Social Norms for Conservation

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Preface

This report is about my thoughts on why we need to come up with a different and better way of doing conservation. Despite the best efforts of conservationists and preservationists in the past century, we find ourselves in the middle of a biodiversity extinction event of an unprecedented scale and rate. Multiple lines of evidence suggest that this extinction event is caused, in large part, by our consumerist tendencies and our abuse of common pool resources. However, few conservation efforts have tried to deal with these issues that are undeniably more social than legal or political. Thus, I believe that it is imperative that we begin to take the power of social forces into consideration when planning our conservation efforts.

That said, we do not understand social forces well enough yet to be able to make full use of them. A large part of this report is also about the power of social norms and about our lack of understanding of these powerful social phenomena. While my long term goal is to find a more effective way of doing conservation, both on short and long time scales, my immediate goals are to gain a better understanding of social norms and to try to find out how effective they can be in helping us to achieve our conservation goals.

My thoughts have been shaped by conversations I have had with experts in many different fields as well as by the literature that has been produced by these and other experts. Thus, this report will start with a brief literature review of some of the important ideas that I have come across in various fields such as history, conservation biology, and psychology.

The literature review will begin with a short history of conservation, particularly as it pertains to the United States. In this section, while taking a look at how the field of conservation has evolved, I will point out what I perceive to be the shortcomings of different conservation approaches that have been used in the past and those that are being currently used as well. This will, hopefully, motivate the need for a new way of thinking about how to achieve our desired conservation goals; one that takes into consideration the behaviors of people and the societies that they are a part of.

I will then introduce social norms (section 1.2) as a possible tool that we could use in doing conservation since social norms appear to determine a large part of our social behavior. In this section, I will introduce the different schools of thought on social norms and their predictions for how norms originate, evolve, and change. I will also point out where each of these schools of thought fall short

and what holes need to be filled in order to truly understand them.

In the next three chapters, I will introduce my ideas on how I plan to contribute to the knowledge of social norms and how I think they can be used in doing conservation more effectively.

Chapter 2 will deal with my ideas on determining which social norms we as conservationists need to focus on in order to affect the most significant amount of change. Using the results from this research, I hope to address a concern that many social scientists have voiced, which is, that changing social norms might not make much of a difference to conservation outcomes. Given that different norms often behave very differently and have different properties, these results will also help me in deciding which norms to focus on in researching the questions I will bring up in the final two chapters.

In chapters 3 and 4, I will discuss how I hope to contribute to the understanding of social norms, particularly conservation related social norms. In chapter 3 I will provide some basic details of the model of social norms that I am hoping to explore, both mathematically and experimentally. Chapter 4 will deal with ideas for experiments and field studies I hope to undertake in order to test the hypotheses of my model and to address other questions that will help to make my model more realistic.

This report is probably best read linearly, but anyone familiar with social norms can skip ahead to chapter 2 after section 1.1. Even for readers familiar with the history of conservation, I would encourage skimming section 1.1 because my motivation for trying to use the considerable power of social norms derives in large part from the matter presented in this section. Chapter 2 is important in that without the validation provided by the results that will come out of the questions posed in this chapter, the pursuit of the questions and ideas in the remaining two chapters will be fairly pointless. Chapter 3 motivates the experiments and field studies proposed in chapter 4, but these experiments are also relevant to the understanding of social norms withot the model presented in 3. Thus, even if you are not very interested in my model, chapter 4 could still be of some interest to you.

Acknowledgements

It is of course always impossible to credit everyone whose guidance and conversations have shaped one's ideas. However, I would at least like to thank those who I know have definitely influenced the way I think about the issues presented in this report. I sincerely apologize to those who have either helped mold my ideas unbeknownst to me or to those who I might forget to mention here.

I believe I would have been quite lost without the support of Professor Debbie Prentice. Despite her busy schedule as Dean of the Faculty at Princeton, she agreed to serve on my committee without hesitation. She also finds time to respond to all my requests for help, regardless of how little sense they might make because of the hurry and excitement in which I send them to her after coming across or coming up with new ideas.

Many thanks are due also to my advisor, Professor Simon Levin, who seems to entertain whatever ideas I bring to him with enthusiasm. He has been very supportive of me exploring different topics even though I have not followed through on most of them. His encouragement has been crucial for my decision to focus on investigating social norms and their application to different kinds of coordination and prosocial behaviors for my doctoral work.

I fear I have failed to make good use of the knowledge and intellectual fertility of my other two committee members, Professors Corina Tarnita and David Wilcove. However, this is something I intend to rectify since the conversations I have had with them have been very thought provoking and helpful as well.

I cannot thank Professor Henry Horn enough for the long discussions on not only the ideas presented here, but also on various other projects and issues that I have considered investigating at different times. A special thanks also to Professor Rob Pringle who introduced me to some of the literature on Rights Based Approaches to Conservation. The philosophy and methods adopted by conservationists championing this approach have had a profound influence on how I think about conservation.

