+宣传+广告) * (态度+行为+意识+认识+了解)
16		AND 并且 & *	A/D/E: ("行为 意图") B: (M=(行为 意图)) C: (行为 意图)
17		AND 并且 & *	A: (环境 OR 生态 OR 保护) AND (社会规范) B: (M=(环境 OR 生态 OR 保护)) AND (M=(社会规范)) C: ((环境) 或者 (生态) 或者 (保护)) 并且 (社会规范) D: (环境|生态|保护) & (社会规范) E: (环境+生态+保护) * (社会规范)
18		AND 并且 & *	A: (动物 OR 野生动物保护) AND (社会规范) B: (M=(动物 OR 野生动物保护)) AND (M=(社会规范)) C: ((动物) 或者 (野生动物保护)) 并且 (社会规范) D: (动物|野生动物保护) & (社会规范) E: (动物+野生动物保护) * (社会规范)
19		AND 并且 & *	A: (环境 OR 生态 OR 保护) AND ("行为 变") B: (M=(环境 OR 生态 OR 保护)) AND (M=("行为 变")) C: ((环境) 或者 (生态) 或者 (保护)) 并且 (行为 变) D: (环境|生态|保护) & ("行为 变") E: (环境+生态+保护) * ("行为 变")
20		AND 并且 & *	A: (动物 OR 野生动物保护) AND ("行为 变") B: (M=(动物 OR 野生动物保护)) AND (M=("行为 变")) C: ((动物) 或者 (野生动物保护)) 并且 (行为 变) D: (动物|野生动物保护) & ("行为 变") E: (动物+野生动物保护) * ("行为 变")

APPENDIX 2.3

SCOPING REVIEW PROTOCOL

Title of the Review: Examining the use and impact of celebrity endorsement in environmental conservation campaigns

First Reviewer: Alegría Olmedo

Supervisor: Dr. EJ Milner-Gulland

Project advisors: Dr. Dan Challender, Dr. Diogo Veríssimo

Team of Reviewers: Laure Cugnière, Huong Dao, Linh Bao Nguyen, Ana Nuno, Alegría Olmedo, Emelyne Potier, Martin Ribadeneira, Laura Thomas-Walters, Diogo Veríssimo, Anita Kar Yan Wan, Yifu Wang.

Experts and stakeholders: Feedback on the protocol will be requested from experts on celebrity research, and from key stakeholders who are involved in research, development and/or implementation of interventions that use celebrity endorsement. The following individuals will be consulted:

Dan Brockington – University of Sheffield

Andreas Eisingerich – Imperial College London

Terry Danuser – National Geographic

Naomi Doak – The Royal Foundation

Wander Meijer – GlobeScan

Christina Vallianos – WildAid

Jan Vertefeuille – WWF

Jennafer Bonello – WWF

1. Background to the project

The Oxford-Martin Programme on the Illegal Wildlife Trade at the University of Oxford is collaborating with Save Vietnam's Wildlife (SVW), Sun-Yat Sen University, Fauna and Flora International (FFI) and the Zoological Society of London (ZSL), to conduct a project that explores the use of celebrity endorsement in wildlife demand reduction, including a case study on the consumption of pangolin products in Vietnam. The project started in April 2018 and is being funded by National Geographic and the Oxford Martin School.

This project aims to provide an evidence base on the effective use of celebrities in illegal wildlife trade campaigns, both in general, and for a case study delivering messages to address the demand of pangolins and their derivatives in Vietnam (Case study 5). Celebrities are defined as: identifiable and well-known individuals among a specific audience whose activities are more prominent and agency is more amplified than the general public within the audience (this definition is partly based on the definition used by Boykoff & Goodman 2009). Pangolins have

been identified as the world's most trafficked wild mammal, and it is estimated over a million have been illegally traded since the year 2000 (Challender et al. 2014). The case study will conduct research to identify the demographic profiles and characteristics of pangolin product consumers and their motivations for consumption, testing celebrity messaging among members of the target audience, and designing, implementing and evaluating a celebrity-based campaign in Vietnam. Lessons learnt from the case study should be applicable to other demand reduction campaigns targeting the use of other species and more broadly, to other interventions that use celebrity endorsement to influence behaviour for the benefit of the environment and biodiversity.

Celebrity involvement has been increasingly used in environmental campaigns over the last two decades. Their presence in these campaigns ranges from endorsing non-governmental organization (NGO)'s messages to creating their own organisations and foundations (Doyle et al. 2017). Interventions focusing on the conservation and protection of wildlife and those that seek to change the awareness, attitude and behaviour of consumers of illegal wildlife products, are no exception (e.g. One Green Planet). However, there is limited evidence of the effectiveness of celebrity endorsement in campaigns that seek to change people's behaviour for the benefit of biodiversity and the environment.

Illegal wildlife trade is now considered to be one of the world's fourth most lucrative illegal international trade, as it falls just under drugs, arms and human trafficking in financial value terms (Walker et al. 2018). Sadly, it is decimating wildlife populations worldwide. Celebrity endorsement is widely used to catch the public's attention, raise awareness and influence behaviour to address the consumption of wildlife products in Asian countries (see examples from: China, Thailand, Vietnam, Cambodia, Myanmar and others). The use of celebrities in interventions that aim to address the consumption of illegal wildlife products has been assumed to have an impact on consumers' choices and/or the general public, despite limited evidence to support this premise.

2. Systematic Review

This review will create a knowledge base on the extent to which celebrity endorsement has been used in various campaigns, the extent to which its effectiveness has been evaluated, how it has been used in different cultures and geographies – particularly in Asia, and it will identify existing gaps in the assessment and evaluation of celebrity endorsement.

Similar reviews were searched for in PROSPERO, the Cochrane Library, The Campbell Collaboration Library, the Collaboration for Environmental Evidence Library, Web of Knowledge, ProQuest and Google Scholar and there were no reviews found on celebrity endorsement related to environmental or conservation topics.

2.1 Aim and Objectives

Aim:
Understand the use and impact of celebrity endorsement in environmental conservation campaigns.

Specific objectives:

- Document celebrity endorsement in environmental conservation campaigns, particularly the geographical scope of campaigns, audiences targeted, topics addressed, celebrities used, organisations/agencies responsible for the campaigns, objective of campaign and objective of celebrity-messaging.

- Determine the extent of evaluation of celebrity endorsement effectiveness.
- Assess the effectiveness of celebrity endorsement in environmental and conservation campaigns.

2.2 Search Strategy

Language: searches will be conducted in English, Spanish, French, Portuguese, Chinese (Simplified) and Vietnamese.

Strategy: a search of the following terms will be carried out in Google Scholar and the databases listed below to capture both peer-reviewed publications and grey literature on the subject.

Search terms – See Annex 1

Databases:
Web of Knowledge
Scopus
Open Grey
ProQuest
Google Scholar

2.3 Screening Strategy

Findings from the first ten pages of results in Google Scholar and all findings from the databases will be screened for inclusion in the review.

Assessment for inclusion in the review will be conducted by reading the title and abstract. Duplicates, which refers specifically to the same publication, will be recorded and excluded from the review.

The screening process will be carried out by nine reviewers each of which will screen the findings independently. If there is a disagreement on the inclusion of a finding, the reviewers will meet to discuss until consensus is reached. Disagreements and final selections will be recorded.
Inclusion criteria:

Types of studies:
The review aims to gain an understanding of the use of celebrity endorsement in campaigns, including looking at intervention design and evidence of effectiveness. As such, publications which contain information regarding one or more campaigns in the fields of interest will be included; for this set of publications, the unit the review will look at is 'campaigns.'
Publications that report on the evaluation of effectiveness of celebrity endorsement will also be included; this group of publications will be referred to as 'studies.' Studies will not be excluded based on their design since it is important to assess the current methods and measurements being applied, regardless of what they may be.

Types of participants:
Interventions included may focus on a specific target audience or on the general public in one or various countries. As the main focus of the review is the use of celebrity endorsement, this has been defined as:

Celebrity endorsement: active participation from a celebrity (defined in Background) in delivering campaign messages (see below).

Types of intervention:
Interventions of interest are environmental and conservation campaigns, these are defined as:

Campaign: organized delivery of messages scheduled over a given time period that seek to: raise awareness, incite a specific action or change a behaviour through determined communication channels.

Environmental campaigns: campaigns that focus on benefitting the natural environment, including: climate change (excluding natural disaster relief efforts), pollution and waste, eco-friendly lifestyle, and sustainable resource use (excluding the promotion of use and purchase of products, and campaigns that focus solely on health benefits).

Conservation campaigns: campaigns that aim to benefit the conservation of land and biodiversity, including: land and marine conservation and protection against a specific threat and biodiversity conservation and protection against a specific threat.

Types of outcomes:
Given that the first stage of the review will look at campaigns, publications or articles included might not speak of outcomes specifically; these will be included nonetheless.

Studies to be included can include various outcomes:

- Campaign reach – measured by number of people reached via offline communications and events and through online platforms and/or number of people whose participation was engaged both offline and online.
- Campaign results – amount of money raised, number of donations, pledges, signatures, commitments or any other immediate action the celebrity endorsement called upon (excluding sharing or liking a post online), as well as message and advertisement recall.
- Evidence of voluntary change in behaviour, perceived change in awareness, and attitudes obtained through any type of pre- and post- intervention survey or experiment which compared changes in the target audience with a control group.

2.4 Data extraction and analysis

All findings included will be reviewed in full-text.

The characteristics of each campaign described in the literature will be recorded. Information extracted will include:

- Campaign information: topic addressed, geographic location, target audience, messages communicated and communication channels.
- Campaign delivery: celebrity used, organisation or agency responsible, and campaign and celebrity-messaging objectives.

Data extracted from studies will include:

- Study information: who conducted the study, objective of evaluation, type of study, and population studied.
- Results: outcomes (as mentioned above) recorded from celebrity endorsement and evidence of effectiveness.

Data extracted from campaigns and studies will serve to identify any existing correlations among the different characteristics recorded.

In order to further analyse the program design features, these will be compared to a series of steps for a celebrity-based intervention outlined in Figure 1, which has been based on Olmedo et al. 2017. These steps will be used to assess how far along the process campaigns in the included literature have gone to achieve their objectives. Extraction of data described above will be used to determine if there are correlations among campaigns depending on how far along the theory of change they reached.

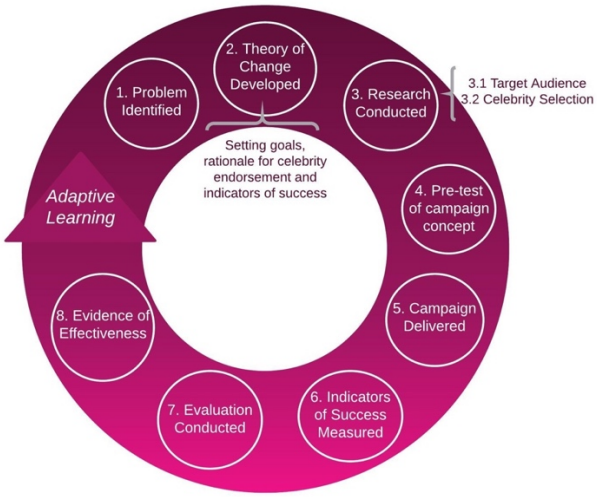


Figure 1. Steps for the design and implementation of a celebrity-based intervention. Adapted from Olmedo et al. (2017).

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Boykoff, M. T., Goodman, M. K. (2009). Conspicuous redemption? Reflections on the promises and perils of the 'Celebritization' of climate change. *Geoforum* 40. 395-406

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Olmedo, A., Sharif, V., Milner-Gulland, E.J. (2017) Evaluating the Design of Behaviour Change Interventions: A Case Study of Rhino Horn in Vietnam. *Conservation Letters.* 11: e12365.

Walker, N.; Garraway, A.; Gill, J. (2018). Anti-corruption strategy and the illegal wildlife trade. House of Commons Library. London, UK

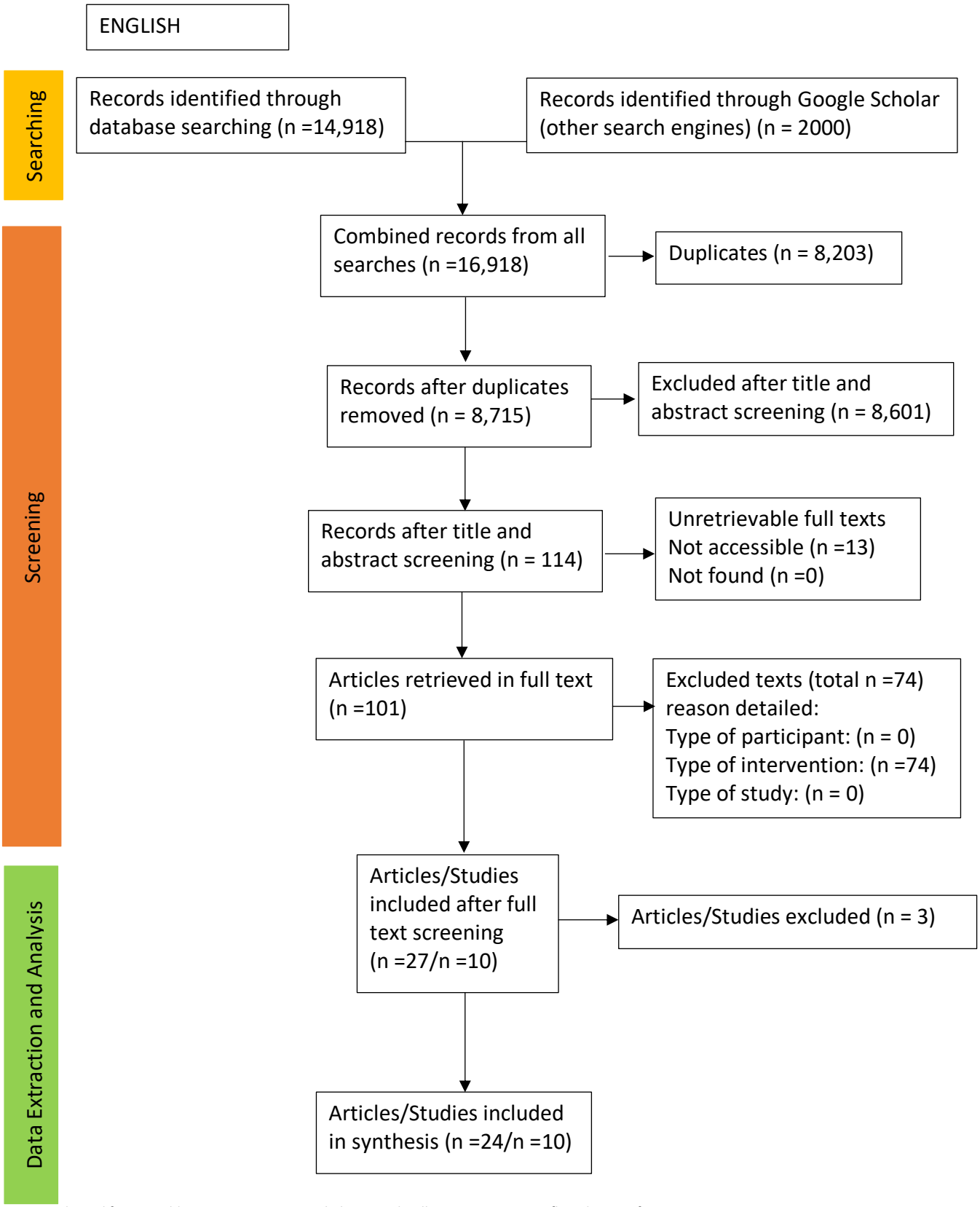
APPENDIX 2.4

Changes suggested by experts who provided feedback on review protocol

Original	Changes Suggested	Final
Review aim: examine the role celebrity endorsement has played in environmental conservation campaigns.	Narrow the 'role' of celebrities to look at impact specifically.	Review aim: understand the extent to which celebrity endorsement has been used in environmental conservation campaigns, the extent to which this endorsement has been evaluated and whether there is evidence for effectiveness. Also led to extract data on evaluation (how this had been conducted and outcome).
Review set out to explore celebrity campaigns only.	Consider comparing these with campaigns that have not used celebrities and the reported effectiveness.	Review focus was kept to analysing celebrity campaigns only given that the first gap found in the literature was the lack of a record of celebrity endorsement in environmental conservation campaigns and literature on the effectiveness. We sought to fill this particular gap.
Review focused on celebrity endorsement of campaigns.	Consider expanding into celebrity appearance, actions, lifestyles, etc. rather than active endorsement of campaigns.	Authors considered passive celebrity actions are considerably different from active endorsement. The review also sought to provide guidance for practitioners using/planning to use celebrity endorsement. This would only be achieved by analysing active endorsement. Including passive celebrity action could be a review in itself.
Language used in original protocol suggested it was assumed celebrity endorsement is effective.	Edit language so it does not imply celebrity endorsement does work and rather raise the question whether it should be used at all.	Language was edited to avoid suggesting celebrity endorsement is indeed effective.