I also have to mention Matthieu Barbier, a postdoc in the Levin lab, whose contribution has been invaluable in getting me to explore alternative modeling approaches. We have both been displeased, to differing degrees, by the emphasis on game theory and on thinking of people characterized as *Homo economicus* when building models to explain social behavior. Without Matthieu, I probably would not have known as much about other possible approaches as I do now. His anthropological views have also helped me to think about things from a

very different perspective. Relatedly, I am also grateful to the Levin lab and the EEB department in general for the informative and stimulating discussions I have had with different members of these groups.

Finally, I cannot pass up this opportunity to thank a great friend and mentor, Jane Masterson. It was only because of my fortuitous acquaintance with her that I seriously considered pursuing an advanced degree in ecology. I had been exploring a number of different fields prior to meeting her without ever really thinking about anything related to ecology as a viable career option. Needless to say, I draw a lot of inspiration from her and her thoughts influence mine immensely.

Contents

Chapter 1

Literature Review

Over the past two years, my ideas have evolved rapidly in response to the literature I have come across and because of the conversations I have had with experts in disparate fields. In this chapter, I will present and discuss some of the literature that has influenced me most.

My thoughts have been shaped immensely by reading about different approaches to conservation that have been undertaken and by what I consider to be their drawbacks. These perceived drawbacks might at times have something to do with the underlying philosophies or with the methods used, but the biggest shortcoming is that they have largely been unable to achieve their desired outcomes on a large scale. I believe that this is because these approaches do not take societies and social forces into consideration even though the issues that conservationists have to deal with seem to be a direct result of the behavior of societies. In order to address this, we need to understand how societies work; why they behave how they behave and why individuals in societies make the decisions that they do.

This chapter will provide a brief introduction to some of the major schools of thought in conservation, the methods they have used, and the shortcomings of these methods. It will also introduce social norms, which are probably the most significant of the social forces that drive the behavior of individuals within societies; and thus, of societies themselves. Through this chapter, I hope to motivate the questions that I am going to begin addressing during my time here at Princeton.

1.1 A Brief History of Conservation

The history of conservation in the US is long, complicated, and involves a number of different actors advocating for different ideals, goals, and approaches. However, for a fairly straightforward and deceptively linear timeline, see figure 1.1. I will follow this timeline in this section merely to simplify matters. Nonetheless, it is important to note that the picture is not as simple and clear

cut as the figure makes it out to be. For example, as early as the late nineteenth and early twentieth centuries, Gifford Pinchot, Theodore Roosevelt, and many others were already advocating strongly for the 'nature for people' approach to conservation [2–4]. The recent debate between proponents of 'nature for itself' against those who propose more utilitarian and economic standards was already playing out between seminal figures like Pinchot and John Muir [5].
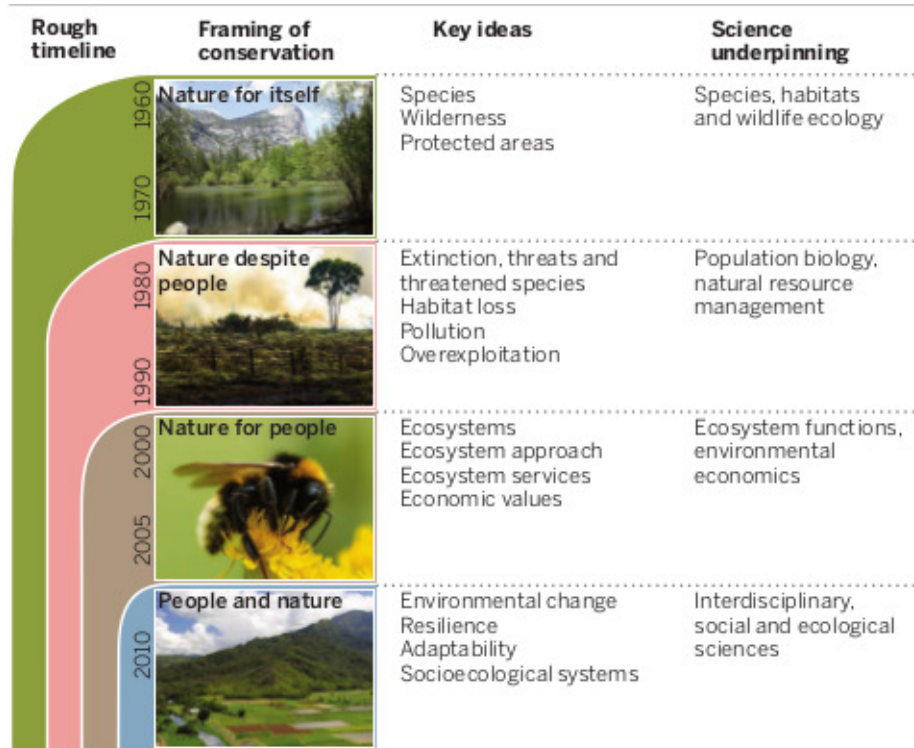
Rough timeline	Framing of conservation	Key ideas	Science underpinning
1960 1970	Nature for itself	Species Wilderness Protected areas	Species, habitats and wildlife ecology
1980 1990	Nature despite people	Extinction, threats and threatened species Habitat loss Pollution Overexploitation	Population biology, natural resource management
2000 2005	Nature for people	Ecosystems Ecosystem approach Ecosystem services Economic values	Ecosystem functions, environmental economics
2010	People and nature	Environmental change Resilience Adaptability Socioecological systems	Interdisciplinary, social and ecological sciences