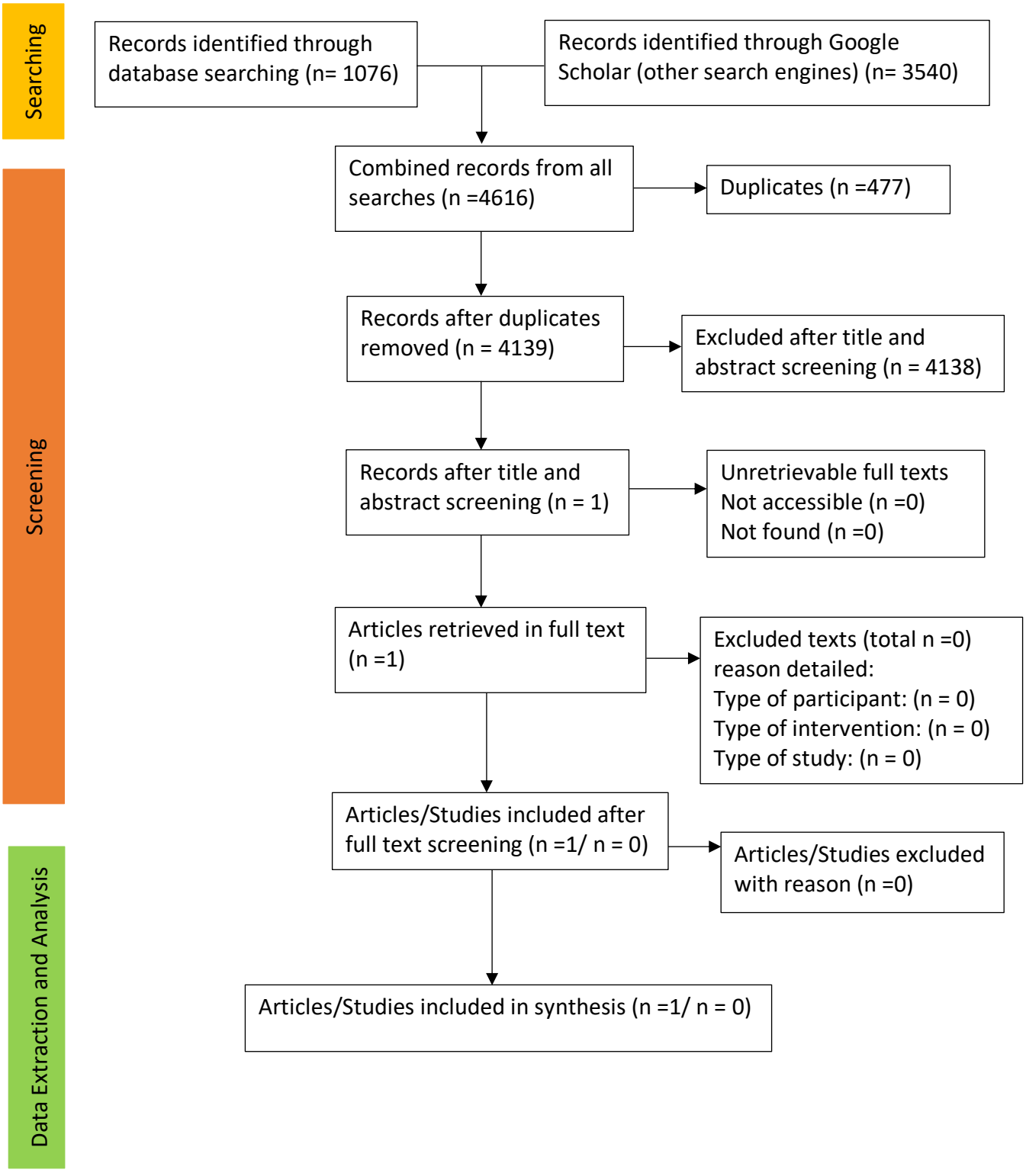
APPENDIX 2.5

Flow Diagrams



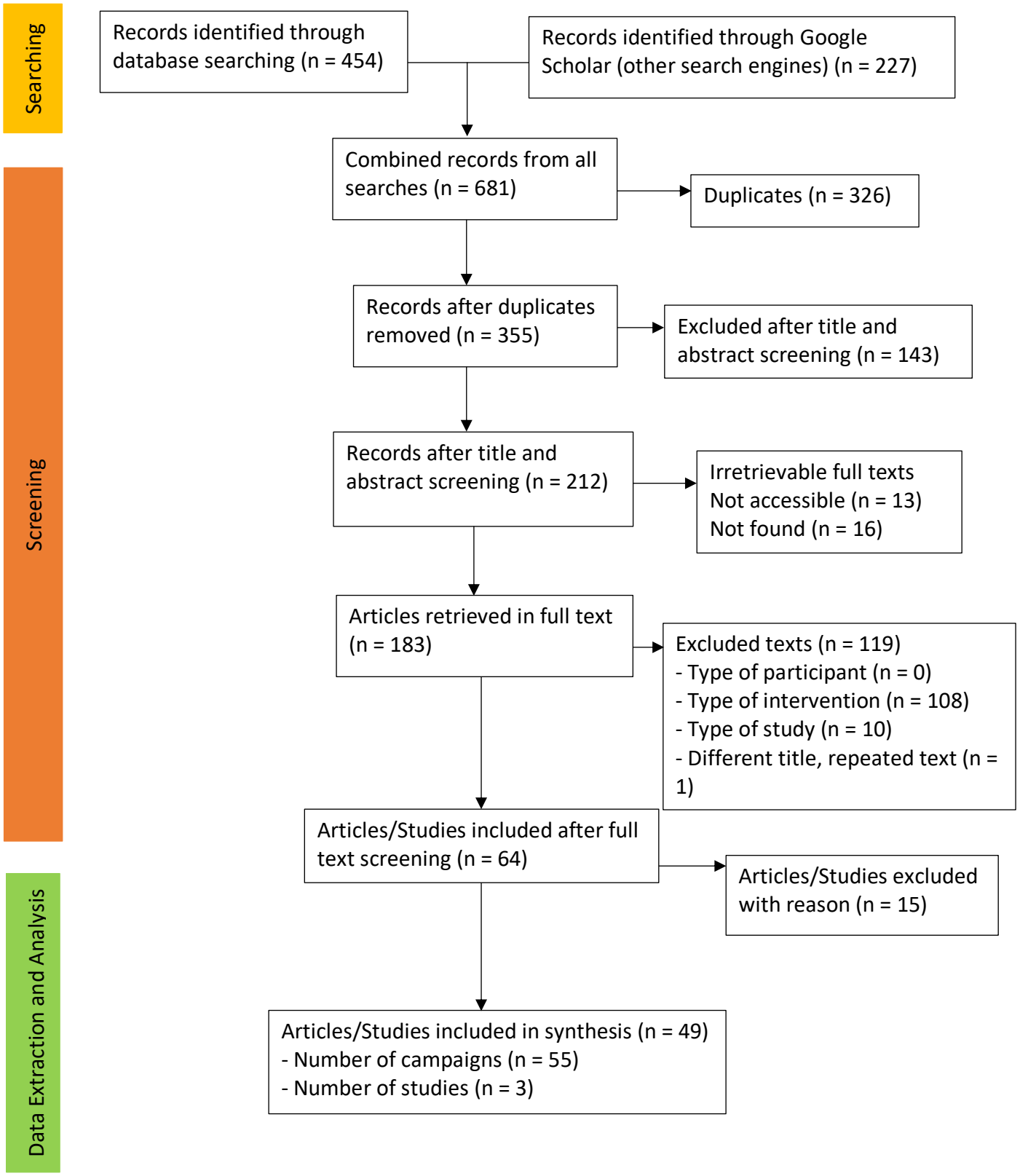
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PORTUGUESE



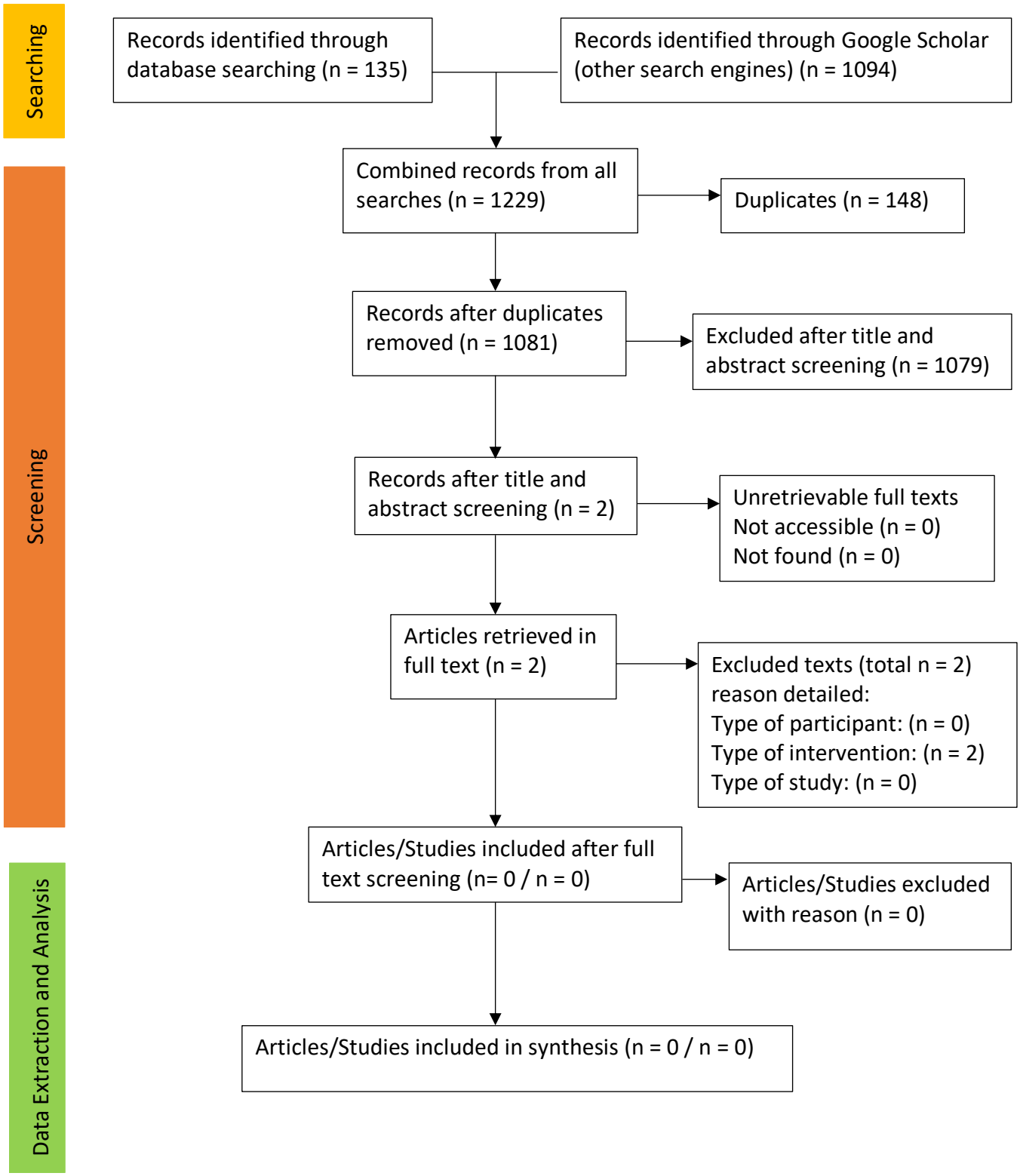
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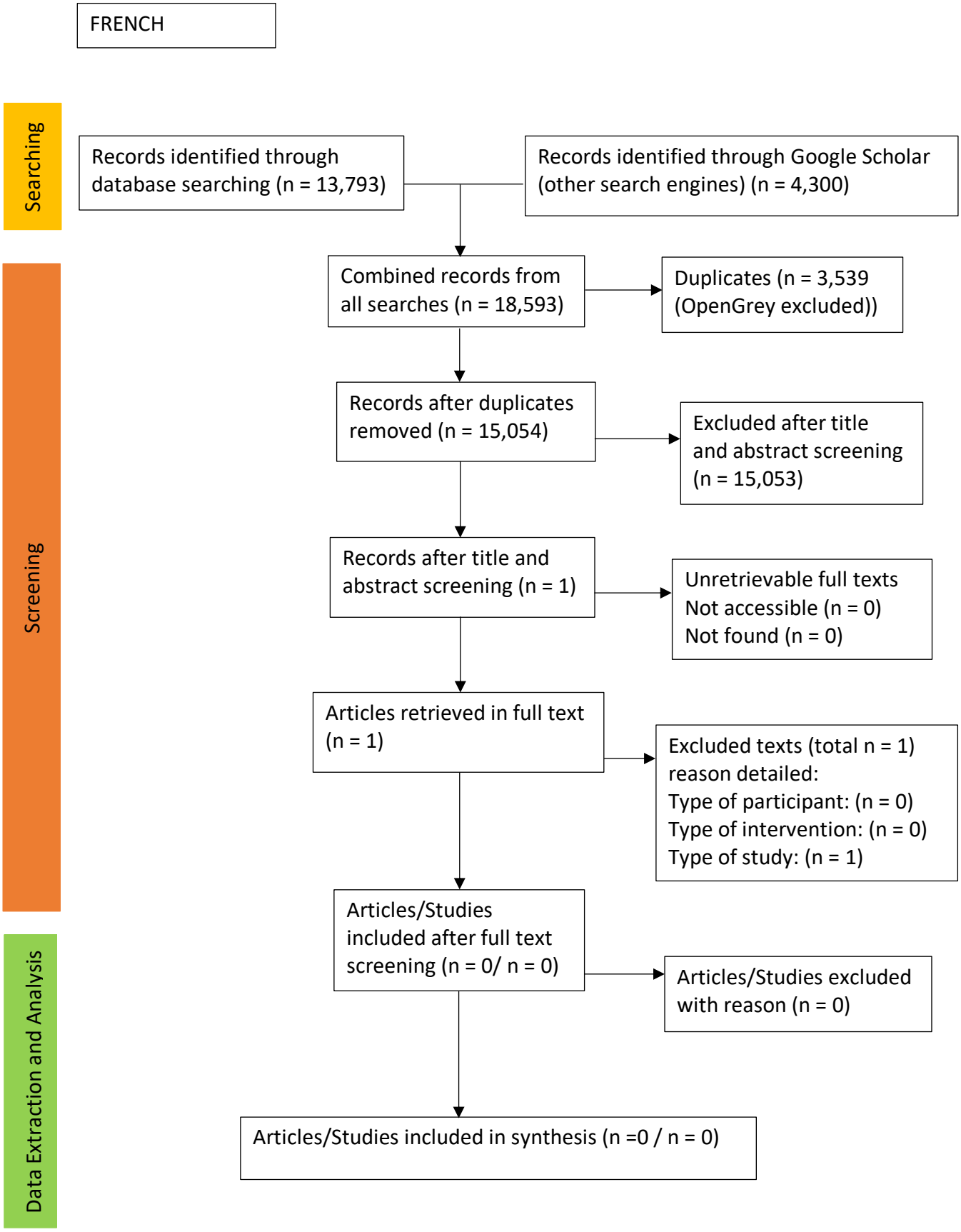


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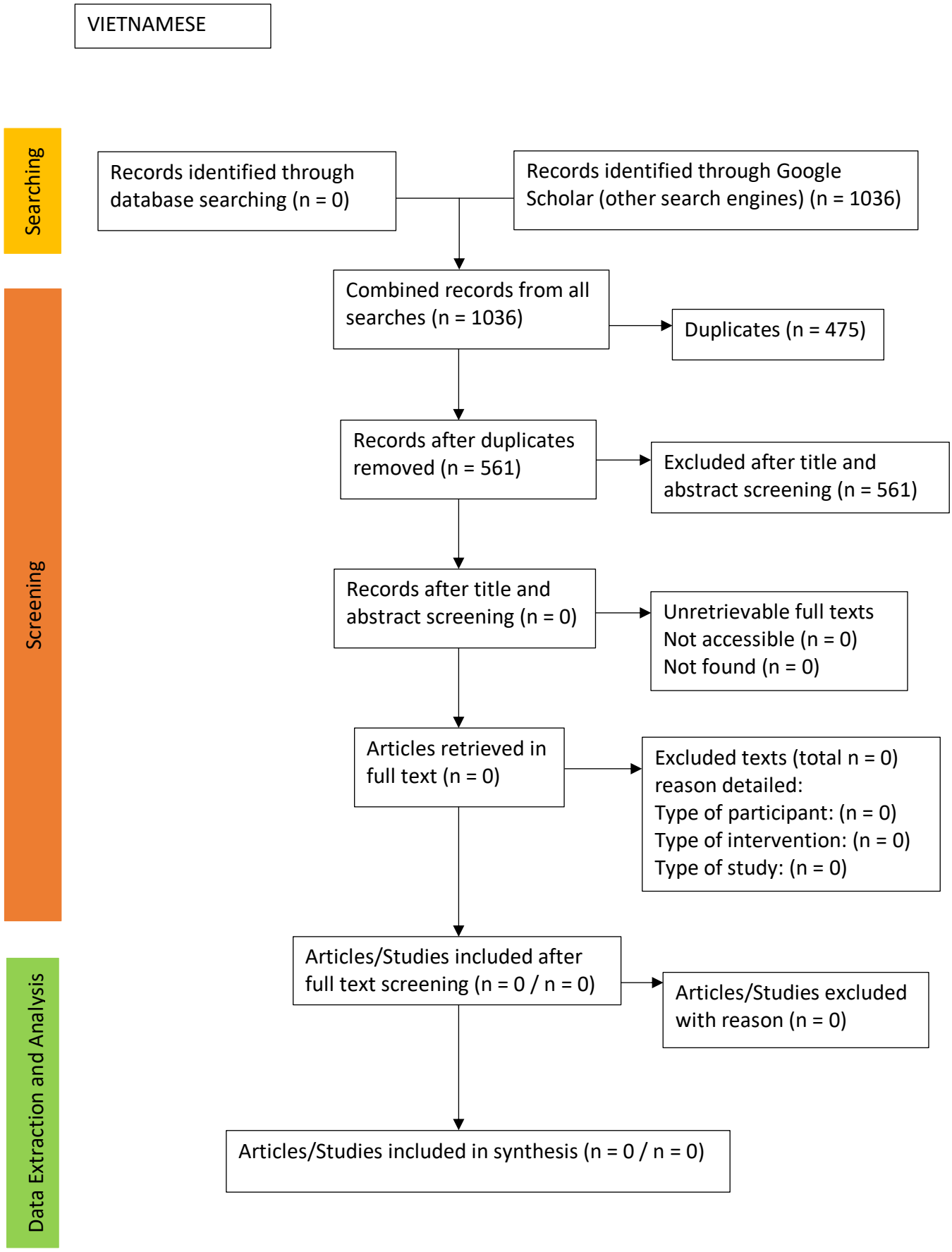
SPANISH



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Adapted from: Haddaway NR, Macura B, Whaley P, and Pullin AS. 2017. ROSES flow diagram for systematic reviews. Version 1.0. DOI: 10.6084/m9.figshare.5897389



Adapted from: Haddaway NR, Macura B, Whaley P, and Pullin AS. 2017. ROSES flow diagram for systematic reviews. Version 1.0. DOI: 10.6084/m9.figshare.5897389

APPENDIX 2.6

Campaign topic categories explained

Campaign Topic	Number of Campaigns	Themes that were consolidated into wider topic categories
Pollution	2	Campaigns on air pollution and environmental pollution generally
General environmental awareness	5	Campaigns that aimed to increase environmental awareness but did not specify the topic
Climate change	5	Those that covered climate change widely and encouraged boycotting of companies contributing to greenhouse emissions
Development project leading to environmental destruction	5	Includes campaigns on Arctic drilling, building a dam in Brazil, mining in the Antarctic, deforestation as a cause of the palm oil industry and habitat destruction in the amazon
Protection or restoration of natural resources	11	Campaigns that focused on water use, the protection of forests, habitat protection and restoration including river conservation and tree planting
Wildlife conservation	22	Includes campaigns covering: poaching, wildlife trade, wildlife consumption, and awareness raising of various species (bears, rhinos, elephants, sharks and other unspecified aquatic species)
Sustainable living	29	Campaigns that covered all topics encouraging environmentally-friendly behaviours and lifestyle including energy conservation, using eco-friendly cars, reducing carbon emissions on a daily basis, sustainable marine consumption, the promotion of green cities, and those that focused on food and packaging waste

APPENDIX 2.7

Full list of celebrities recorded in included articles

Actors	Models	Athletes	Musicians	Comedians	TV Hosts	Other Public Figures	Experts /Business leaders	Writers /Artists	Politicians
Bai Yu	Angelababy	Ding Junhui	Ragheb Alama	Chen Peisi	Bai Yansong	Nick Baines (Bishop)	Richard Branson	Deng Youmei	Feng Danli
Laura Bailey	Gisele Bündchen	Guo Jingjing	Cao Yuan Xiong Mei	Ricky Gervais	Chai Jing	Gao Haiyun (beauty pageant winner)	Roberto Burle Marx	Lou Zhenggang	
Bao Jianfeng	Nadya Hutagalung	He Zi	Jeff Chang	Claire Hooper	Jing Yidan	Margaret Kenyatta (Kenya's first lady)	George Calombaris	Lu Yao	
Jackie Chan	Stella Tennant	Glen Johnson	Wakin Chau	Hou Yaohua	Kang Hui	Laura Li (beauty pageant winner)	James Cameron	Shu Yi	
Chen Long	Jo Wood	Kong Linghui	Chen Lin		Na Sen	Li Xinmiao (beauty pageant winner)	Jacques Cousteau	Roy Williams	

Chen Shu	Wu Yingfei	Li Ning	Jarvis Cocker	Qiu Dan	Dr. Jane Goodall	Sally Wu
Vincent Chiao		Li Ting	Dave Matthews Band	Tian Na	Hugh Fearnley-Whittingstall	Xu Gang
Cherie Chung		Li Xiaoshuang	Deng Chaoyu	Nathan Uzhta	Feng Lun	Yin Zhiguang
Penélope Cruz		Li Xiaoxia	Deng Yaping	Kim Watkins	Feng Xiaoning	Zhang Kangkang
Rosario Dawson		Liu Guoliang	Florence (Florence and the Machine)	Wu Xin	Hu Baosen	Zhao Danian
Cameron Diaz		Liu Xuan	G.E.M.	Yang Lan	Huang Nubo	Zhang Xiaogang
Shawn Dou		Gerald McCoy	Guan Mucun		Li Dongsheng	
Feng Gong		Pan Xiaoting	Don Henley		Anita Roddick	
Morgan Freeman		Qin Kai	Jike Junyi		Barton Seaver	
Jennie Garth		Sun Jihai	Angélique Kidjo		Wei Xue	
Gong Li		Sun Wei	Lang Lang			
Guan Xiaotong		Yaya Touré	Liu Huan			
Hai Qing		Yao Ming	Lu Wei			
Hu Ke		Zhang Peimeng	Ma Yu			
Huang Bo		Zhou Jihong	Man Wenjun			
John Hurt		Zou Kai	Dr. Brian May			
Bianca Jagger			Ana Matronic			
Leon Lai			Paul McCartney			
Jude Law			Thu Minh			

Lucy Lawless	One Direction
LiBingbing	Radiohead
Li Chen	Song Zuying
Li Huan	Tengger
Li Ruoxi	KT Tunstall
Li Xian	Toyah Willcox
Li Yapeng	Jackson Wang
Li Yifeng	Karry Wang
Ruby Lin	Wang Ying
Jelly Lin	Jackson Yee
Jin Liu	YUNDI
Liu Tao	Zhao Dadi
Liu Xiao Ling Tong	Zhang Ye
Lu Nuo	
Ma Tianyu	
Sienna Miller	
Thandie Newton	
Edward Norton	
Gwyneth Paltrow	
Brad Pitt	
Pu Cunxin	
Robert Redford	
Sha Yi	

Jenny Seagrove
Ian Somerhalder
Sun Li
Tang Guoqiang
Tiffany Tang
Tian Liang
Wang Yinuo
Annie Wu
Xia Yu
Xiao Yang
Xu Jinglei
Xu Kaiping
Yao Yuan
Yang Mi
Yang Xiao
Yang Zishan
Yue Yunpeng
Vincent Zhao
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Zhao Yong
Zhang Youhao
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APPENDIX 2.8

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APPENDIX 2.9

Articles excluded at the full-text screening stage with reason

	Reason for Exclusion	Reference
1	Did not report on a specific environmental celebrity campaign	Alexander, J. (2013). The case of the green vampire: eco-celebrity, Twitter and youth engagement. *Celebrity Studies, 4*. 353-368
2	Did not report on a specific environmental celebrity campaign	Anderson, A. (2011). Sources, media, and modes of climate change communication: the role of celebrities. *WIREs Climate Change, 2*. 535-546
3	Did not report on a specific environmental celebrity campaign	Anonymous. (2013). *Lily Cole: my best teacher.* The Times Educational Supplemental Scotland; London, 2325.
4	Did not report on a specific environmental celebrity campaign	Barret, W.P. (2000). Sweet Charity. Forbes Magazine. Available at: https://www.forbes.com/forbes/2000/0320/6507180a.html#71a48e351b8c
5	Did not report on a specific environmental celebrity campaign	Benson, W.T. (2003). President Theodore Roosevelt's Conservation Legacy. Infinity Pub.
6	Did not report on a specific environmental celebrity campaign	Biedron, K. & Tabascko, M. (2017). "Newea-Water for Life "Water Champion Campaign". Proceedings of the Water Environment Federation, 4. 5783-5788
7	Did not report on a specific environmental celebrity campaign	Biermann, C.A. & Bradley, R.M. (1999). The Gaias (Earth Mothers) of the ecological/conservation movements. *The American Biology Teacher, 61*. 252-257
8	Did not report on a specific environmental celebrity campaign	Birmingham, B. and LeQuire, S.L. (2010). Green heroes reexamined: An evaluation of environmental role models. Leadership for Environmental Sustainability. Routledge Taylor & Francis Group.
9	Did not report on a specific environmental celebrity campaign	Blackburn, S.A. (2011). The influence of Facebook use on pro-environmental behavioural intentions: the roles of parasocial interaction and identification with a celebrity. The University of Texas at San Antonio, USA.
10	Did not report on a specific environmental celebrity campaign	Bradshaw, C.J.A., Brook, B.W., McMahon, C.R. (2007). Dangers of sensationalizing conservation biology. *Conservation Biology, 21*. 570-571
11	Did not report on a specific environmental celebrity campaign	Breitbart, E. (2007). The burns effect: documentary as celebrity advertisement. *New England Review, 28.* 168-178
12	Did not report on a specific environmental celebrity campaign	Brockington, D. (2008a). Celebrity conservation: interpreting the Irwins. *Media International Australia, 127*. 96-108
13	Did not report on a specific environmental celebrity campaign	Brockington, D. (2008b). Powerful environmentalisms: conservation, celebrity and capitalism. *Media, Culture & Society, 30*. 551-568
14	Did not report on a specific environmental celebrity campaign	Brockington, D. (2009). Celebrity and the environment: Fame, wealth and power in conservation. Zed Books. London and New York.
15	Did not report on a specific environmental celebrity campaign	Brockington, D. (2013). Celebrity, environmentalism and conservation. *Environmental Conflict and the Media.* 139-152

16	Did not report on a specific environmental celebrity campaign	Brockington, D. (2015a). Towards an international understanding of the power of celebrity persuasions: a review and a research agenda. *Celebrity Studies, 6*. 486-504
17	Did not report on a specific environmental celebrity campaign	Brockington, D. (2015b). Celebrity advocacy: international and comparative perspectives. *Celebrity studies, 6*. 393-398
18	Did not report on a specific environmental celebrity campaign	Brockington, D. (2017). Environment and Celebrity. The International Encyclopedia of Geography.
19	Did not report on a specific environmental celebrity campaign	Brockington, D. and Scholfield, K. (2009). Celebrity colonialism and conservation in Africa. Celebrity Colonialism: fame, representation and power in (post) colonial cultures. Newcastle: Cambridge Scholars Publishing.
20	Did not report on a specific environmental celebrity campaign	Brown, W.J. (2010). Steve Irwin's Influence on Wildlife Conservation. *Journal of Communication, 60*. 73-93
21	Did not report on a specific environmental celebrity campaign	Brown, L.A. (2011). Celebrity environmentalists: the effects of the rich and famous on conservation efforts. California Polytechnic State University.
22	Did not report on a specific environmental celebrity campaign	Bulleting of the Atomic Scientists. (2015). Paul R. Ehrlich: seeking environmental solutions in the social sciences. *Bulletin of the Atomic Scientists, 67*. 1-8
23	Did not report on a specific environmental celebrity campaign	Cavallaro, M. C., Boucher, M. & Steelman, T. A. (2017). Sustainability champions: role models in sustainability graduate education. In (eds Filho, W.L. et al.) *Handbook of Theory and practice of Sustainable Development in Higher Education*, World Sustainability Series.
24	Did not report on a specific environmental celebrity campaign	Crossland, P. (2007). The Green Book: the everyday guide to saving the planet one simple step at a time. *The Booklist, 103*.
25	Did not report on a specific environmental celebrity campaign	de los Salmones M., Dominguez, R., Herrero, A. (2013). Communication using celebrities in the non-profit sector. *International Journal of Advertising, 32*. 101-119
26	Did not report on a specific environmental celebrity campaign	de los Salmones, M.M.G & Dominguez, R. (2016). Celebrity endorsement and involvement with the social cause in nonprofit organizations. *Journal of Nonprofit & Public Sector Marketing*, *28*, 309-326. *doi*:10.1080/10495142.2016.1237922
27	Did not report on a specific environmental celebrity campaign	Doyle, J. (2016). Celebrity vegans and the lifestyling of ethical consumption. *Environmental Communication, 6*. 777-790
28	Did not report on a specific environmental celebrity campaign, ads used were fabricated for the study	Duthie, E. (2014) Celebrities in Conservation: Are they a hindrance or a help? Imperial College London.
29	Did not report on a specific environmental celebrity campaign, ads used were fabricated for the study	Duthie, E., Verissimo, D., Keane, A., Knight, A. T. (2017). The effectiveness of celebrities in conservation marketing. *PLoS ONE, 12*.
30	Did not report on a specific environmental celebrity campaign, ads used were fabricated for the study	Elgaaied-Gambier, L., Monnot, E., Reniou, F. (2018). Using descriptive norm appeals effectively to promote green behaviour. *Journal of Business Research, 82.*

31	Did not report on a specific environmental celebrity campaign, ads used were fabricated for the study	Eren-Erdogmus, I., Salari Lak, H., cicek, M. (2016). Attractive or credible celebrities: who endorses Green products better? *Social and Behavioral Sciences, 235*. 587-594
32	Did not report on a specific environmental celebrity campaign	Erfani-Ghadimi, N. (2016). Practitioner perspectives and assumptions about the role media plays in communication strategies that aim to change the behaviour of an individual. University of the Witwatersrand.
33	Did not report on a specific environmental celebrity campaign	Farrell, N. (2015). 'Conscience Capitalism' and neoliberalisation of the non-profit sector. *New Political Economy, 0*.1-19.
34	Did not report on a specific environmental celebrity campaign	Fennel, T. (1995). *The Arctic advocate*. MacLean's Magazine, Canada. 23-25
35	Did not report on a specific environmental celebrity campaign	Fletcher, R. (2015). Blinded by the stars? Celebrity, fantasy, and desire in neoliberal environmental governance. *Celebrity Studies, 6*. 457-470
36	Did not report on a specific environmental celebrity campaign	Frizzell, C. (2011). Public opinion and foreign policy: the effects of celebrity endorsements. *The Social Science Journal, 48*. 314-323
37	Did not report on a specific environmental celebrity campaign	Gajda, A., Kieffer, S.W. (2007). Celebrity meets science: Hollywood's environmentalism and its effect. The Geological Society of America, 17.
38	Did not report on a specific environmental celebrity environmental celebrity campaign	Goodman, M.K., Littler, J., Brockington, D., & Boykoff, M. (2016). Spectacular environmentalisms: media, knowledge and the framing of ecological politics. *Environmental Communications, 10*. 677-688
39	Did not report on a specific environmental celebrity campaign	Hall, N.L., Taplin, R. (2009). Environmental non-profit campaigns and state competition: Influences on climate policy in California. *Voluntas, 21*.62-81
40	Did not report on a specific environmental celebrity campaign	Hasegawa, K., Chen, S., Hong, J.H., Xie, Y., Lu, X. (2016). Which sustainability campaign – "Ripples", "Emily", and "Sort it Out" – is most well-known amongst UBC students? University of British Columbia.
41	Did not report on a specific environmental celebrity campaign	Heywood, L., Montgomery, M. (2008) 'Ambassadors of the last wilderness'? Surfers, environmental ethics, and activism in America. In (eds) Atkinson, M., Young, K. Tribal Play: Subcultural Journeys Through Sport. Emerald, United Kingdom, North America, Japan, India, Malaysia, China.
42	Did not report on a specific environmental celebrity campaign	Hot Picks: Holland Goes Green. Broadcast; London, October 1, 2015
43	Did not report on a specific environmental celebrity campaign	Kapoor, I. (2013). Celebrity Humanitarianism: the ideology of global charity. Routledge
44	Did not report on a specific environmental celebrity campaign	Keeling, S. (2009). What if? Media, celebrity and climate change. Royal Meteorological Society.
45	Did not report on a specific environmental celebrity campaign	Klooster, D. (2013). Brand aid: Better than nothing, far from enough. International Political Sociology.

46	Did not report on a specific environmental celebrity campaign	Knoll, J., Matthes, J. (2016). The effectiveness of celebrity endorsements: a meta-analysis. *Journal of the Academic Marketing Sciences, 45.* 55-75
47	Did not report on a specific environmental celebrity campaign	Leas, E.C., Althouse, B.M., Dredze, M., Obradovich, N., Fowler, J.H., Noar, S.M., Allem, J., Ayer, J.W. (2016). Big data sensors of organic advocacy: the case of Leonardo DiCaprio and Climate Change. *PLoS ONE, 11*.
48	Article has been retracted by the journal	Lindenberg, S., Joly, J.F., Stapel, D.A. (2011). The norm-activating power of celebrity. *Social Psychology Quarterly, 74*. 98-123
49	Did not report on a specific environmental celebrity campaign	McCurdy, P. (2013). Conceptualising celebrity activists: the case of Tamsin Omond. *Celebrity Studies, 4*. 311-324
50	Did not report on a specific environmental celebrity campaign	Meister, M. (2015). Celebrity culture and environment. In (eds) Hansen, A., Cox, R. The Routledge Handbook of Environment and Communication. Routledge
51	Did not report on a specific environmental celebrity campaign	Noe, C. (2011). Celebrity and the environment: fame, wealth and power in conservation – review. *South African Geographical Journal, 93*. 213-214
52	Did not report on a specific environmental celebrity campaign	Northfield, J.K., McMahon, C.R. (2009). Crikey! Overstating the conservation influence of the crocodile hunter. *Science Communication, 32*. 412-417
53	Did not report on a specific environmental celebrity campaign	O'Regan, V.R. (2014). The celebrity influence: do people really care what they think? *Celebrity Studies, 5*. 469-483
54	Did not report on a specific environmental celebrity campaign	Ottman, J.A., Staqfford, E.R., Hartman, C.L. (2006). Avoiding green marketing myopia: ways to improve consumer appeal for environmentally preferable products. *Environment: Science and Policy for Sustainable Development, 48*. 22-36
55	Did not report on a specific environmental celebrity campaign	Pasquale, S. (2012). The effect of pro-environmental third party organisation (TPO) endorsements on consumer behaviour. University of Wollongong.
56	Did not report on a specific environmental celebrity campaign	Pedelty, M. (2012). Ecomusicology, Rock, Folk, and the environment. Temple University Press.
57	Did not report on a specific environmental celebrity campaign	Peterson, N., Tripoli, E., Langenbach, K., Devasagayam, R., (2018). Celebrity endorsements and donations: empirical investigation of impact on philanthropic giving. *Business Perspectives and Research, 6*. 79-89
58	Did not report on a specific environmental celebrity campaign	Rettie, R., Barnham, C. & Burchel, K. (2011). Social normalisation and consumer behaviour: using marketing to make green normal. Kingston Business School, Working Paper.
59	Did not report on a specific environmental celebrity campaign	Rettie, R., Burchell, K., Barnham, C. (2013). Social normalisation: using marketing to make green normal. *Journal of Consumer Behaviour, 13*. 9-17
60	Reported on fictitious ads and endorsers created for the study.	Roozen, I. & Raedts, M. (2015). The impact of negative endorser information and their facial appearance on advertisement effectiveness for profit and not-for-profit organizations. *Journal of Mass Communication Journalism, 5*. 1-7
61	Did not report on a specific environmental celebrity campaign	Saeed, R., Naseer, R., Haider, S. & Naz, U. (2014). Impact of celebrity and non-celebrity advertisement on consumer perception. *The Business & Management Review, 4*. 1-7.

62	Did not report on a specific environmental celebrity campaign	Scheer, L.K. & Stern, L.W. (2018). The effect of influence type and performance outcomes on attitude toward the influencer. *American Marketing Association, 29*. 128-142
63	Did not report on a specific environmental celebrity campaign	The Times of India. (1998). *Shooting Starts*. The Times of India. Pg. 14
64	Did not report on a specific environmental celebrity campaign	The Washington Post. (1964). *Mrs. Ambassador*. The Washington Post, Times Herald.
65	Did not report on a specific environmental celebrity campaign	van Bekkum, J. E. (2011). Understanding and encouraging cycle commuting in workplace setting: a psychological perspective. The University of Edinburgh, Scotland.
66	Did not report on a specific environmental celebrity campaign	van Vuuren, K. & Lester, L. (2008). Ecomedia: of angelic images and environmental values. *Media International Australia*. 1-11
67	Did not report on a specific environmental celebrity campaign	van Vuuren, K., Ward, S., Coyle, R. (2013). Revisiting the greening of prime-time television soap operas. *Media International Australia, 146*. 35-47
68	Did not report on a specific environmental celebrity campaign	Venter, E. & Loubser, C. (2017). An evaluation of the conservation education programmes of the Uganda Wildlife Education Centre. 1-12
69	Did not report on a specific environmental celebrity campaign	Wheeler, R.T. (2009). Nonprofit advertising: Impact of celebrity connection, involvement and gender on source credibility and intention to volunteer time or donate money. *Journal of Nonprofit & Public Sector Marketing, 21*. 80-107
70	Reported on an animal welfare campaign, not environmental conservation.	Winge, T.M. (2015). "Green is the new black": Celebrity chic and the "green" commodity fetish. *Fashion Theory, 12*. 511-523
71	Did not report on a specific environmental celebrity campaign	Yaple, C. (2014). A salute to Pete Seeger: Environmental Patriot Extraordinaire. Taproot, 23. 26 – 29.
72	Did not report on a specific environmental celebrity campaign	Yoo, J. & Jin, Y. (2013). Effects of celebrity-organization congruence on audience attitudes, preferences, and credibility ratings for goodwill ambassadors. *Asian Journal of communication, 23*. 620-636
73	Did not report on a specific environmental celebrity campaign	Zabava, A. (2014). How people respond to advocacy messages: the impact of message source and media platform on attitude in a non-profit environment. University of Missouri-Columbia, USA.
74	Did not report a specific environmental celebrity campaign	Zach, J. (2007). Hayden Panettiere. Scholastic Action; Social Science Premium Collection. 4.
	Excluded at the Extraction Phase	
75	Photographs and ads for cars, even if they are electric cars do not seem to be for the purpose of an environmentally-friendly product but rather to increase sales for the car, not where the environment Is the main purpose – as defined in the purpose of campaigns in the protocol.	Hanna, P., Kantenbacher, J., Cohen, S., Gossling, S. (2018). Role model advocacy for sustainable transport. *Transportation Research Part D, 61*. 373-382

76	Did not report on a specific environmental celebrity campaign	Cooper, A.F. (2008). Celebrity Diplomacy. Routledge Taylor & Francis Group. London and New York.
77	Did not report on a specific environmental celebrity campaign – focused on celebrity's personal social media posts	Hunting, K., & Hinck, A. (2017). "I'll see you in Mystic Falls": intimacy, feelings, and public issues in Ian Somerhalder's celebrity activism. *Critical Studies in Media Communications, 34*. 432-448
CHINESE		
1	Did not report a specific environmental celebrity campaign	Anon 无名 (2011). 谁是最适合的品牌代言人? [*Who is the most suitable brand ambassador?*]. 国际公关 [*International Public Relations*]. 2011(3), 86-88. Available from: http://qikan.cqvip.com/Qikan/Article/Detail?id=38079838
2	Did not report a specific environmental celebrity campaign	Anon 无名 (2011). 谭晶世园会的绿色大使 [*Tan Jing, green ambassador of Shiyuan Park*]. 中国林业产业 [*China Forestry Industry*]. 2011(6), 66-67. Available from: http://qikan.cqvip.com/Qikan/Article/Detail?id=38580130
3	No celebrity involvement in campaign	Anon 无名 (2016). "节能宣传大使" 环湖走倡导低碳出行 [*"Energy-saving promotion ambassador" walks around lake to advocate for low-carbon travel*]. 能源研究与利用 [*Energy Research and Utilization*]. 2016(4), 14. Available from: http://qikan.cqvip.com/Qikan/Article/Detail?id=669972475
4	Did not report a specific environmental celebrity campaign	Anon无名 (2018). 百位明星集体代言 撬动粉丝经济 [*Collective endorsement by one hundred celebrities leverages the fan economy*]. 声屏世界: 广告人 [*Admen*]. 2018(8), 33. Available from: http://www.cnki.com.cn/Article/CJFDTOTAL-GGRZ201808010.htm
5	Did not report a specific environmental celebrity campaign	Cai, S. 蔡绍华 (2016). 体育公益广告明星效应的眼动研究 [*Eye-tracking research in the effect of sports celebrity public service advertisements*]. 体育与科学 [*Sports and Science*]. 2016(2), 100-106. Available from: http://www.cnki.com.cn/Article/CJFDTOTAL-TYYK201602015.htm
6	Did not report a specific environmental celebrity campaign	Cao, Y. 曹莹莹 (2016). 准社会关系视角下媒介人物对大学生价值观念及行为影响研究 [*Research on the influence of media characters on college students values and behaviours from the perspective of quasi-social networks*]. 安徽大学 [*Anhui University*], Master's thesis. Available from http://cdmd.cnki.com.cn/Article/CDMD-10357-1016129041.htm.
7	Did not report a specific environmental celebrity campaign	Chen, N. 陈宁 (2003). 不同年龄广告名人效应的心理加工机制研究 [*A study on the psychological processing mechanism of the celebrity effect of advertisements for different age groups*]. 心理科学 [*Psychological Science*]. 2003(1), 37-40. Available from: http://www.cnki.com.cn/Article/CJFDTOTAL-XLKX200301009.htm
8	Did not report a specific environmental celebrity campaign	Chen, R. 陈瑞 (2015). 名人效应与名人APP的运营 [*The celebrity effect and operations of celebrity APP*]. 青年记者 [*Youth Journalist*]. 2015(14), 68. Available from: https://xueshu.baidu.com/usercenter/paper/show?paperid=dcac904372f542eaa09562528ba69acb&site=xueshu_se

9	Did not report a specific environmental celebrity campaign	Chen, X. 陈相光 (2006). 中国体育明星对大学生的影响及人文教育价值 [*The influences of sports stars in China on college students and their value in humanistic education*]. 体育学刊 [*Journal of Physical Education*]. 2006(4), 15-18. Available from: http://www.cnki.com.cn/Article/CJFDTOTAL-TYXK200604004.htm
10	Did not report a specific environmental celebrity campaign	Chen, X. & Cui, F. 陈学胜 & 崔丰慧 (2006). 明星广告的羊群效应分析 [*Analysis of herding effect in celebrity advertising*]. 集团经济研究 [Group *Economics Research*]. 2006(5X), 236-237. Available from: http://qikan.cqvip.com/Qikan/Article/Detail?id=21915128
11	Did not report a specific environmental celebrity campaign	Cui, W. 崔玮 (2014). 关之琳: 热爱环保的美女代言人 [*Guan Zhilin: beautiful spokesperson with love for the environment*]. 中国林业产业 [*China Forestry Industry*]. 2014(8), F0001-F0002. Available from: https://xueshu.baidu.com/usercenter/paper/show?paperid=31badf51c940af4872f61ff25dccb941&site=xueshu_se
12	Did not report a specific environmental celebrity campaign	Ding, X., Wang, H., & Ma, M. 丁夏齐, 王怀明 & 马谋超 (2005). 名人推荐者道德声誉对名人广告效果的影响 [*The effect of morality reputation on evaluations to celebrity endorser and endorsement*]. 心理学报 [*Journal of Psychology*]. 2005(3), 382-389. Available from: http://www.cnki.com.cn/Article/CJFDTOTAL-XLXB20050300E.htm
13	Did not report a specific environmental celebrity campaign	Fan, X., Zhou, D. & Zhang, Y. 范晓萍, 周丹 & 张元利 (2012). 体育明星效应产生的动力要素及其价值 [*The power factor and value produced by the sports celebrity effect*]. 体育成人教育学刊 [*Journal of Sports Adult Education*]. 2012(1), 43-45. Available from: http://www.cnki.com.cn/Article/CJFDTOTAL-TYHS201201016.htm
14	Did not report a specific environmental celebrity campaign	Gan, L. 甘霖 (2010). 现代营销环境下名人代言生存之道的思考 [*On the survival of celebrity endorsements in the modern marketing environment*]. 现代商贸工业 [*Modern Business Trade Industry*]. 2010(3), 116-117. Available from: http://www.cnki.com.cn/Article/CJFDTOTAL-XDSM201003071.htm
15	Did not report a specific environmental celebrity campaign	Gao, S. 高山 (2014). 传播学生态视野下的网络名人 [*Internet celebrity in the ecological view of communication*]. 红河学院学报 [*Journal of Honghe University*]. 2014(4), 115-117. Available from: https://xueshu.baidu.com/usercenter/paper/show?paperid=0bd419a85436e3c3439fc75498341d97&site=xueshu_se
16	Did not report a specific environmental celebrity campaign	Gong, W. & Li, X. 龚婉祺 & 李喜根 (2018). 微博红人广告行为的预期背离及其影响——基于预期违背理论框架的广告效果研究 [*Microblogging sensation advertising behaviour expected departure from and its influence – a study on advertising effectiveness based on the expectancy violation theoretical framework*]. 新媒体与社会 [*New Media and Society*]. 2018(1), 115-127. Available from: http://qikan.cqvip.com/Qikan/Article/Detail?id=675789114
17	Did not report a specific environmental celebrity campaign	Gong, Y. & Xu, H.龚艳萍 & 许焕 (2018). 多人组合代言对消费者广告态度的影响——基于自我建构视角的分析 [*The effects of multiple celebrity endorsement on consumer's advertising attitude – an analysis from the perspective of self-construal theory*]. 商业研究

		[*Commercial Research*]. 2018(3), 11-20. Available from: http://www.cnki.com.cn/Article/CJFDTOTAL-BUSI201803003.htm
18	Did not report a specific environmental celebrity campaign	Guo, Q. 郭晴 (2006). 论体育明星的公共关系价值及价值实现 [*On public relation values and value realization of sports stars*]. 武汉体育学院学报 [*Journal of Wuhan Institute of Physical Education*]. 2006(8), 17-20. Available from: http://www.cnki.com.cn/Article/CJFDTOTAL-WTXB200608004.htm
19	Did not report a specific environmental celebrity campaign	Guo, Q. & He, Y. 郭秋艳 & 何跃 (2013). 新浪微博名人用户特征挖掘及效应研究 [*Study on the celebrity users' characteristics mining and the effects of Sina Micro-blog*]. 情报杂志 [*Journal of Intelligence*]. 2013(2), 112-116. Available from: http://www.cnki.com.cn/Article/CJFDTOTAL-QBZZ201302021.htm
20	Did not report a specific environmental celebrity campaign	He, L. & Wang, H. 何浏 & 王海忠 (2014). 品牌组合代言溢出效应研究——名人崇拜的调节作用 [*Research on the spillover effect of brand portfolio endorsement – the moderating effect of celebrity worship*]. 商业经济与管理 [*Business Economics*]. 2014(4), 67-75. Available from: http://www.cnki.com.cn/Article/CJFDTOTAL-SYJG201404009.htm
21	Did not report a specific environmental celebrity campaign	He, M. & Ding, X. 何苗 & 丁晓伟 (2016). 选择明星还是动漫形象代言?来自脑电研究的证据 [*Choosing celebrities or cartoons for endorsement? Evidence from electroencephalogram research*]. 新闻与传播研究 [*Journalism and Communication Studies*]. 2016(10), 40-48. Available from: http://www.cnki.com.cn/Article/CJFDTOTAL-YANJ201610005.htm
22	Did not report a specific environmental celebrity campaign	He, Y., Lan, C. & Zhang, Y. 何洋, 兰春梅 & 张洋 (2018). 论明星效应对大学生价值观的影响 [*On the impact of the celebrity effect on the values of college students*]. 文化创新比较研究 [*Comparative Study of Cultural Innovation*]. 2018(21), 31-32. Available from: http://g.wanfangdata.com.cn/details/detail.do?_type=perio&id=whcxbjyj201821018
23	Did not report a specific environmental celebrity campaign	Hu, K. & Tang, T. 胡凯 & 唐婷婷 (2014). 名人微博对大学生网络认知的影响及对策 [*The influence of celebrity microblogging on network knowledge of college students and countermeasures*]. 思想教育研究 [*Research on Ideological Education*]. 2014(5), 55-59. Available from: http://www.cnki.com.cn/Article/CJFDTOTAL-SIXI201405012.htm
24	Did not report a specific environmental celebrity campaign	Hu, S. 胡世涛 (2009). 消费者市场购买行为与明星代言广告的有效性探讨 [*Exploring consumer market buying behaviour and the effectiveness of star-endorsed advertisements*]. 中国水运: 下半月 [*China Water Transport: The Second Half of the Month*]. 2009(10), 71-72. Available from: http://qikan.cqvip.com/Qikan/Article/Detail?id=1003764259

25	Did not report a specific environmental celebrity campaign	Hua, D. 华多 (1994). "名人广告" 效应谈 [*On the impact of "celebrity advertising"*]. 前线 [*Frontline*]. 1994(24), 38. Available from: http://www.cqvip.com/qk/80995x/199424/4001360478.html
26	Did not report a specific environmental celebrity campaign	Huang, G., Fan, Q. & Zhou, Y. 黄光, 范起凤 & 周延风 (2008). 广告代言人、品牌名称对中国消费者购买意愿的影响 [*Impact of advertising spokespeople and brand names on Chinese consumer buying intentions*]. 北京邮电大学学报: 社会科学版 [*Journal of Beijing University of Posts and Technology: Social Sciences Edition*]. 2008(5), 31-36. Available from: http://www.cnki.com.cn/Article/CJFDTOTAL-BJYS200805008.htm
27	Did not report a specific environmental celebrity campaign	Huang, H. 黄葵 (2013). 运用名人建立品牌资产的策略研究 [*A study of use of celebrity endorsement in building brand equity*]. 厦门大学 [*Xiamen University*], Master's thesis. Available from http://www.wanfangdata.com.cn/details/detail.do?_type=degree&id=J0100536.
28	Did not report a specific environmental celebrity campaign	Huang, L. & Wang, J. 黄丽红 & 王金洲 (2001). 名人广告使用的六大要点 [*Six key points for celebrity advertising*]. 当代经济 [*Contemporary Economics*]. 2001(7), 44. Available from: https://xueshu.baidu.com/usercenter/paper/show?paperid=dffcf59ac42cfd72049d1c28cb5f5200&site=xueshu_se
29	Did not report a specific environmental celebrity campaign	Huang, M., Yao, S. & Liu, M. 黄敏学, 姚舜禹 & 刘茂红 (2018). 自强还是自嘲? 名人代言如何提升社会化媒体广告的营销效果 [*Self-enhancing or self-deprecating? How can celebrity endorsement enhance the marketing effectiveness of advertisements in social media*]. 心理学报 [*Journal of Psychology*]. 2018(8), 907-919. Available from: http://www.cnki.com.cn/Article/CJFDTOTAL-XLXB201808010.htm
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88	Did not report a specific environmental celebrity campaign	Wang, X. **王雪** (2016). 动**物保**护NGO**通**过**媒体**对**中国野生**动**物保**护**的影响研究** [*Research on the influence of animal protection NGOs on Chinese wildlife protection through the media*]. 东**北林**业**大学** [*Northeast Forestry University*], Master's thesis. Available from: http://cdmd.cnki.com.cn/Article/CDMD-10225-1016310767.htm.
89	Did not report a specific environmental celebrity campaign	Wang, Y. **王迎波** (2008). **基于信息**经济**学信号理**论**的名人广告研究** [*Study of celebrity advertising based o signaling theory in information economics*]. **山**东**大学** [*Shandong University*], Master's thesis. Available from: http://cdmd.cnki.com.cn/Article/CDMD-10422-2008188379.htm.
90	Did not report a specific environmental celebrity campaign	Wu, H. **吴洪**应 (2016). **多名人**组**合代言**对**消**费**者**评**价的影响机制研究** [*Research on the influence mechanism of multiple celebrity endorsements on consumer evaluation*]. **五邑大学** [*Wuyi University*], Master's thesis. Available from http://cdmd.cnki.com.cn/Article/CDMD-11349-1016273911.htm.
91	Did not report a specific environmental celebrity campaign	Wu, J. **吴江文** (2009). **影**视**明星影响力与二次**销**售理**论 [*Movie star influence and theory of secondary sales*]. **中国广播**电视**学刊** [*China Radio and TV Academic Journal*]. 2009(10), 26-28. Available from: http://www.cqvip.com/qk/81246x/200910/31793266.html

92	Did not report a specific environmental celebrity campaign	Xiao, J. 肖泯 (2000). 请名人作广告 *[Inviting celebrities for advertising*]. 北京工人 [*Beijing Workers*]. 2000(9). Available from: https://xueshu.baidu.com/usercenter/paper/show?paperid=0e8e4f031136cc3a1edba4db0f4f0a9b&site=xueshu_se
93	Did not report a specific environmental celebrity campaign	Xie, X. 谢小杭 (2017). 基于社群文化的明星粉丝消费行为研究 [*A study on the consumer behaviour of celebrity fans based on community culture*]. 中国政法大学 [*China University of Political Science*], Master's thesis. Available from: http://cdmd.cnki.com.cn/Article/CDMD-10053-1017170812.htm.
94	Did not report a specific environmental celebrity campaign	Yan, A. & Qi, L. 颜爱民 & 齐兰 (2009). 名人广告对 "粉丝" 消费态度的影响研究 [*Research on the effect of celebrity advertising on consumption attitudes of "fans"*]. 长沙通信职业技术学院学报 [*Journal of Changsha Telecommunications and Technology Vocational College*]. 2009(4), 77-80. Available from: http://qikan.cqvip.com/Qikan/Article/Detail?id=32333936
95	Did not report a specific environmental celebrity campaign	Yan, B. 颜帮全 (2002). 试论名人广告 [*On celebrity advertisements*]. 重庆三峡学院学报 [*Journal of Chongqing Three Gorges University*]. 2002(1), 75-79. Available from: http://www.cqvip.com/qk/90389b/200201/6445563.html
96	Did not report a specific environmental celebrity campaign	Yan, Z. 阎俊 (2003). 影响绿色消费者消费行为的因素分析及其营销启示 [*Analysing factors impacting green consumer behaviour and its marketing implications*]. 北京工商大学学报：社会科学版 [*Beijing Technology and Business University: Social Sciences*]. 2003(2), 56-58. Available from: https://kns.cnki.net/kcms/detail/detail.aspx?filename=BJSB200302014&dbcode=CJFQ&dbname=CJFD2003&v=
97	Did not report a specific environmental celebrity campaign	Yang, C. 杨畅 (2017). 微博中明星代言广告的策略 [*Strategies of celebrity Weibo advertising campaigns*]. 新闻传播 [*Journalism & Communication*]. 2017(8X), 15-16. Available from: http://g.wanfangdata.com.cn/details/detail.do?_type=perio&id=xinwcb201716007
98	Did not report a specific environmental celebrity campaign	Yang, D. 杨东平 (1995). 走向绿色消费 [*Towards green consumption*]. 绿色大世界 [*Green World*]. 1995(2), 38. Available from: http://qikan.cqvip.com/Qikan/Article/Detail?id=1005465682
99	Did not report a specific environmental celebrity campaign	Yang, L. 杨柳 (2016). 明星广告代言人对消费者购买态度的影响研究 [*Research on the influence of star endorsers on consumer buying attitudes*]. 现代视听 [*Modern Audio-Video Arts*]. 2015(1), 43-47. Available from: http://g.wanfangdata.com.cn/details/detail.do?_type=perio&id=QKV20162016060800013408
100	Did not report a specific environmental celebrity campaign	Yang, X. 杨鑫 (2010). 我国名人广告传播现状研究 [*Research on the current status of celebrity advertisement communications in China*]. 河南大学 [*Henan University*], Master's thesis. Available from: http://cdmd.cnki.com.cn/Article/CDMD-10475-2010154407.htm.

101	Did not report a specific environmental celebrity campaign	Yang, Y. 杨移贻 (1989). “名人效应” 有功劳 [*The “celebrity effect” has merit*]. 南风窗 [*Nanfengchuang*]. 1989(7). Available from: https://xueshu.baidu.com/usercenter/paper/show?paperid=120ff863c443fcb26c924b3619dfd415&site=xueshu_se
102	Did not report a specific environmental celebrity campaign	Ye, L. 叶丽华 (2007). 名人广告效应的修辞原理 [*The rhetorical principle of the celebrity advertisement effect*]. 商场现代化 [*Market Modernization*]. 2007(7X), 121-123. Available from: https://xueshu.baidu.com/usercenter/paper/show?paperid=d63e0e1786747a0e967caa190e424184&site=xueshu_se
103	Did not report a specific environmental celebrity campaign	Ye, M. 叶茂中 (2004). 找明星做广告的十大注意 [*Ten tips to be aware of when looking for celebrities in advertising*]. 中国广告 [*China Advertising*]. 2004(7), 84-86. Available from: http://qikan.cqvip.com/Qikan/Article/Detail?id=10129943
104	Did not report a specific environmental celebrity campaign	Yi, M. 亦木 (2013). 王力宏出任绿源新一代品牌代言人 [*Wang Lihong acts as the new generation Luyuan brand ambassador*]. 电动自行车 [*Electric Bicycle*]. 2013(1), 7. Available from: https://xueshu.baidu.com/usercenter/paper/show?paperid=7d4b08300f10d21319c79217e0c6cf72&site=xueshu_se
105	Did not report a specific environmental celebrity campaign	Yuan, R. 袁瑞贤 (2010). 浅析消费者态度对名人代言品牌效果的影响 [*Analysis on the influence of consumer attitudes on effectiveness of celebrity endorsements*]. 现代商业 [*Modern Business*]. 2010(32), 182. Available from: http://qikan.cqvip.com/Qikan/Article/Detail?id=35853659
106	Did not report a specific environmental celebrity campaign	Yuan, Y. 袁永波 (2016). 新形势下明星效应对大学生价值观的影响分析 [*Analysis on the influence of the star effect on the values of college students under the new trend*]. 产业与科技论坛 [*Industrial & Science Tribune*]. 2016(13), 119-120. Available from: http://qikan.cqvip.com/Qikan/Article/Detail?id=669248200
107	Did not report a specific environmental celebrity campaign	Yue, C. 岳重仁 (2012). 名人与植树 [*Celebrities and tree planting*]. 林业与生态 [*Forestry and Ecology*]. 2012(5), 35-37. Available from: https://xueshu.baidu.com/usercenter/paper/show?paperid=7e847616eb24974fd73872c8949f8eb0&site=xueshu_se
108	Did not report a specific environmental celebrity campaign	Zhang, L., Lin, J., Wu, Q. & Wang, X. 张蕾, 林家晔, 吴秋琴 & 王啸远 (1999). 名人丑闻对代言企业绩效的影响研究 [*Research on the influence of celebrity scandals on the performance of endorsement enterprises*]. 电子科技大学学报: 社会科学版 [*Journal of Xidian University: Social Sciences Edition*]. 2017(3), 67-70. Available from: https://xueshu.baidu.com/usercenter/paper/show?paperid=bf1d1833e22c5098217246c768b804f6&site=xueshu_se
109	Did not report a specific environmental celebrity campaign	Zhang, M. 张明新 (2003). 名人广告何以能大行其道? [*How can we popularize celebrity advertising?*]. 传媒观察 [*Media Observer*]. 2003(12), 24-26. Available from: https://xueshu.baidu.com/usercenter/paper/show?paperid=5570470e302d1ee43448008cc00a73d0&site=xueshu_se

110	Did not report a specific environmental celebrity campaign	Zhang, S., Chen, J. & Zhao, M. 张少卿, 陈金龙 & 赵明 (2018). CEO代言还是明星代言: 代言人类型对广告效果的影响——基于感知社会风险的中介作用 [*CEO endorsements or celebrity endorsements: the impact of spokesperson type on advertising effectiveness – based on intermediary role of perceived social risk*]. 福建商学院学报 [*Journal of Fujian Commercial College*]. 2018(2), 37-44. Available from: http://g.wanfangdata.com.cn/details/detail.do?_type=perio&id=fjsygdzkxxxb201802006#
111	Did not report a specific environmental celebrity campaign	Zhang, X. 张晓雨 (2018). 论网红明星对广告宣传的推动作用 [*On the use of web-famous celebrities in boosting advertising*]. 现代经济信息 [*Modern Economic Information*]. 2018(6), 331-333. Available from: http://g.wanfangdata.com.cn/details/detail.do?_type=perio&id=xdjjxx201806268#
112	Did not report a specific environmental celebrity campaign	Zhang, X. & Gong, M. 张馨正 & 巩梦鑫 (2016). 明星微博在社会公益活动中的传播功能与效果研究 [*Research on the spread function and effect of celebrity microblogging in social welfare activities*]. 新媒体研究 [*New Media Research*]. 2016(20), 49-50. Available from: http://g.wanfangdata.com.cn/details/detail.do?_type=perio&id=guig201620023
113	Did not report a specific environmental celebrity campaign	Zhang, Y. 张英 (2005). 濒危野生动植物种有了代言人 [Endangered species of wildlife gets a spokesperson]. 中国林业 [*China Forestry*]. 2005(1A), 14. Available from: https://xueshu.baidu.com/usercenter/paper/show?paperid=634138aa53d05ca7ee7b3d4cbd034d6a&site=xueshu_se
114	Did not report a specific environmental celebrity campaign	Zheng, X. 郑晓霞 (2013). 试析体育名人"正效应"释放其正能量 [*An analysis of the "positive effect" of sports celebrities in releasing positive energy*]. 体育世界(下旬刊) [*Sports World (Late Issue)*]. 2013(12). Available from: https://xueshu.baidu.com/usercenter/paper/show?paperid=c84da6f6cb5763245142bca00da00e45&site=xueshu_se
115	Did not report a specific environmental celebrity campaign	Zhou, J., Zhou, Y. & Han, J. 周俊辉, 周勇 & 韩骏 (2015). 体育明星广告说服机制与影响效果的关联性研究 [A study on the relationship between sports celebrity advertising as a persuasion mechanism and its influence in effectiveness]. 天津体育学院学报 [*Journal of Tianjin Institute of Physical Education*]. 2014(6), 546-549. Available from: http://www.cnki.com.cn/Article/CJFDTOTAL-TJTY201406018.htm
116	Did not report a specific environmental celebrity campaign	Zhou, X. 周象贤 (2009). 名人广告效果的影响因素及其理论探讨 [*The influencing factors and the theoretical discussion of the communication effect of celebrity advertising*]. 心理科学进展 [*Advances in Psychological Science*]. 2009(4), 811-820. Available from: http://journal.psych.ac.cn/xlkxjz/CN/Y2009/V17/I04/811
117	Did not report a specific environmental celebrity campaign	Zhou, X. 周晓丽 (2015). 浙江评出首位野生动物保护形象大使 [*Zhejiang named the first ambassador for wildlife conservation*]. 浙江林业 [*Zhejiang Forestry*]. 2015(11), 35. Available from: http://www.cqvip.com/qk/82824x/201511/666821707.html

118	Did not report a specific environmental celebrity campaign	Zhu, H. & Yao, X. 朱海腾 & 姚小雪 (2012). 名人代言广告效果影响因素综述 [*Review of factors influencing the effectiveness of celebrity endorsements*]. 北方经贸 [*Northern Economy and Trade*]. 2012(7), 52-55. Available from: http://qikan.cqvip.com/Qikan/Article/Detail?id=42405962
	Excluded at the Extraction Phase	
119	Did not report a specific environmental celebrity campaign – reported on a concert with unclear environmental messaging	Anon 无名 (2007). 音乐、明星与环保 [*Music, stars and environmental protection*]. 世界环境 [*World Environment*]. 2007(6), 89-90. Available from: https://xueshu.baidu.com/usercenter/paper/show?paperid=32e46403957e22c501ef47a332d12fcf&site=xueshu_se
120	Did not report a specific environmental celebrity campaign – reported on a music album with unclear environmental messaging	Anon 无名 (2011). 袁泉: 低碳环保的演艺明星 [*Yuan Quan: The low-carbon environmentally friendly actress*]. 中国林业产业 [*China Forestry Industry*]. 2011(4), 1. Available from: http://www.cnki.com.cn/Article/CJFDTOTAL-LYCY201104001.htm
121	Did not report a specific environmental celebrity campaign	Cao, M., Wang, L. & Jin, Y. 曹梦娜, 王璐 & 金煜 (2016). 微博名人效应在野生动物保护领域的调查研究 [*Research on the effect of celebrity microblogging in the field of wild animal protection*]. 野生动物学报 [*Chinese Journal of Wildlife*]. 2016(2), 162-165. Available from: http://www.cnki.com.cn/Article/CJFDTOTAL-YSDW201602017.htm
122	Did not report a specific environmental celebrity campaign – reported on a concert with unclear environmental messaging	Chen, J. 陈婧 (2013). 谭盾与他的环保音乐 [*Tan Dun and his environmental music*]. IT经理世界 [*CEOCIO China*]. 2013(10), 124-128. Available from: http://www.cnki.com.cn/Article/CJFDTOTAL-JLSJ201310057.htm
123	Did not report a specific environmental celebrity campaign – reported on a concert with unclear environmental messaging	Feng, M. 冯曼 (2013). 时尚达人乔任梁 唱响环保之音 [*Fashion star Qiao Renliang sings for environmental protection*]. 中国林业产业 [*China Forestry Industry*]. 2013(6), 80-81. Available from: http://www.cnki.com.cn/Article/CJFDTOTAL-LYCY201306032.htm
124	Did not report a specific environmental celebrity campaign – unclear if campaign was ever implemented	Guo, W. 郭薇 (2004). 撒遍人间都是爱——访环境大使李亚鹏 [*A world full of love – an interview with the Ambassador for the Environment, Li Yapeng*]. 世界环境 [*World Environment*]. 2004(2), 6-9. Available from: http://www.cnki.com.cn/Article/CJFDTOTAL-SJHJ200402001.htm
125	Did not report a specific environmental celebrity campaign – reported on a concert with unclear environmental messaging	He, Z. 贺震 (2010). 节能环保:需要宣传,更需要行动 [*Energy saving and environmental protection: The need for publicity, but more about action*]. 环境教育 [*Environmental Education*]. 2010(1), 60. Available from: http://www.cnki.com.cn/Article/CJFDTOTAL-HJJY201001024.htm
126	Did not report a specific environmental celebrity campaign – reported on a media event	Li, M. 李明爽 (2015). 奥运冠军刘国梁出任全国水生野生动物保护公益形象大使 [*Olympic champion Liu Guoliang as National Aquatic Wildlife Conservation Welfare Ambassador*]. 中国水产 [*China Fisheries*]. 2015(7), 21. Available from: http://www.cnki.com.cn/Article/CJFDTOTAL-SICA201507010.htm

127	Did not report a specific environmental celebrity campaign	Wu, X. 吴小军 (2005). 一个喜剧明星的环保情结 [*A star comedian's environmental concerns*]. 环境教育 [*Environmental Education*]. 2005(4), 50-51. Available from: http://www.cnki.com.cn/Article/CJFDTOTAL-HJJY200504022.htm
128	Did not report a specific environmental celebrity campaign – reported on a charity event with unclear environmental messaging	Yan, H. 闫华 (2010). 《时尚芭莎》杂志举办明星慈善夜, 亮相上海助环保 ["*Bazaar" magazine's Star Charity Night, Shanghai debut to help environmental protection*]. 出版参考 [*Publishing Reference*]. 2010(12), 19. Available from: http://www.cnki.com.cn/Article/CJFDTOTAL-CBCK201012020.htm
129	Did not report a specific environmental celebrity campaign – reported on proposed activities but no implementation	Zeng, F. 曾凡美 (2013). "给野生动物一个自然的生存空间" ——访海南省野生动物保护形象大使、香港著名三栖明星温兆伦 ["*Give wildlife a natural living space" – An interview with Hainan Wildlife Conservation Ambassador, famous Hong Kong star Deric Wan*]. 海洋与渔业 [*Ocean and Fishery*]. 2013(7), 36-38. Available from: https://xueshu.baidu.com/usercenter/paper/show?paperid=a2637879a04fa48b1a762e591c2d8f01&site=xueshu_se
130	Did not report a specific environmental celebrity campaign – reported on a documentary with unclear environmental messaging	Zeng, F. & Wang, Y. 曾繁旭 & 王宇琦 (2015). 社会化媒体与明星公共行动的影响力 [*Influence of social media and stars' public actions*]. 探索与争鸣 [*Exploration and Free Views*]. 2015(12), 72-76. Available from: http://www.cqvip.com/qk/97673x/2015012/667167404.html
131	Did not report a specific environmental celebrity campaign – reported on a concert with unclear environmental messaging	Zhang, L. 张粒砂 (2008). 美国新潮: 通过明星的嘴和脸来环保 [*New American trend: Environmental protection through the star's mouth and face*]. 环境 [*Environment*]. 2008(1), 74. Available from: http://www.cnki.com.cn/Article/CJFDTOTAL-HQYT200801032.htm
132	Did not report a specific environmental celebrity campaign – reported on a documentary and concert with unclear environmental messaging	Zhang, Y. 张宇 (2006). 文娱名人的绿色情缘 [*Entertainment celebrities and their green love*]. 中国林业 [*China Forestry*]. 2006(9A), 17-20. Available from: http://www.cnki.com.cn/Article/CJFDTOTAL-ZGLY200617009.htm
133	Did not report a specific environmental celebrity campaign – reported on concerts and celebrity award event with unclear environmental messaging	Zheng, T. 郑婷 (2012). 以绿色的名义期待明天 屈正、李蜜、罗旭等8人获" 2012绿色中国公益大使" 称号 [*Looking forward to tomorrow in the name of green: Qu Zheng, Li Mi, Luo Xu, etc. eight people receives the "2012 Green China Charity Ambassador" title*]. 绿色中国 [*Green China*]. 2012(10), 66-71. Available from: https://xueshu.baidu.com/usercenter/paper/show?paperid=5f8724ab731d8a952e1c589949f1e21e&site=xueshu_se&hitarticle=1

APPENDIX 3.1

Questionnaire

1.1 Please select your gender:
Male
Female
Other

1.2 How old are you?
18-25
26-30
31-35
36-40
41-45
46-50
51-55
56-60
61-65
66-70
71-75
75+

1.3 Please select your Nationality:
Vietnamese
Chinese
Korean
Japanese
Other

1.4 Please select your highest level of education:
None
Primary education
Secondary education
High School Diploma
College
University degree
Postgraduate education
Vocational School

1.5 Please tick the profession that most closely matches your current occupation:
Unemployed
Homemaker
Retiree
Freelance/consultant
Office worker (accountant, bookkeeper, administration, communications)
Industrial worker/machine operator/construction

Service, retail, market worker
Media professional
Business owner, manager, director
Senior government officer
Student
Doctor, lawyer, architect
Education professional
Healthcare professional
IT/Software/High Technology/Engineer
Finance (analyst, investment, tax specialist, audit)
Primary production, farming, fishing, forestry
Other: _____

1.6 Please select the income (per month) bracket you fall under:
< 5 million VND
6 - 10 million VND
11 - 20 million VND
21 - 30 million VND
31 - 40 million VND
41 - 50 million VND
51 - 60 million VND
61 - 70 million VND
> 70 million VND

1.7 Please indicate your marital status
Married
Single

LIFESTYLE AND PRODUCT PURCHASES

Please read the list below. How many of the items below have you consumed in the last 12 months (present month included)? The products you do not count are those you have not consumed even once in the last 12 months.

Control Group	Treatment Group
Snails Squid Crocodile meat Hu tieu	Snails Squid Pangolin meat Crocodile meat Hu tieu

Please read the list below. How many of the items below have you consumed in the last 12 months (present month included)? The products you do not count are those you have not consumed even once in the last 12 months.

Control Group	Treatment Group
Vitamin supplement Kho qua Paracetamol Deer antlers	Vitamin supplement Pangolin scales Kho qua Paracetamol Deer antlers

Please read the list below. How many of the items below have you consumed in the last 12 months (present month included)? The products you do not count are those you have not consumed even once in the last 12 months.

Control Group	Treatment Group
Red wine Coffee Snake wine Beer	Red wine Coffee Snake wine Beer Pangolin wine

DIRECT QUESTIONS

1. Please list three wild animals you have used the most in the last 12 months for food, medicine, as a tonic and ornamentation. If you haven't consumed any, please fill in 'None'.

(Open-ended)

2. Have you used pangolin products in the last 12 months?
Yes
No

If respondent answers 'No', end of questionnaire.

If respondent answers 'Yes':

3. Which pangolin products have you consumed/used in the last 12 months? Please select all that apply:
Meat

Scales
Wine
Other Please specify:_____

The following questions will be displayed depending on answer to previous question.

If they ticked pangolin meat:

Which pangolin part did you consume the last time you consumed pangolin meat?
Whole pangolin
Specific body part:_____
Don't know

When was the last time you consumed pangolin meat?
Within the last month
Within the last 3 months
Within the last 6 months
Within the last year
More than one year ago

Where did you consume pangolin meat the last time you consumed it?
At home
Restaurant (in HCMC)
Restaurant (outside of HCMC)
At my work
Other_____

With whom do you typically consume pangolin meat?
Friends
Family
Business colleagues
Other_____

What is the typical event at which you consume pangolin meat?
Family/friends celebration
Meal with business colleagues
No special event
Other:_____

If they ticked Scales:

What circumstances led you to use pangolin scales the last time you used them?
Illness
Overall well-being
Curiosity
Food
Good fortune

Other_____

Was this at a special event?
Yes/No

If yes: **What was the event?**
Family/friends celebration
Meal with business colleagues
Other:_____

When was the last time you consumed scales?
Within the last month
Within the last 3 months
Within the last 6 months
Within the last year
More than one year ago

Where did you obtain pangolin scales the last time you got them?
Restaurant
TCM doctor
TCM shop
Western doctor
Western pharmacy
Western hospital
Given to me by friend/family
Given to me by business colleagues
Purchased from hunters
Online
Other:_____

Was this in HCMC?

Yes/No

If no:

Please specify the city/province where you obtained the scales:

If they ticked pangolin wine:

What pangolin product did you consumed soaked in wine the last time you consumed it?
Whole pangolin
Specific body part:_____
Don't know

When was the last time you consumed pangolin wine?
Within the last month
Within the last 3 months
Within the last 6 months
Within the last year
More than one year ago

Where did you obtain pangolin wine the last time?
Restaurant
Bar
TCM shop
Given to me by friends/family
Given to me by business colleagues
Purchased from hunters
Other____

Was this in HCMC?
Yes
No

If no:
Please specify the city/province where you obtained pangolin wine:

Where did you consume pangolin wine for the last time?
Restaurant
Bar
At home
TCM shop
Other_____

Was this in HCMC?
Yes
No

If no: Please specify the city/province where you consumed pangolin wine.

With whom do you typically consume pangolin wine?
Friends
Family
Business colleagues
Other_____

What is the typical event at which you consume pangolin wine?
Family/friends celebration
Meal with business colleagues
No special event

Illness
To improve my overall health
Other:_____

If they ticked Other:

What other pangolin product have you consumed?
(open-ended)

When was the last time you consumed/used this product?
Within the last month
Within the last 3 months
Within the last 6 months
Within the last year
More than one year ago

Where did you obtain this product the last time you obtained it?
Restaurant
Bar
Given to me by friend/relative
Given to me by business colleagues
TCM shop
Souvenir shop
Western pharmacy
Purchased from hunters
Online
Other_____

Was this in HCMC?
Yes
No

If no:
Please specify the city/province where you obtained this product.

What is the typical occasion/circumstance in which you would use/consume this product?
Family/friends celebration
Meal with business colleagues
No special event
To treat an illness
To improve overall health
To bring good fortune
Other:_____

APPENDIX 3.2

Variables combined for analysis

Table 1. Age categories grouped into broader categories for analysis.

Age options displayed in Questionnaire	**Age categories used for analysis**
18-25	18-25
26-30	26-35
31-35	36-55
36-40	55+
41-45	
46-50	
51-55	
56-60	
61-65	
66-70	
71-75	
75+	

Table 2. Education categories grouped into broader categories for analysis.

Education options displayed in Questionnaire	**Education categories used for analysis**	
None	Very Basic	None
Primary education		Primary
Secondary education	Basic	Secondary
High School Diploma		High School
College		Vocational
University degree	Higher Education	College
Postgraduate education		University
Vocational School		Postgrad

Table 3. Profession categories grouped into broader categories for analysis.

Profession options displayed in Questionnaire	**Profession categories used for analysis**	
Unemployed Homemaker Retiree Student Freelance/consultant Office worker (accountant, bookkeeper, administration, communications) Industrial worker/machine operator/construction Service, retail, market worker Media professional Business owner, manager, director Senior government officer Doctor, lawyer, architect Education professional Healthcare professional IT/Software/High Technology/Engineer Finance (analyst, investment, tax specialist, audit) Primary production, farming, fishing, forestry Other	Unemployed	
	Homemaker	
	Retiree	
	Student	
	Other	
	Elementary	Service
		Primary production
		Industrial
	Professionals	Freelance/consultant
		Office worker
		Media
		Business owner/ manager/director
		Government officer
		Doctor/lawyer/ architect
		Education
		Healthcare
		IT/Software/Tech/ Engineer/Finance

Table 4. Income levels combined into broader categories for analysis.

Income options displayed in Questionnaire (in Vietnamese Dong)	**Income categories used for analysis**
< 5 million 6 – 10 million 11 – 20 million 21 – 30 million 31 – 40 million 41 – 50 million 51 – 60 million 61 – 70 million >70 million	<5 – 10 million 11 – 30 million >31 million

APPENDIX 4.1

The questionnaire (translation from Vietnamese into English)

1. Please select your gender:
Male
Female
Other

2. How old are you?
18-25
26-35
36-55
55 plus

3. Please select your highest level of education:
Primary education
Secondary education
High School Diploma
College
University degree
Postgraduate education
Vocational School

4. Please tick the profession that most closely matches your current occupation:
Unemployed
Homemaker
Retiree
Freelance/consultant
Office worker (accountant, bookkeeper, administration, communications)
Industrial worker/machine operator/construction
Service, retail, market worker
Media professional
Business owner, manager, director
Senior government officer
Student
Doctor, lawyer, architect
Education professional
Healthcare professional
IT/Software/High Technology/Engineer
Finance (analyst, investment, tax specialist, audit)
Primary production, farming, fishing, forestry
Other

5. Please select the income (per month) bracket you fall under:
<5 million

5 – 10 million
11 – 30 million
31 – 50 million
>50 million

6. Which of the following types of restaurants have you been to with your friends in the last 12 months? Select all that apply.

Street food
Bia Hoi
Jungle Restaurant (or any restaurant that serves jungle meat)
Fast food chain
International Cuisine

7. Which of the following types of restaurants have you been to with your family in the last 12 months? Select all that apply.

Street food
Bia Hoi
Jungle Restaurant (or any restaurant that serves jungle meat)
Fast food chain
International Cuisine

8. Which of the following types of restaurants have you been to with your work colleagues in the last 12 months? Select all that apply.

Street food
Bia Hoi
Jungle Restaurant (or any restaurant that serves jungle meat)
Fast food chain
International Cuisine
N/A

9. Which of the following types of restaurants have you been to by yourself in the last 12 months? Select all that apply.

Street food
Bia Hoi
Jungle Restaurant (or any restaurant that serves jungle meat)
Fast food chain
International Cuisine
N/A

If Jungle Restaurant to ANY of these (if not, questionnaire ends):

10. What do you typically eat at a Jungle Restaurant or a restaurant that sells jungle meat? Select all that apply.

Sea-food
Domestic meat

Jungle meat / farmed jungle meat
Other

Questionnaire only continues if they answer Jungle meat, if not questionnaire ends

11. Is there a typical event in which you consume jungle meat?
Yes
No
Have never consumed jungle meat

If yes:
12. What is the event?
Celebration with family
Celebration with friends
Meal with business colleagues
Other

If Other:

13. Please specify other

14. When was **the last time** you visited a Jungle Restaurant?

In the last month
In the last three months
In the last six months
In the last year
Don't know/don't want to answer

15. Approximately, how many people did you go with the last time you visited a jungle restaurant?
Open-ended

16. Why did you choose going to a Jungle restaurant, or a restaurant that sells jungle meat over other restaurants the last time you went to one? Select all that apply.

Ambiance (facilities, atmosphere, layout)
Food
Service
Convenience
Price
Good for my reputation
The choice was not mine
Other

If Other:

17. Please specify 'other'

If 'The choice was not mine':

18. Who made the choice of going to this restaurant?
Open-ended

19. Who paid for the meal?
I did
One other person in the group
We split it between the group

If another person paid:

20. What was the relationship to you of the person who paid:

21. Which of the following characteristics related to food is the most important to you when consuming jungle meat at a restaurant?
Taste
Quality
Health value
Freshness
Rarity
Price
Variety of options
Other

If Other:

22. Please specify other:

23. Please rate the food you ate the last time in a Jungle restaurant according to the following characteristics:

Taste

Awful	Bad	Okay	Good	Excellent

Quality

Awful	Bad	Okay	Good	Excellent

Freshness

Awful	Bad	Okay	Good	Excellent

Health Value

Awful	Bad	Okay	Good	Excellent

Price

Awful Bad Okay Good Excellent

24. What type of meat did you order last time? Select all that apply.

Chicken
Beef
Pork
Fish
Duck
Civet
Porcupine
Wild pig
Leopard cat
Turtle
Forest rabbit
Forest chicken
Pangolin
Buffalo
Snake
Deer
Other

If Other

25. Please specify 'other':

26. Why did you order this meat?
Open-ended

IF THEY DON'T SELECT PANGOLIN THE QUESTIONNAIRE ENDS

If Pangolin is selected:

27. What pangolin product(s) did you consume? Select all that apply.
Meat
Wine
Other

If Other: Please specify 'other'.

28. Please rate this product according to the following characteristics for the last time you ate it **(TO BE ANSWERED FOR EACH PRODUCT THEY SELECT)**

Taste
Awful Bad Okay Good Excellent

Quality
Awful Bad Okay Good Excellent

Freshness

Awful	Bad	Okay	Good	Excellent

Health Value

Awful	Bad	Okay	Good	Excellent

Price

Awful	Bad	Okay	Good	Excellent

29. How do these compare to previous times that you have eaten this product?
Open-ended

30. Do you consider this pangolin product to be rare?
Yes
No

31. How often do you consume pangolin?
1 time a week
1-3 times a month
1-3 times a year
Have done so 1-3 times in my life

32. If pangolin is not available, what other jungle meat do you order?

APPENDIX 4.2

Table 1. Education categories grouped into larger categories for analysis.

Education options displayed in Questionnaire	**Education options combined for analysis**	
None	Very Basic	None
Primary education		Primary
Secondary education	Basic	Secondary
High School Diploma		High School
College		Vocational
University degree	Higher Education	College
Postgraduate education		University
Vocational School		Postgrad

Table 2. Profession categories grouped into larger categories for analysis.

Profession options displayed in Questionnaire	**Profession options combined for analysis**	
Unemployed	Unemployed	
Homemaker	Homemaker	
Retiree	Retiree	
Student	Student	
Freelance/consultant	Other	
Office worker (accountant, bookkeeper, administration, communications)	Elementary	Service
Industrial worker/machine operator/construction		Primary production
Service, retail, market worker		Industrial
Media professional	Professionals	Freelance/consultant
Business owner, manager, director		Office worker
Senior government officer		Media
Doctor, lawyer, architect		Business owner/ manager/director
Education professional		Government officer
Healthcare professional		Doctor/lawyer/ architect
IT/Software/High Technology/Engineer		Education
Finance (analyst, investment, tax specialist, audit)		Healthcare
Primary production, farming, fishing, forestry		IT/Software/Tech/ Engineer/Finance
Other		

Table 3. Income levels combined into larger categories for analysis.

Income options displayed in Questionnaire (in Vietnamese Dong)	**Income options combined for analysis**
< 5 million 5 – 10 million 11 – 30 million 31 – 50 million >50 million	<5 – 10 million 11 – 30 million >31 million

APPENDIX 4.3

Breakdown of species categories

Table 1. Breakdown of animal species categories. Information on the status of each species was sourced from the IUCN Red List of Threatened Species. Due to time and resources constraints, it was assumed all animals are native to Vietnam so only species native to the country are included below.

Animals displayed in questionnaire	**Species categories combined for analysis**	
Wild pig Deer Pheasant Wild rabbit Porcupine Civet Snake Turtle Pangolin Leopard cat Bamboo rat Crocodile Mouse deer Lizard Ostrich Salamander Buffalo Duck Beef Pork Fish Chicken	Domestic	Beef Pork Chicken Buffalo
	Wild species of concern	**Pangolin** *Manis javanica* (Critically Endangered) or *Manis pentadactyla* (Critically Endangered) **Wild rabbit** *Nesolagus timminsi* (Endangered)
	Species for which there is not enough certainty for category placement	**Mouse deer** unclear whether it is *Tragalusus kanchil* (Least Concern) or *Tragalusus versicolor* (Data Deficient) **Civet** unclear if it is *Chrotogale owstoni* (Endangered), *Viverra megaspila* (Endangered), *Viverricula indica* (Least Concern), *Viverra zibetha* (Least Concern), *Paradoxurus hermaphroditus* (Least Concern), *Paguma larvata* (Least Concern), *Arctogalidia trivirgata* (Least Concern) **Deer** unclear if it is *Muntiacus puhoatensis* (Data Deficient), *Muntiacus vuquangensis* (Critically Endangered), *Cervus nippon* (Least Concern), *Rusa unicolor* (Vulnerable)) **Snake** unclear if it is *Achalinus ater* (Least Concern), *Naja atra* (Vulnerable), *Colubroelaps nguyenvansangi* (Data Deficient), *Argyrophis giandinhensis* (Data Deficient), *Xenopeltis hainanensis* (Least Concern), *Naja kaouthia* (Least Concern), etc. and several snake species are most likely provided by farms (WCS, 2008). **Turtle** unclear if it refers to *Chelonia mydas* (Endangered), *Caretta caretta* (Vulnerable), *Lepidochelys olivacea* (Vulnerable), *Eretmochelys imbricata* (Critically Endangered), *Dermochelys coriacea* (Vulnerable), *Mauremys annamensis* (Critically Endangered), *Geoemyda spengleri* (Endangered), *Cuora galbinifrons* (Critically Endangered), *Cuora picturata* (Critically

		Endangered), *Rafetus swinhoei* (Critically Endangered), *Cuora mouhotii* (Endangered), *Cuora amboinensis* (Endangered), *Cuora bourreti* (Critically Endangered), Chinese Stripe-necked Turtle (Endangered), *Mauremys mutica* (Endangered), *Malayemys subtrijuga* (Vulnerable), but several of these species are supplied by farms. **Lizard** unclear if it is *Leiolepis ngovantrii* (Vulnerable), *Shinisaurus crocodilurus* (Endangered), *Acanthosaura captra* (Near Threatened), *Physignathus cocincinus* (Vulnerable), *Acanthosaura lepidogaster* (Least Concern), *Draco maculatus* (Least Concern), *Takydromus sexlineatus* (Least Concern), etc. **Salamander** unclear if it is *Paramesotriton deloustali* (Least Concern), *Tylototriton notialis* (Vulnerable), *Tylototriton vietnamensis* (Endangered), *Tylototriton verrucosus* (Least Concern), *Tylototriton ziegleri* (Vulnerable), *Tylototriton podichthys* (Least Concern), etc. **Duck** unclear if it is domestic or wild **Fish** unspecified species, could be farmed fresh/salt water or wild fresh/salt water
	Species of least concern	**Wild pig** *Sus scrofa* (Least Concern) **Bamboo rat** *Rhizomys pruinosus* (Least Concern) **Junglefowl** unclear if it refers to *Gallus varius* (Least Concern), or *Gallus gallus* (Least concern) **Porcupine** unclear if it is *Atherurus macrourus* (Least Concern) or *Hystrix brachyura* (Least Concern) **Crocodile** *Crocodylus siamensis* (Critically Endangered) but supplied in Vietnam by farms (WCS, 2008) **Leopard cat** *Prionailurus bengalensis* (Least Concern) **Ostrich** non-native to Vietnam. Speculated to be imported or farmed

References

IUCN. (2020). The IUCN Red List of Threatened Species Version 2020-2. Available at: https://www.iucnredlist.org/

WCS. (2008). *Commercial wildlife farms in Vietnam: A problem or a solution for conservation?* Wildlife Conservation Society, Hanoi.

APPENDIX 4.4

Descriptive graphs of psychographic and behavioural variables compared among demographics and social context of consumption depending on whether a visual difference was observed.

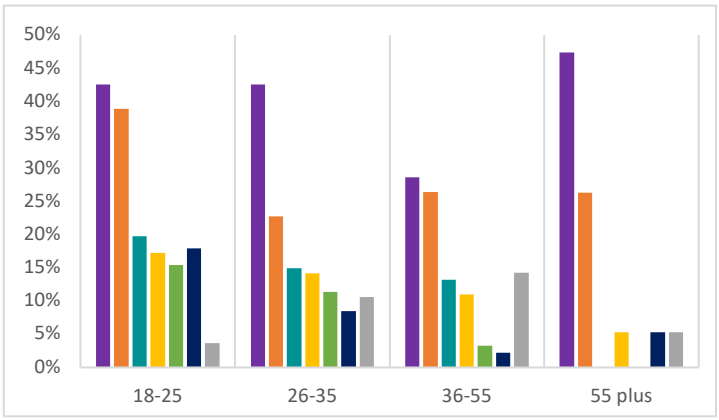


Figure 1a

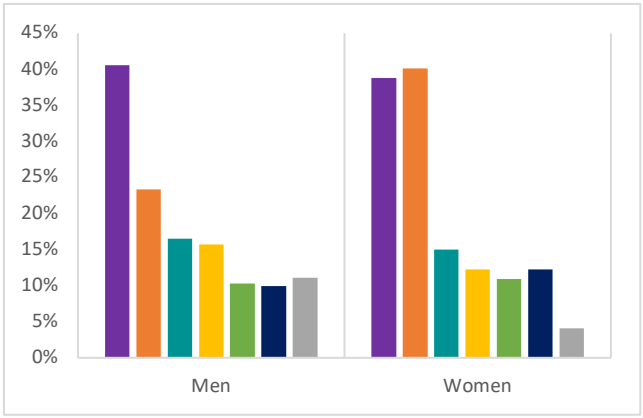


Figure 1b

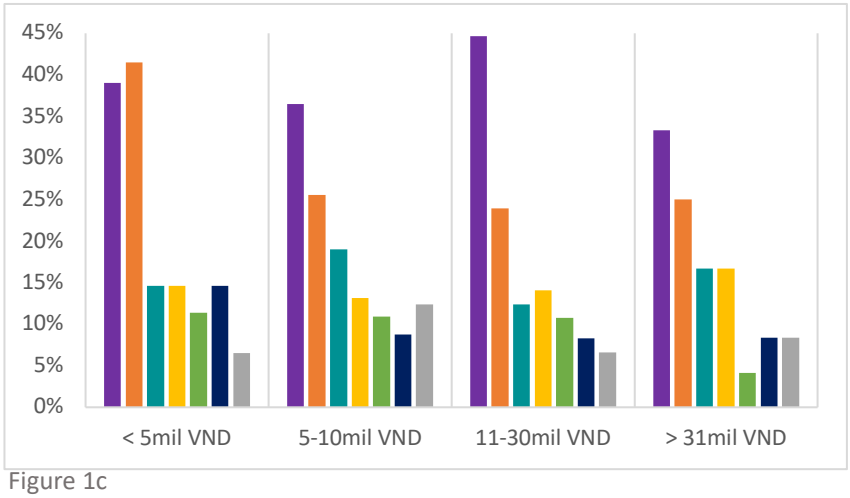


Figure 1c

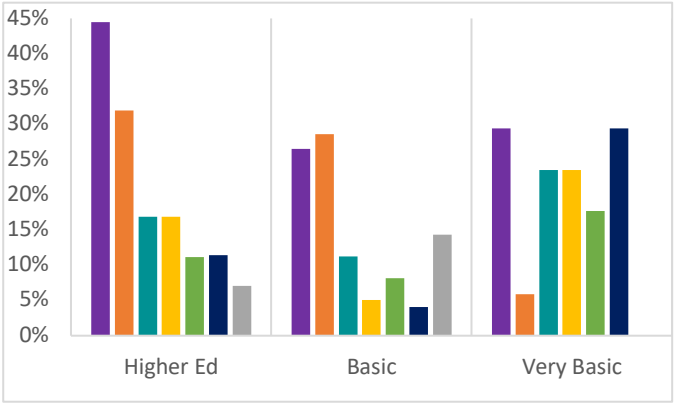


Figure 1d

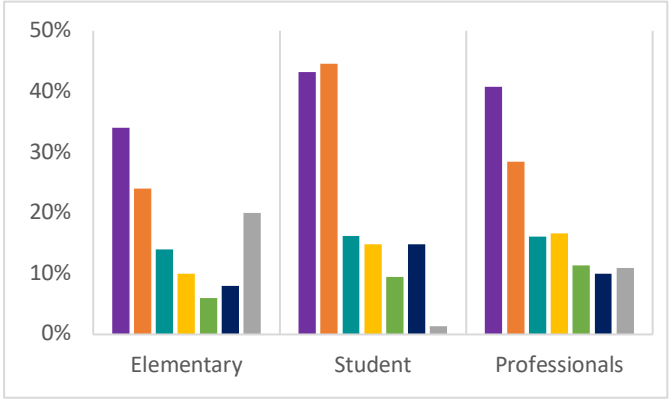


Figure 1e

Figure 1. Reasons for selecting wild meat restaurants by proportions of respondents by a) age; b) gender; c) income level; d) education level; and e) profession type.

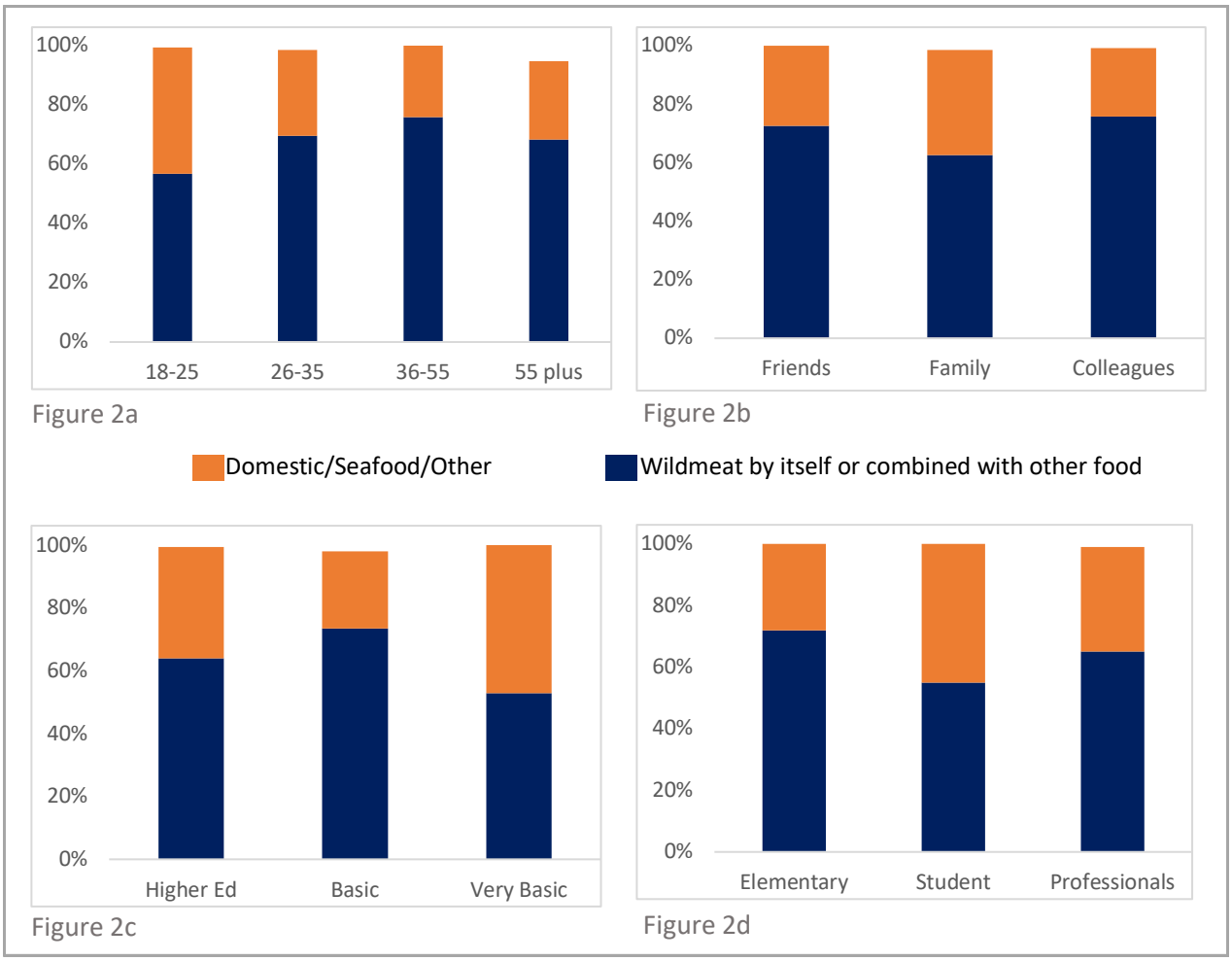


Figure 2. Food typically ordered at a wild meat restaurant by a) age; b) group visited the restaurant with; c) education level; and d) profession type.

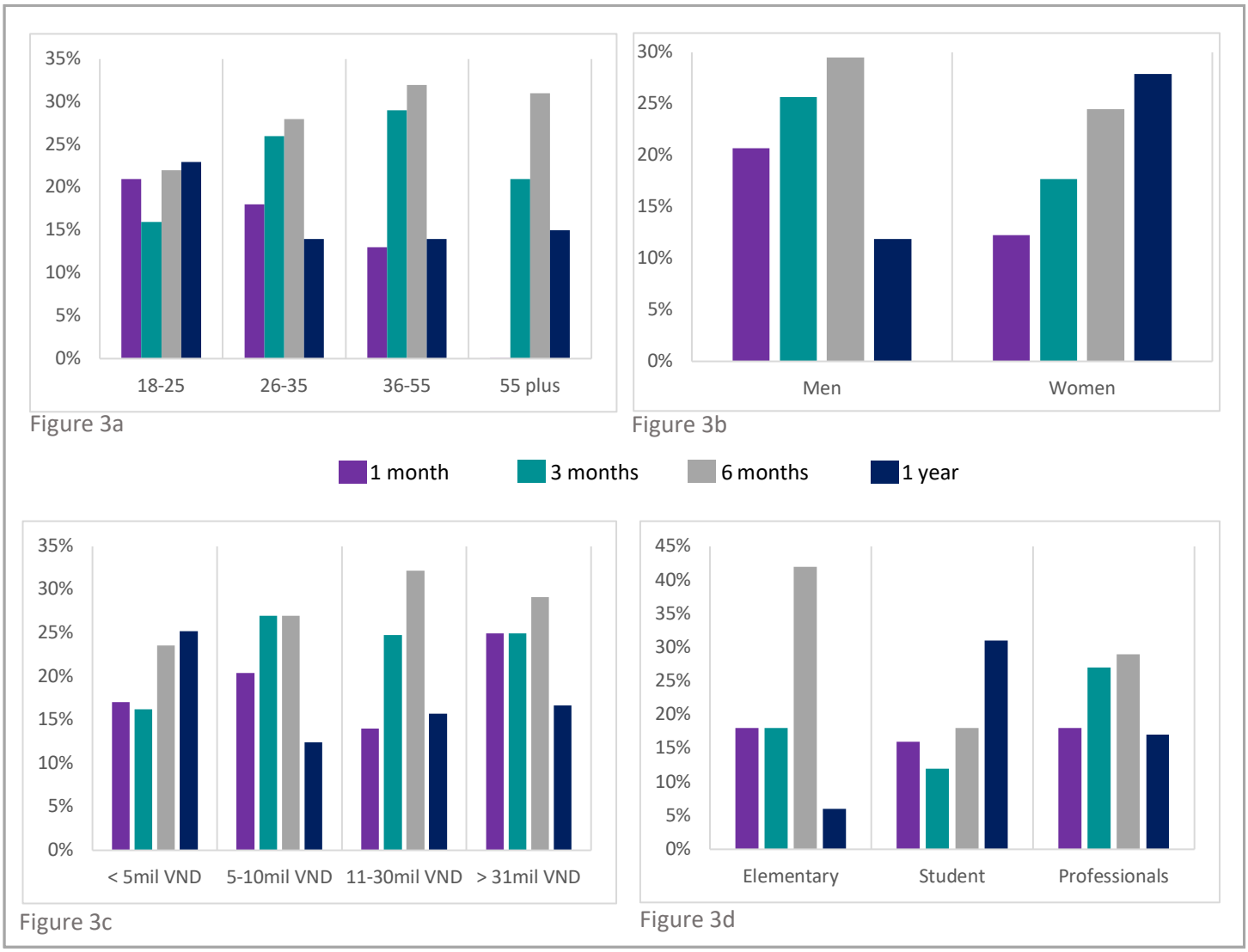


Figure 3. Last time a wild meat restaurant was visited presented by a) age; b) gender; c) income; and d) profession type.

APPENDIX 5.1

Focus group discussions Methods and Results

Methods

Based on results from Chapter 4, I selected Classic Consumers as my target audience. I conducted focus group discussions (FGD) to gain further insights into their consumption of wild meat, to understand the values associated with this behaviour, explore potential alternatives to wild meat, and hear Classic Consumers' opinion on five shortlisted celebrities. I selected focus groups because I sought to create a discussion regarding the topic of wild meat consumption, record and subsequently analyse group opinions on celebrities and their relevance to communicating messages in HCMC regarding consumption of alternatives to wild meat (Newing et al. 2010).

Three focus groups were conducted with Classic Consumers, in December 2020. Participants who fit the target audience profile were recruited in public areas nearby known wild meat restaurants in HCMC. This was done to increase the likelihood of finding people who had consumed wild meat in restaurants in the preceding 12 months. A total of 18 participants (six per FGDs) of my target audience were recruited who fit the desired criteria (Crowe et al. 2015). Focus groups were conducted in Vietnamese and moderated by a professional Vietnamese facilitator who fit the profile of a Classic Consumer so he could connect with participants and create a comfortable atmosphere for discussion. Myself and project partner, Huong Dan, observed all focus group discussions (simultaneous English translation was provided) and feedback sessions were held with the facilitator immediately after each discussion in order to ensure the English translation had not overlooked important insights. This research was approved by the University of Oxford's Social Sciences and Humanities Interdivisional Research Ethics Committee (R58702).

<u>Instrument design</u>

The FGD guide was informed by results from Chapter 4 and consultations with my local partner organisation to ensure cultural context and references were appropriate. The FGD aimed to gain additional insights into the consumption of wild meat in restaurants in HCMC and answer four questions: i) what dishes or restaurants could be promoted as alternatives for wild meat and/or wild meat restaurants? ii) what are the reasons one would select the alternative? iii) who would be the most successful celebrity in promoting an alternative? iv) what communication channels should these messages be delivered on? (Appendix 5.3).

To identify celebrities that could be effective in delivering these messages, literature from the marketing, advertisement and celebrity endorsement fields was consulted to identify attributes that should be considered when selecting an endorser. As part of the research conducted for Chapter 4 to inquire about wild meat consumption in restaurants among residents of HCMC, I requested respondents (N = 384) to name and rate celebrities that fit particular attributes. The attributes inquired about were: credibility, attractiveness, match-up with the product and audience match-up. These attributes follow recognised and evidence-based models summarised in Table 5.1 in Chapter 5.

I applied these attributes to shortlist celebrities by requesting the first half of respondents (N= 188) to list celebrities who they considered to possess these attributes (Appendix 5.4). 'Celebrity' was defined as a person who is "identifiable and well known to a specific audience, and whose activities are more prominent and agency more amplified (in the sense of possessing more ability or resources to influence the course of events) than the average individual within that audience" (Chapter 2). Each question was designed to inquire about one of the attributes mentioned above. I manually collated the ten celebrities that were listed most frequently across all attributes and requested the second half of respondents (N = 196) to rate the top three celebrities among these ten that each individual considered to fit the attribute the best (the order of the list of ten celebrities was randomised for each respondent) (Appendix 5.4). From this rating, the top five celebrities who were considered to fit the attributes by the highest number of respondents were shortlisted and included in focus group discussions; these individuals were: Hoai Linh, My Tam, Viet Huong, Truong Giang and Tran Thanh.

Analysis

Focus groups were transcribed in Vietnamese and translated to English by a professional translator. English transcripts were compared to the original transcripts by Huong Dao (fluent in both English and Vietnamese) who has understanding of the research area, as suggested by Choi et al. (2012).

I conducted a thematic analysis of the focus group findings using NVivo (version 12). An inductive data-driven coding manual was created during coding in which sentences were allocated under descriptive categories (Vaismoradi et al. 2016; Appendix 5.5).

Prior to coding the full dataset, a second coder coded one of the three transcripts (chosen at random) in order to test the reliability and robustness of the codes devised. I measured inter-rate reliability using Cohen's kappa (*K*) calculated in NVivo. The final result was a value of $K = 0.83$. As this is considered a reliable score (Syed & Nelson 2015), I coded the remaining transcripts and proceeded to identify themes from the data for analysis (Vaismoradi et al. 2016).

Results

Analysis of the three transcripts provided the answers to the four research questions and offered further insights into wildmeat consumption.

Species consumed as wild meat

Wild meat was said to be offered in restaurants participants go to; thus, the topic arose naturally and unprompted by the facilitator. Participants stated that they consumed various animals in wild meat restaurants including: wild boar, deer, buffalo, ostrich, weasel, iguana, salamander, porcupine, wild rabbits and junglefowl; which are similar to the species recorded in Chapter 4. A distinction was made by participants during one of the discussions regarding 'middle-rank' (common species) and 'high-rank' animals (rare species). 'High-rank' were considered to be civets, bamboo rats, pangolins, shrimps, crabs (i.e., Alaskan, King) and bird nests. 'Middle-rank' were said to include wild boar, deer, buffalo, goat, bird, snake.

Discussions elicited that participants are aware some of the meat they are served might be coming from farmed wild animals:

> *"What they claim to be wild meat is not real wild meat. Many of them are from farmed animals. 8/10 are farmed animals. They call it wild meat to provoke the feeling of rareness, it is not really wild meat" – FGD 2*

Participants noted customers at a restaurant can never be totally sure if the wild meat is really wild or not, they can only trust what the restaurant claims to serve. However, some believe farming wild animals can limit the illegal hunting and that:

> *"If the animal can be farmed, its consumption should be encouraged" – FGD 2*

<u>Reasons for consuming wild meat</u>

The main reason discussed for consuming wild meat was to 'change taste':

> *"I want to eat wild meat to make it different from ordinary days" – FGD 1*

> "[regular non-wild meat dishes] *Are ordinary because we eat them often then they are not special anymore. Like chicken can be cooked in many different ways, but in the end, it is still only chicken" – FGD 3*

The second most frequent reason referred to food-internal attributes, those specific to the physical qualities of the meat, such as taste:

> "[Referring to ordinary food] *They are much inferior to wild meat" – FGD 1*

> *"*[Referring to wild meat] *Its natural taste is different from that of normal animals" – FGD 2*

> *"Wild meat is sweeter and more delicious than regular meat" – FGD 3*

Other reasons were the food-external attributes, which refers to the social activities or perceptions associated with consumption and the role it plays in social dynamics:

> *"When we eat wild meat, people are more excited than when eating seafood. For example, when we sit at a table with wild meat dishes and other tables around us are without, then we also feel happy" – FGD 3*

> *"Wild meat is rare and expensive, like a special dish for rich people to show off. So, when we invite our VIP guests to eat wild meat,*

they will feel that we show them respect" – FGD 2

Another reason was that wild meat is a good combination with alcohol – drinking alcohol, 'boozing', is considered an essential part of this social activity. In addition, wild meat is perceived to be healthier, more nutritious and natural than meat from domestic animals. The latter are believed to have more fat than wild animals and to be fed growth promoters rather than natural food which wild animals eat in the forest.

Wild meat consumption as a social activity

Consuming wild meat was described as an entirely social activity, which people take part in with friends, colleagues and business partners or customers. The importance of making everybody included feel comfortable was highlighted:

> *"If I hang out with my friends, we can probably go somewhere at a reasonable price, if we go for premium options, not all people in the group are comfortable with it. It will be very bad if those people think that we are isolating them" – FGD 2*

Differences were discussed regarding the type of places participants can go with friends or colleagues in a casual context compared to the restaurants they are expected to take business partners, bosses or customers:

> *"With friends we can go to casual restaurants or eateries, with cheap and good food" – FGD 1*

> *"If I want the party to be more special, instead of inviting the person to eat seafood which is very regular, then I want to introduce that person to wild meat because it is rare and uncommon. If the person I invite is my boss then I must give them something uncommon" – FGD 3*

Potential alternatives to wild meat and reasons for selecting them

Several alternatives were identified (Table 1), of which the one mentioned most frequently was seafood, which includes fish, shrimp, crab, shellfish, squid, octopus and snails.

Table 1. Alternatives to wild meat discussed by FGD participants presented by counts of FGD where each alternative was brought up.

Alternative	**Number of FGD it was brought up in**
Seafood	3
Chicken	3
Beef, veal	3
Hot pot	3
BBQ	3
Duck	3
Farmed wildlife (i.e., goat, eel, frogs)	2
Dishes typical of different regions (i.e., Mekong delta)	2
Salad	1
Beer clubs	1
Other wildlife (i.e., turtles, tortoises, field rats)	1
Street food restaurants	1
Dog meat	1
Countryside dishes (i.e., food from rural areas)	1

A number of reasons for selecting these alternatives instead of eating wild meat were discussed by participants, with Price being the most common (Table 2). The expensive price of wild meat was brought up and how this limits how often one can go to a wild meat restaurant. Cost per person at a wild meat restaurant was said to vary from 300,000 VND to 1,000,000 VND, depending on the dishes ordered with species like civets and other rare dishes being more expensive than others.

"I want to eat economically, some days I don't have much money then I don't dare to go to wild meat restaurants" – FGD 2

"We would be more worried when going to wild meat restaurants, where everyone must contribute enough to pay the bills" – FGD 1

"The more wild meat I consume, the poorer I become" – FGD 2

"If we are going in a large group, we con only have little wild meat, but we can have plenty of these [ordinary] *dishes – FGD*

Table 2. Reasons for choosing alternatives rather than wild meat.

Reason	**Number of FGD it was brought up in**
Price	3
Atmosphere	3
Service	3
Mood/Taste	3
Location/convenience	3
Specialises in one dish	3
Credibility	2
Wild meat unavailable	2
Quality/Freshness	1
Attractive name	1
Untrustworthy quality of wildmeat	1
Good combination with alcohol	1
Widely accepted	1
Popular	1
Recommended by someone	1

Atmosphere refers to how open, casual, and busy a restaurant is. Preferences were indicated for *"outdoors, open, with beautiful scenery, garden-style"* restaurants. In regards to Service, participants described a significant waiting time in wild meat restaurants unless the meal is ordered beforehand. Thus, a restaurant that serves a tasty meal in a short amount of time, would be well received. Participants spoke a lot about wanting to eat different types of food depending on the *"mood"* they are in, i.e., what they are craving at a given time, usually something that is not eaten often:

"I want to eat something that I don't feel too bored with" – FGD 3

Restaurants that specialise in one dish were considered attractive as this tactic highlights the uniqueness of the dish and the skill required to prepare it. Additionally, such restaurants are likely to offer more novel food than what is consumed reguarly.

Credibility of the food served, was also an attractive attribute of alternatives. This refers to trust that the meat/dish served is genuinely what it is advertised as:

> *"For example, if it is Ca Mau crab, then it must be from Ca Mau province, cannot be from other places" – FGD 3*

> *"They don't mix ingredients. They don't mix French beef with normal beef, for example" – FGD1*

This relates to a concern mentioned of eating wild meat:

> *"Only afraid that it* [wild meat] *is fake" – FGD 3*

There was also a preference for fresh food, which refers to animals that are usually alive right up until they are killed for the meal, as opposed to meat that has been stored or frozen.

Celebrities

Five local celebrities (described in the Methods section) were presented to participants. All of them, except female singer My Tam, appeared to be congruent with messages around food consumption; My Tam was associated with cosmetic, luxury products, a few scandals (e.g., related to her romantic life) and not considered to be persuasive. Perceptions of each celebrity were inquired following the celebrity models described in the main text (Table 1). Associated images, perceptions and opinions are summarised in Figure 1 in the main text. Hoai Linh was perceived most favourably in all FGD even in respect to messages around food consumption:

> *"Hoai Linh can influence everyone, from young to old people, his life is the norm for many people. Furthermore, his words are always more attractive and more respected than others, he is admired by everyone" – FGD 2*

> *"Whenever it comes to food, Hoai Linh is the first person to come to mind" – FGD 2*

However, because he is associated with a simple, more ordinary life, as opposed to luxury, a participant commented an endorsement by Hoai Linh might make the dish: *"a bit too common" – FGD 1*.

The second celebrity who appears to be associated with positive attributes is a female comedian and master of ceremony (MC), Viet Huong. Participants generally had a positive opinion of her, and related her to the act of going for a meal and drinks ('boozing'). Participants knew of existing YouTube content where Viet Huong reviewed various restaurants local to HCMC. This previous experience has given her a reputation of being willing to explore different and new dishes around the city. When compared to

Hoai Linh, Viet Huong was perceived to be more commercial, meaning she is more likely to promote products to earn money.

In contrast, male comedian Truong Giang and male comedian and MC, Tran Thanh, were not perceived as positively by participants. Truong Giang had the highest number of negative perceptions of all celebrities, followed by Tran Thanh. Although both celebrities own restaurants, this was not seen to provide them with expertise or knowledge about food, but was believed to be a motive for suspicion if they are seen endorsing dishes or food:

> *"Tran Tahnh and Truong Giang have restaurants so it will be harder for them to convince people" – FGD 2*

Additionally, both of these individuals were said to likely be effective in influencing young people rather than members from my Classic Consumers target audience.

Although Hoai Linh and Viet Huong were described as persuasive, particularly in promoting certain dishes in HCMC, some participants claimed they do not care about celebrity endorsement in general:

> *"Personally, if a famous or non-famous person talks about a dish, if I try it, it's good and I like it, it's not because of the famous person" – FGD 3*

> *"For me, in fact, I don't like actors and actresses. I don't care and don't listen to whatever they say because I know they are acting" – FGD 3*

When discussing long-term influence of persuasive celebrity endorsements of an alternative to wild meat, participants clarified this influence would only be effective in the short-term because wild meat is not consumed often and eventually, they will have to 'change their taste' away from more ordinary food.

<u>Communication channels</u>

There was a clear distinction made between communication channels frequently used by participants and those that are considered reliable. While Facebook was the most popular channel, followed by YouTube, Zalo (a similar, Vietnamese version of Facebook), online newspapers and television, the order of reliability was different. Facebook was used because it is easy to access at any time (due to smartphones), is constantly updating on news and friends' updates and is used by everyone. However, Facebook and YouTube were both considered *"too free"* because anyone can post anything and there is no verification process before news are posted and shared.

The most reliable channel was television, as this was considered an official channel that is verified by the government. Online newspapers were considered the second most reliable channel, followed by billboards.

Some channels appeared to be more relevant to specific celebrities; Viet Huong, Tran Thanh and Truong Giang are known to share videos on YouTube and Facebook while Hoai Linh does not have much of a presence on YouTube and he was associated with television, the more official and traditional channel.

Combination of alternatives, reasons, celebrities and channels

As part of the FGD, participants were asked to combine an alternative food type and reasons for selecting it with a celebrity and a communications channel (Table 3).

Table 3. Combinations of intervention elements provided by FGD participants.

Alternative	**Celebrity**	**Reason**	**Channel**
Southern grill village (grilled food restaurant)	Hoai Linh	Affordable price, popularity, family-oriented, suitable for everyone's taste and for boozing	TV – channel associated with Hoai Linh
Southern Bun Bo Nam Bo (vermicelli noodle dish with beef)	Hoai Linh	Good service, spacious, with VIP rooms	TV – channel associated with Hoai Linh
Chicken wrapped with sticky rice, grilled food, young lotus stalk salad	Hoai Linh	Fresh, reasonable price, countryside dishes	TV – channel associated with Hoai Linh
Banh canh (rice noodle soup) or Banh canh vit lay (duck rice noodle soup)	Viet Huong	Restaurant specialises in one dish, taste, reasonable price	YouTube or Facebook – channels where Viet Huong shares content
Chau Doc (location in the Mekong Delta) fish and snail vermicelli, simmered eel, stir-fried eel	Viet Huong	Taste, reasonable price, specialties of the Mekong Delta	Facebook – channel where Viet Huong shares content
Oc Vinh Khanh snail restaurant	Viet Huong	Spacious and cool restaurant	TV – Viet Huong did a TV show on local restaurants, like Oc Vinh Khanh, in the past
Chicken with distiller grains	Tran Thanh	Restaurant specialises in one dish, taste, good combination with alcohol	YouTube – channel where Tran Thanh shares content
Crystal crab and elephant trunk snail	Tran Thanh	To change taste with something unique and novel	Facebook – channel where Tran Thanh shares content

Oc Dao snail restaurant	Tran Thanh	Taste	Facebook – channel where Tran Thanh shares content
Danh Phat veal restaurant	Truong Giang		Facebook – channel where Truong Giang shares content
Steamed chicken and grilled octopus	Truong Giang	Taste	Facebook – channel where Truong Giang shares content

Illegality of consumption and overexploitation of wildlife

Participants were aware that selling particular wildlife products is prohibited and that certifications are needed to demonstrate the legal origin of wildlife served at restaurants. Due to wildlife being limited in restaurants, participants mentioned it is necessary to know the right people to ensure real wild meat can be acquired, which might only be sold to acquainted customers.

Hunting of many species was understood to be a crime but consumption was not; there was a perception that those providing the supply must ensure they are following the law, but those consuming are not responsible for the illegality of products. In the words of one of the participants: *"No supply, no demand" – FGD 3.* Additionally, the knowledge that authorities in Vietnam consume wild meat appeared to be a disincentive to limit consumption:

> *"If someone with authority sets a bad example, those below them will follow" – FGD 3*

> *"There are many calls to stop, however, in the long-term will they* [authorities] *stop?" – FGD 3*

When discussing general messages to achieve a reduction in wild meat consumption, participants spoke of the need for government announcements on the illegality of the behaviour and that it must be highlighted that customers will be fined if protected species are consumed.

It was understood some animals are and should be protected by law, these were: monkeys, tigers, elephants and pangolins. There was also awareness regarding species that are facing declines and should be preserved: bears, pangolins, rhinos, elephants, civets, mouse deer and bamboo rats. Participants knew wild animals are depleted in Vietnam and that are now harder to find, particularly in certain areas of the country. However, this knowledge was only mentioned as a reason to halt wildlife consumption by one participant.

Aftermath of COVID-19 pandemic

While the links to SARS-CoV-2 and eating meat from wild animals and wildlife trade have been widely discussed, these links were not salient with my target audience. The only impact COVID-19 reportedly had on participants' wild meat consumption habits was that

it limited their income so they could not eat out as often. The only wildlife connected to the virus was bats, *"But nobody eats bats" – FGD 3.*

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APPENDIX 5.2

Behaviour change models considered for application in my case study.

I considered behaviour change models that could highlight risks associated with consuming wild meat and those that speak to the social norms or identification with one's social group given that a previous study suggests that the food-external stimuli, such as anticipated social consequences or images associated with consuming wild meat, is a driver for this behaviour (Chapter 4).

Table 1. Behavioural models and theories considered for application in the present case study.

Model	**Brief overview**	**Applicability to case study**	
		Applicable	Inapplicable
COM-B Model (Michie et al. 2011)	Contends that three factors must be present for a behaviour to occur: capability (physical and psychological), opportunity (physical and social) and motivation (automatic or reflective). Proposes the behaviour change wheel to guide intervention design to target one, or more, of the three factors.	Research conducted for this case study (Chapter 4) demonstrates other alternatives to wild meat exist and are sometimes chosen in the same context where wild meat is consumed. This proves consumption of wild meat is not an automatic, but rather a reflective choice made by consumers, thus the reflective motivation factor described in this model, could be addressed. The social opportunity factor could also be addressed through a shift in social norms.	It would not be feasible for my project team to design an intervention that restricts the physical or psychological capability of consumers, nor to limit the physical opportunity given this would require decreasing availability of wild meat which would be more appropriate for a law enforcement intervention.
Extended parallel process model (Witte 1992)	Predicts behavioural reaction when an individual is confronted with fear-inducing stimuli. Commonly used in health communication campaigns.		No available evidence suggests consuming wild meat in HCMC is detrimental to human health. It would be unethical to attempt to induce fear in my target audience from consuming wild meat.
Precaution adoption process Model (Weinstein 1988)	Explains how a decision is made regarding the adoption of a new precaution and how an individual translates that decision into adoption of the precaution or cessation of risky behaviour.		A legitimate deterrent (related to health risks or illegality of consuming certain species) does not currently exist in Vietnam (Appendix 5.1) thus, consumers face no known immediate risk an intervention could leverage on.

Social cognitive theory (Bandura 2001)	Contends that human behaviour influences and is influenced by personal factors, such as knowledge and self-efficacy, and environmental factors, both social and physical. Social learning is highlighted as a main influence in this theory.	Social factors seem to be enabling the consumption of wild meat (Chapter 4); if successful in influencing part of the target audience, an intervention could rely on social learning to contribute to a reduction in wild meat consumption.	An intervention that relies on social learning could be more useful in later stages once members from this target audience subscribe to the desired behaviour.
Social ecological model of behaviour change (Panter-Brick et al. 2006)	Emphasises multiple levels of influence (individual, interpersonal, organizational, community and public policy) for human behaviours, contending that behaviour is affected by these personal and environmental factors.		My case study did not seek to explore the relationship between the community, other organisational factors or policy related to my target behaviour.
Social-identity theory (Tajfel 1979)	A person's sense of self is based on their group membership. Individual's attitudes, emotions and behaviours are shaped by their social group and thus, group norms are internalised.	Chapter 4 suggest that the social consequences and activities associated with wild meat consumption are important drivers of this behaviour.	However, no evidence from my case study suggests demonstrating group membership is a motivation driving consumption of wild meat.
Social norms theory (Perkins & Berkowitz 1986)	Posits that human behaviour is influenced by misperceptions of how peers act and think. Correcting misperceptions of perceived norms will most likely result in a decrease of the undesired behaviour.		Results from previous research into wild meat consumption in Vietnam suggest this behaviour is performed to enhance one's social status, emphasising belonging to an elite group (Shairp et al. 2016); this is also supported by the FGDs. Enhancing the rarity of this behaviour might have an undesired impact in my target audience.
Theory of normative social behaviour (Rimal and Real 2005)	Posits that the influence of descriptive norms (perceptions about what other people do) on behaviour is moderated by injunctive norms (perceptions about what one is expected to do), outcome expectations and group identity.		Introducing injunctive norms in my case study would require introducing a moral appeal about wildlife depletion/ environmental conservation, which have been mostly ineffective in conservation (Wright et al. 2015). Additionally, referencing what this group is socially expected to do could have the adverse effect of reinforcing the expectation to affirm/display one's social status by consuming wild meat.

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APPENDIX 5.3

Focus group discussion guide

WILD MEAT RESTAURANTS

- *What types of restaurants do you go to with friends? Family? Colleagues? Why those restaurants with each group?*
    - *What are the main reasons for choosing to eat at a wild meat restaurant instead of a different type of restaurant?*
    - *What do you like about the food at wild meat restaurants?*
    - *(If it has not come up:) In what social situation would you visit a wild meat restaurant?*
- If going to a wild meat restaurant is not a possibility for di nhau or other social times, where would you (and the group you are with) go instead? You don't need to think just about restaurants.
- If wild meat dishes are not available, what would you eat instead (that would likely be available in that same restaurant)? Why these dishes in particular?

CELEBRITIES

- We've identified these 5 celebrities (listed below) who might be well regarded in HCMC. What are some words that come to mind when you see these individuals? Who do you think is their main fan base?
- Of these 5 celebrities, who are you most likely to listen to when thinking about which restaurants to visit and what food to eat?
    - Exercise: rank celebrity list (as a group) from most to least in terms of who they think people would pay attention to regarding which restaurant to visit/what food to eat.
- Now thinking specifically about going to wild meat restaurants, and about choosing wild meat dishes when you're there, would your ranking of celebrities change if one/more of the celebrities conveyed a message to you about where to go or what to eat? Why?
- If you think there is a more influential messenger to discuss these topics than any of these five celebrities, who would it be? Why?

COMMUNICATION CHANNELS

- What communication channels do you trust the most?
- Would your ranking regarding trust be the same if the messages being delivered were discussing consumption of wild meat?

CHOOSING ALTERNATIVES

- Earlier we discussed restaurants or venues you might go to when, for whatever reason, you are not able to go to a wild meat restaurant and we discussed other dishes you might order when wild meat is not available.
    - What are the most important positive reasons why you would choose the ALTERNATIVE (say the name/type of establishment) restaurant or other type of venue, rather than a restaurant that sells wild meat?

- What are the most important positive reasons why you would choose the ALTERNATIVE (say the name/type of food) dish/dishes rather than wild meat?
- What are the most important negative reasons why you would NOT choose the ALTERNATIVE (say the name/type of establishment) restaurant rather than one that sells wild meat?
- What are the most important negative reasons why you would NOT choose the ALTERNATIVE (say the name/type of food) dish/dishes rather than wild meat?

<u>CHANGING CONSUMPTION OF WILD MEAT WITH CELEBRITIES – CASE STUDY</u>
Now we will explore the best fit of celebrity messengers in an example case study where the alternatives for wild meat and restaurants will be presented/promoted to people who occasionally eat at wild meat restaurants.

- Exercise:
  - **For facilitator:** Given to participants: XX CARDS with alternatives for restaurants and for meat. TWO CARDS with the most likely reasons to select an alternative venue. TWO CARDS with the most likely reasons to select a different dish/food. FIVE CARDS for each of the 5 celebrities. THREE with the three communication channels ranked the highest.
  - Activity: As a group, participants select **one venue** alternative that would be best presented by X celebrity supported by X reason delivered through X communication channel to effectively promote an alternative.
    - They can repeat this exercise as many times using as many alternatives/arguments/celebrities they think would be effective in promoting the alternatives.
    - If they create several combinations, they have to rate them in the order they think they would be most effective.
  - Activity 2: As a group, participants select **one wild meat** alternative that would be best presented by X celebrity supported by X reason delivered through X communication channel to effectively promote an alternative.
    - They can repeat this exercise as many times using as many alternatives/arguments/celebrities they think would be effective in promoting the alternatives.
    - If they create several combinations, they have to rate them in the order they think they would be most effective.
- How may the celebrity "sell" the most appropriate alternative and message?
    - For example – be seen in an advertisement eating somewhere else besides a wild meat restaurant / doing something else / eating something other than wild meat? Share his/her thoughts on promoting the alternative on their own social media platforms? Partner with other respected individuals to deliver the message (nutritionists, government officials, restaurant owners, etc.)?
- Do you think the alternative, messenger and argument that resonates with you as a group would be the same for anyone who eat wild meat in restaurants? If not, why not?

COVID

- Discuss the COVID outbreak and its relationship with wildlife consumption.
    - Do they know if this news has impacted the behaviour of anyone they know in relation to buying or consuming wildlife, particularly at restaurants? And if so, how? Have you changed your behaviour concerning the food you eat, and if so why?

APPENDIX 5.4

Celebrity-related questions from the study conducted in Chapter 4.

Naming celebrities

Celebrity (this definition was read out and explained to respondents by Research Assistants): This person can be a famous individual or just a 'well-known person' who a lot of people in your social circle would recognize even if they don't know them personally, they can be international as well.

1. Who do you consider a well-known celebrity?
2. Which well-known person do you consider to have a good reputation?
3. Who do you consider to be a trustworthy (believable, honest and dependable) well-known individual?
4. Who is a well-known person you admire?
5. Who is a well-known person you think can represent you and your social circle?
6. Who is a well-known person you think would be successful in advertising a restaurant in HCMC?
7. Why do you think this person would be successful in advertising a restaurant in HCMC?

Rating of celebrities

Hoai Linh
Dan Vinh Hung
Viet Huong
My Tam
Tran Thanh
Cam Ly
Huong Giang
Truong Giang
Dan Truong
Son Tung

1. Please indicate **in order** which well-known individuals from the list below you consider to be the most well-known, second well-known and third well-known.
2. Please indicate **in order** which well-known individual from the list below you consider to have the best reputation, second best and third best reputation.

3. Please indicate **in order** which well-known individual from the list below you consider to be the most trustworthy, second most trustworthy and third most trustworthy.
4. Please indicate **in order** which well-known individual from the list below you admire the most, second and third.
5. Please indicate **in order** which well-known individual from the list below you consider can represent you and your social circle the best, the second best and third best.
6. Please indicate **in order** which well-known individual from the list below you consider can be the best at advertising a restaurant in HCMC, second best and third best
7. Why do you think the person you selected first as most successful to advertise a restaurant in HCMC would be the most successful to do so?

Ranking results

Celebrities ranked first for each attribute were allocated 3 points; those rated second were allocated 2 points; and those rated third were allocated 1 point; in cases where respondents ranked four or five celebrities, those ranked fourth and fifth were allocated 1 point for each ranking. This scoring system was used so the celebrity who was ranked first for each attribute would receive more points than those ranked in other positions.

Table 1. Celebrity ranking results per attributes described in celebrity models (Table 1, main text). Dark gray rows depicts the top five celebrities ranked the highest overall.

	Well-known	Good reputation	Trustworthy	Admirable	Represents social circle	Best at advertising restaurant	TOTAL POINTS
Hoai Linh	237	263	252	221	232	152	1358
Dam Vinh Hung	68	51	51	58	54	41	323
Viet Huong	65	108	89	71	83	121	537
My Tam	157	213	174	145	147	111	947
Tran Thanh	168	117	119	161	137	199	901
Cam Ly	61	90	108	57	86	49	451
Huong Giang	89	42	67	87	87	83	455
Truong Giang	99	77	56	97	65	129	523
Dan Truong	62	96	73	60	53	56	400
Son Tung	105	49	48	98	53	81	434

APPENDIX 5.5

Codebook exported from NVivo and used to code focus group discussion transcripts. Node Name shows the categories and subcategories in which sentences were coded into.

Node Name	Description
Celebrities	
Comparisons	Statements comparing one celebrity to another. Can be in terms of popularity, in terms of being knowledgeable or relatable, etc. but NOT regarding their influence.
Influence	
Level compared to each other	Mentions of comparing one celeb to another in terms of how influential they can be
Most persuasive celeb	Comments made on who the celebrity with highest perceived level of influence is whether it answers a question from the moderator or not.
Negative or indifferent or unsure	Responses on celebrity influence being low, very low, 50/50 or if people make any other comments that suggests they feel indifferent about the potential influence.
Other people	Mentions of how other people besides the 5 celebrities could influence the participants (friends/family/colleagues) even other celebrities
Positive	Any mention of how a specific celebrity (which should be coded as a Case) may have/or has the ability to influence adults (themselves or their friends or people in general, not young people, teenagers or children) in the city.
Young people	Mentions of how X celebrity can only influence young people
Luxury	Represents high class
Inappropriate for food	Mentions of celebrities not matching food/restaurant advertising
Negative perceptions	Mentions or comments of celebrities having a bad reputation, having heard negative rumors about them, having heard celebrities are associated with scandals. Includes negative comments of how celebrities treat other people.
Positive attributes	
Admirable	Only when people specifically and literally say the celebrity is admired
Best ad a restaurant	Most successful at advertising a restaurant in HCMC
Countryside dishes and regional	Comments on celebrity having knowledge/ being associated with dishes from the country side and other regions (e.g., Mekong delta)
Explore new or different dishes	Comments on celebrity being known for trying out different/new/weird dishes
Luxury dishes or restaurant	Comments on celebrity being associated for promoting, eating expensive, luxurious dishes or restaurants
General Positive	General positive comments made about the celebrities that cannot be coded as any of the specific attributes in this same folder (Admirable, Good reputation, How they treat others, Knows food…, Like, Relatable, Represent social circle, Trustworthy, Well-known)
Good reputation	Only when people specifically and literally say the celebrity has a good reputation

How they treat others	Positive comments on how celebrities treat other people
Knows food or cooking or has reviewed restaurants before	Mentions or comments of celebrities having knowledge /experience with food, cooking or reviewing food or restaurants
Like	Only when people specifically and literally say the celebrity is like/they like the celebrity
Relateable	Only when people specifically and literally say the celebrity is easy to relate to
Represent social circle	Only when people specifically and literally say the celebrity can represent their own social circle
Trustworthy	Only when people specifically and literally say the celebrity is trustworthy, honest, believable
Well-known	Only when people specifically and literally say the celebrity is well-known or popular
Comms channel	
Best for WM topic	Comments about how a communications channel is most appropriate to discuss the topic for wild meat
Favourite	Ranking of which communications channel respondents prefer
Popular	Ranking or comments of which communications channel respondents use MOST often
Reliable	Ranking or comments of which communications channel respondents consider the MOST reliable
Reliable for celeb	Channels where a celeb would reliably share their news, their own posts, their own opinions
Used	Listing or mentioning which communication channels people use (not related to frequency or reliability or linked to celebrity)
COVID	
Eating habits	Mentions or comments of how COVID has changed respondents' eating habits.
Link to wild meat	Comments on whether respondents think or don't think COVID is linked to wild meat.
Food	
Alternatives	
BBQ	
Beef, veal	
Beer clubs	
Chicken	
Countryside dishes	
Dishes typical of other VN locations	For example, dishes form the Mekong delta
Dog meat	
Duck	
Family dishes	
Farmed wildlife	
Hot pot	
Other Wildlife	Any other wild animals mentioned (rats, turtles, etc.) with no mention whether they are farmed or not. These are animals that in the direct Vietnamese translation may not be considered wildmeat.
Reasons	Reasons for selecting these other dishes rather than wild meat
Atmosphere	
Attractive name	
Credibility	Real ingredients, not falsely advertised or mixed with cheaper,

	other, ingredients
Good with alcohol	
Location and convenience	
Mood or taste	Preference of the speaker, wanting to eat something different besides wild meat.
Popular	Respondents know of the popularity of a restaurant and know it's a good place to go to/or to try out.
Price	
Quality or Freshness	Any mention about the quality, freshness, authenticity of other dishes whether it is something positive or something negative about the quality or freshness of wild meat
Recommendation	A friend or acquaintance had previously recommended a restaurant.
Service	
Specialising in one dish	
Untrustworthy quality of wild meat	
Widely accepted	Comfortable for everyone
WM unavailable	
Salad	
Seafood	Includes fish, crab, shrimp, snail
Streetside eateries	
Authorities eating WM	Mentions/comments of government authorities eating wild meat
Domestic animals	Mentions/opinions of pig, beef, chicken, in comparison to wild animals
Eating WM outside of HCMC	Mentions of having eaten wild meat outside of HCMC, in other parts of Vietnam or other countries.
Farmed wild animals	Mentions of wild meat in restaurants coming from farms or mentions/opinions about farmed wildlife in general
Know someone	You must know the correct people who an supply you wild with meat
Legality	
Number of times they go to WMR	Out of all the times respondents eat out, how many times they go to a wild meat restaurant.
Order beforehand	Mentions of wildcat having to be ordered before you go to the restaurant
Overexploitation of wildlife	Any comments on how wildlife is being exploited or hunted. If there are differences with abundance in the past
Price	Anything to do with the price of wild meat (whether cheap or expensive), with the affordability of it (whether they can/can't or could/couldn't afford it
Reasons for eating wildmeat	
Affordable	
Change taste	Eat something different, out of the ordinary
Dissatisfaction if unavailable	
Exploring strange foods	
Food-external	
Food-internal	Taste, smell, texture
Good with alcohol	
Healthier - Natural	

Recommended by someone	By a close friend, family, colleague
Restaurant-food preferences	
Change taste	Need/want to eat something different every once in a while
Food prefered	Mentions, comments on the kind of food respondents enjoy
Food served	Mentions, comments on the food that is usually served in the restaurants they go to.
Location or convenience	Mentions, comments or preferring a restaurant because of the location or convenience (close to their house, their work)
Open and casual places	Places that have a garden, are outside, feel less crowded, more comfortable
Service	Mentions, comments on what kind of service they prefer.
Types of places	
Social activity	
Depends on company	Being with different people (friends, family, colleagues) means different type of food will be eaten
People gone with	Who do they go with usually?
Wildlife species consumed	
High rank	High quality, premium quality
Middle rank	Cheaper, for middle-class people
Unclassified high or med	Not high rank or middle rank, no mention of rank.
WM Concerns	Any mentions, comments on any concerns related to wild meat (regarding health oor the quality)
WM is specialty or rare	Mentioning WM is rare or a specialty but not related to this being a reason why people consume it.
Potential interventions	Celebrity combined with the dish/restaurant they would advertise, the reason and the comms channel.
Hoai Linh	A potential intervention where Hoai Linh is involved
Messages general	Comments on messages making sense or not or any comments on what messages should be delivered to the public in general.
My Tam	A potential intervention where My Tam is involved
Participation of others	Comments whether other people should be involved in an intervention. Or comments if other people are not needed in an intervention.
Tran Thanh	A potential intervention where Tran Thanh is involved
Truong Giang	A potential intervention where Truong Giang is involved
Viet Huong	A potential intervention where Viet Huong is involved

APPENDIX 6.1

Concepts trialled in FGD

CONCEPT 1

1



2



3



4



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Concept 1

1. Viet Huong shares a live video on her YouTube page where she is looking for a restaurant in HCMC to eat something novel with friends, something out of the ordinary.
2. She first comes across this restaurant and enquires about the menu. The staff at the door tell her they have various types of food, including meat from forest animals.
3. The staff take her to see one of the private rooms available and tell her the price of some items on the menu and some off the menu, as they can offer special meat form rare and precious wild animals. “I know people who spend so much money to eat those dishes… but I know something better”, Viet Huong says, deciding the food served is not what she wants.
4. Instead she goes to a restaurant that specialises in a dish from the Mekong Delta.
5. Viet Huong chooses the restaurant for its special dish, Chau Doc fish and snail vermicelli, and its reasonable price. It also offers private tables. She enjoys the casual and open style of the restaurant which reminds her of the Mekong Delta.
6. Viet Huong eats the dish and comments on its good taste, different from the ordinary, its quality and how the restaurant prepared this specialty really well. She leaves paying a reasonable price and says she will come back again.

Concept 2

1. Hoai Linh appears in a video in which he is looking for a restaurant in HCMC to "change his taste" with his friends - to eat something out of the ordinary.
2. He first comes across this restaurant and enquires about the menu. The staff at the door tell him they have various types of food, including meat from forest animals.
3. The staff take him to see one of the private rooms available and tell him the price of some items on the menu and some off the menu, as they can offer special meat from rare and precious wild animals. “I know people who spend so much money to eat those dishes… but I know something better”, Hoai Linh says, deciding the food served is not what he wants.
4. Instead he goes to a different restaurant which serves various options of grilled food.
5. Hoai Linh chooses the restaurant because of the food, as they offer a variety of options and meat (but not wild meat), and at a good price. He likes the garden-style, casual atmosphere too and enjoys the service at a private table.
6. After trying a couple of dishes, he comments on their good, novel taste, the food’s freshness, quality and good pairing with alcohol. He pays a reasonable price and says he will come back again.

CONCEPT 2

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APPENDIX 6.2

FGD Discussion Guide

Welcome to this focus group discussion and thank you for your participation. This discussion is part of a wider research project about visits to, and consumption in, restaurants in Ho Chi Minh City.
The aim of the session is to understand your opinions about two different advertisement concepts that will be presented to you. We would like to hear your thoughts and opinions on the concepts and the individuals delivering the message Please note that these advertisements are not real, they have not been made public, shared or approved by the celebrities. The images you will see have only been created for the purpose of this discussion. The restaurant and celebrity pictures we have used here are publicly available images.
We encourage you to share your thoughts and opinions as we go through the discussion. There are no right or wrong answers to any of the questions, none of the answers or opinions you give will be linked back to you personally. Your contact details and answers will remain confidential and will not be shared outside the research team.
I will now ask you to fill in these consent forms which state that you understand what the discussion will be about and that you agree to participate. If you do not wish to participate at this point, please feel free to say so.
**Hand out Consent forms and collect them once signed* (Appendix 2)*
Please help yourself to the refreshments and help us by keeping your phones off during the duration of this discussion. I would like to remind you that you can choose to leave this discussion at any time without having to give a reason. Let's begin.

For facilitator: Show the advertisement, describe the advertisement following the images (to give participants a better idea of what the advertisement would show) and ask the questions at the bottom. Then take participants through the second advertisement and repeat the same questions.

1. ***Evaluate Advertisement 1:*** *discussion can take up to 45-50 min*

Flow of each evaluation:

1. *Facilitator introduces about the advertisement & guides respondents to fill in the self-evaluation form.*
2. *Show the advertisement (Appendix 4.2)*
3. *Let respondents to fill in the self-evaluation form. (Appendix 4.3)*
4. *Facilitator starts asking the main question for advertisement diagnosis.*

INITIAL REACTIONS

- Tell me about your first impression after watching this advertisement, please? What do you think about this advert? What else?
- What impresses you most in this advert? Why?
- Is there anything that irritates you when watching this ad?
- Overall, how much do you like this ad by using 5 point scale with 1 is totally dislike and 5 is Like it very much?

- What do you particularly like/ dislike in this ad?

- If you come across this advertisement (Ad 1 – as you are watching TV and then scrolling through Facebook; Ad 2 – as you are on YouTube and then scrolling through Facebook) would you watch it/click on it? Why? Why not?
    - **For facilitator:** to see if participants find the advert **relevant, interesting** and to **understand if the dish promoted, the place, or the celebrity catches their attention**.
- Who do you think this advertisement is **aimed at**? **For what context** (lunch with family, dinner after work, etc.)?
    - **For facilitator:** If this does not come up, ask if it seems **relevant for people like themselves** (their age, profession, their peers) and in the boozing (di nhau) social context. Ask about two contexts: 1) boozing with friends, colleagues and 2) dinner with business partners/bosses/clients.
- What are the **main messages** you receive from this advertisement?

<u>DISH ADVERTISED</u>

- Is the food/ restaurant advertised similar to dishes you already eat / places you already go to?
- Are you curious to try the dish/food and undergo the restaurant experience (atmosphere, service)? Why? If not, why?
- What situation does the promoted dish/food/location make you think of, who would you eat this dish with, in this type of place? Why? And on what types of occasion?
    - **For facilitator:** If they do not mention, ask about friends, family, colleagues and business partners/bosses/customers. Why with certain groups and not others (if that is the case)?

<u>CELEBRITY</u>

- Are they (celebrity) seen advertising many products? What kinds of product? On what channel (Facebook, television, billboards, YouTube, Zalo, online newspapers)?
- Why do you think they are involved in this advertisement?
    - **For facilitator:** To understand if the celebrity appears genuine or not e.g., like they have just been paid to advertise something.

<u>AS ALTERNATIVE TO WILD MEAT RESTAURANTS</u>

- What kinds of restaurants would you be going to in a similar context/situation?
    - **For facilitator:** refer to the context described in the second question under <u>Initial Reactions</u> *(boozing with friends, colleagues and 2) dinner with business partners/bosses/clients)*
- Would you **suggest to your friends/family/colleagues going to a restaurant like the ones in the advert**, instead of the restaurants you usually go to? Why? Why not?
- Would you **eat the food promoted** in Advert 1/2 instead of the restaurants/food you would usually eat?

        - **For facilitator:** to understand if this restaurant/food promoted would be inherently considered as an alternative to wild meat.
    - What could make this advertisement more effective in convincing people to go to this restaurant / eat this food instead of others visited in this context/situation?

2. ***Evaluate Advertisement 2*****:** *discussion can take up to 45-50 min*

*** repeat the same questions after showing the second advertisement***

3. **Advertisement comparison:** *in the remaining 15- 20 min*

    - Which advertisement do you find **most persuasive**? Why?
    - Which advertisement do you think **would convince most people like you** (your friends, colleagues) to go to that restaurant rather than the usual restaurants visited in similar social contexts? Why?

APPENDIX 6.3

Focus Group Discussion Results

Concept 1

It was understood that the concept promotes regional specialties of the Mekong Delta. The restaurant itself was not considered particularly special. However, the average and above average scores were due to Viet Huong's presence:

> *"I scored it as a 3-4 because I like Viet Huong… while there is nothing unique in the ad at all"*
>
> *"If other people took the role as the key character in this ad, I will give it 1 or 2 scores only"*
>
> *"Viet Huong is influential. Viet Huong recently advertised vermicelli with crab meat, which made me want to go there too"*
>
> *"When Viet Huong recommends common dishes and not special ones, other people also want to go there to eat those dishes after watching the ads"*

Other elements that caught the participants' attention were the restaurant atmosphere and the price:

> *"The countryside restaurant with nice decoration, a comfortable space and restaurant style"*
>
> *"The prices are suitable and reasonable"*

When asked about the audience for this advertisement, participants felt it was targeted at people like them: middle-aged men and women too. This was because the restaurant was considered to be suitable for families:

> *"Because families tend to go to countryside restaurants with comfortable sitting space more often"*

A distinction was made between the type of restaurants one would go to with family and with business clients, with a preference for private space for the latter context:

> *"When we want to have a small party with family, we make decision to go to that kinds of restaurant which bring us a comfortable outdoor space. But if I intend to have some food with clients, we prefer a private space"*
>
> "[Regarding VIP rooms] *Yes, it is more convenient to have a business discussion and even work there"*

The first restaurant described in this concept (which serves wild meat and offers VIP rooms) was considered suitable for business clients and friends:

> *"The second restaurant Viet Huong goes to isn't suitable for friends. Only for families or those who have the same hobby as Viet Huong will go to the second restaurant"*

> *"For inviting partners or clients, you should go to the first restaurant"*

> *"I will go to the first restaurant because of privacy but I won't go to the one serving Mekong River Delta dishes"*

Concept 2

This concept was preferred by half of the participants who stated a preference for the variety of dishes that would be offered in a BBQ restaurant and the distinctions in social context:

> *"This restaurant offers various BBQ dishes while the other restaurant only serves noodle soup, which is very simple. After we finish eating, we may sit there* [BBQ restaurant] *for a while."*

> *"The ad* [first concept] *means eating noodle soup, which is very similar to eating breakfast, lunch, or dinner so I will eat it quickly while this ad shows Hoai Linh eats and sits for a long time because he eats grilled food and drinks alcohol with friends"*

> *"Because the dishes served at the restaurant are various, it will be tastier when taking spirits and enjoying BBQ dishes. Naturally, it takes a longer time to eat BBQ dishes and drink spirits"*

However, BBQ dishes were not considered particularly special as there are many BBQ restaurants in HCMC so the dishes promoted are not new. Some felt the Mekong Delta specialty endorsed in the first concept was more special than BBQ because it is a regional specialty:

> *"Viet Huong visited this restaurant and it has regional specialties whereas there is nothing special about a BBQ outlet."*

> *"The ad* [first concept] *shows more unique items while those in this ad* [second concept] *are ordinary"*

The most special dishes were thought to be offered in the first restaurant rejected by both celebrities:

> *"I think the first* restaurant [in both concepts] *offers more special dishes"*

Restaurants visited with business clients specifically were described to be *"fancy"*, and some participants indicated a preference for luxurious restaurants:

> *"It is kind of restaurant which serves Western and European cuisine"*

> *"In my viewpoint, I like eating at restaurants as they are more fancy to sign contracts in private rooms and talk privately"*

Participants stated dishes that would be eaten in these fancy restaurants would be seafood, steak, shrimp, prawns or fish.

Hoai Linh was perceived to be more popular than Viet Huong but has recently been involved in a scandal which has affected his popularity:

> *"Hoai Linh used to be okay but now he is under investigation"*

> *"He used to be more popular than Viet Huong"*

> *"Hoai Linh's cachet is much higher than Viet Huong's. But in the future, Hoai Linh's cachet will decrease because of his recent scandal"*

<u>Promoting alternatives to wild meat</u>

In both concepts, the refusal of the celebrities to patronise a restaurant serving wild meat did not catch participants' attention. Other elements in the concepts distracted them from this message:

> *"Both scripts talk about the second restaurant with reasonable prices there"*

> *"When I heard it, I thought it was an advertisement for Vietnamese specialty dishes"*

> *"The scripts show pictures of the countryside restaurant, which makes me think about the restaurant, scenery and dishes only"*

A main reason given as to why the refusal of wild meat was not prominent enough was the described reaction of the celebrities themselves:

"If Hoai Linh and Viet Huong's serious faces are emphasised at the end of the content to show that they won't eat such dishes, it will be easier to understand"

"The refusal by the key talent isn't strong or fierce"

Distinctions were made regarding protected wild animals and those raised in commercial farms like deer and boar, which participants were aware are legal to serve, purchase and eat.

Suggestions given to improve the clarity of the concepts included showing the menu advertising wild meat products in the rejected restaurant, specifically those from protected animals, caught from the wild as opposed to raised commercially in farms, and the celebrities imagining wild animals being killed and having a stronger reaction rejecting the restaurant:

"When looking at the menu with prohibited kinds of meat, Viet Huong should show more shock and say: My Goodness, you sell meat of prohibited animals? I am a celebrity, how could I eat that?"

The above suggestion was said to avoid the celebrity's rejection of wild meat appearing to be temporary and shows they will never consume wild meat, as opposed to just preferring different food that day. Other suggestions included emphasising the threats of consuming wild meat to one's health, spiritual life or soul.

Regarding the context the advertisement should focus on, eating out with friends was considered appropriate as this is done more frequently than with business clients. A male celebrity was said to fit the context better as men are more likely to drink alcohol when eating out. However, due to this recent scandal, Hoai Linh was not considered to be a good option.

<u>Communication channels</u>

Responses on interactions with the advertisement in Facebook were mixed. While participants believed they would click on it and watch the full video, they stated this would only happen if they were looking for a place to eat at the time. Otherwise, the advertisement would be ignored or the entire video would not be watched.