Figure 1.1: A very simplified timeline of conservation in the US [1]

1.1.1 Nature for itself

The basis for a lot of the efforts before the 1970s was the misguided 'Nature for itself' philosophy. According to this philosophy, 'wilderness' is nature untouched by the hands of men. The intrinsic value of life is a central tenet of this line of thought. The 'nature for itself' ideology was promoted by early preservationists such as John Muir and Henry David Thoreau [6,7]. Approaches emerging out of this way of thinking included the designation of national parks and the protection of endangered species. These approaches are still evident today, especially in areas of the world that are most vulnerable to large losses in biodiversity and forest cover. In fact, E.O. Wilson, in his most recent book *Half-Earth: Our*

Planet's Fight for Life, suggests that in order to stave off the cataclysmic mass extinction event facing us today, we need to set aside about half of our planet's surface as a permanent nature preserve [8].

Notwithstanding the legal, political, and logistical difficulties involved in designing and creating nature preserves on which different levels of human use are permissible, there is ample evidence to prove that this underlying view of wilderness as untramelled nature itself is grossly incorrect. In the United States, Native Americans had been managing and molding land for their uses for centuries [9–11]. Management techniques mostly included the use of fire. Besides playing an important role in agriculture, these fires served predominantly two additional purposes: ensuring fresh grass for their large herds of horses to graze on, and to promote the growth of herbs, berries, and other forage which would lure game animals in [9,12]. A number of the grasslands, prairies, and open pine forests that early explorers were so attracted to and felt so strongly inclined to preserve can, to some extent, be attributed to the Indian fires.

In addition to painting a false picture of nature and humans' place in it, the nature for itself approach in many cases ends up adversely affecting the people who most heavily depend on it for their livelihoods. A number of journalists, environmental policy scholars, and environmental historians have criticized conservation efforts for displacing populations of native people and people who are forced into homesteading because of socio-economic reasons [13–15]. This often leads to feelings of resentment against conservation organizations and government bodies amongst the local people. Sometimes, the extreme discontent engendered amongst locals causes them to take strong retaliatory anti-conservation actions such as burning down large swathes of designated national parks (personal communication with Benjamin H. Johnson, an environmental historian). The recent standoff in Malheur is also evidence of disenchanted ranchers and other affected people reacting to exclusionary federal government policies [16]. The checkered history of national parks throughout the world often includes severe human rights violations that are very rarely brought up when discussing the history of conservation.

Due to the negative effects it has on local people's attitudes towards conservation and because the underlying ideology only serves to further the incorrect notion of human societies and nature being wholly seperate entities, the methods resulting from the nature for itself line of thought cannot provide sustainable conservation options. Unless we understand that all of life on earth is closely linked and that we are all simply components of a large, complex adaptive system, there will be little realization of the need for conservation. There will be limited public support for conservation, particularly when our methods are turning large sections of society against conservation. While arguments concerning the intrinsic value of life are important and useful, they alone cannot suffice. Despite this having been the most prevalent conservation philosophy for well over the past hundred years, we are still facing a mass extinction event of an unprecedented scale [17–19]. That is not to say that national parks and nature preserves have not been at all successful or that we should completely abandon them. There is plenty of evidence to show that without them, we

would probably be facing even greater biodiversity losses [20–23]. However, by the end of the 1960s and in the early 70s, conservationists had begun to realize that it was imperative that they came up with better, more inclusive ways of doing conservation. They realized that thrree needed to be a greater recognition of how our natural systems affect us and how we affect them.

This led to the next prominent phase in the history of conservation. Beginning in the late 1970s, there was a shift in thinking from the 'nature for itself' or 'nature without people' approach to a 'nature despite people' approach. This marked the recognition and consideration of the often deleterious effects that human activities have on nature.

1.1.2   Nature despite people

The period extending from the 1970s to the turn of the century witnessed a shift from thinking about nature as completely removed from the human enterprise to thinking about nature as being severely harmed by the human enterprise. Probably the most influential work of this period was Rachel Carson's *Silent Spring* published in 1962. Carson's work awakened the United States and the world at large to the environmental impact that our actions could have (in this case, the use of pesticides, especially DDT) [24]. *Silent Spring* had a number of long lasting impacts. It ensured that 'No one since would be able to sell pollution as the necessary underside of progress so easily or uncritically' [25]. The ecofeminism movement can be traced back to it as well, as can, at least partially, the formation of the Environmental Defense Fund and the Environmental Protection Agency [25].

A number of other scholars researched and wrote about related issues as well. E.O. Wilson identified the 'four mindless horsemen of the environmental apocalypse' (over-exploitation, habitat destruction, introductions of non-native species, and the spread of diseases carried by non-native species) as being responsible for most of the species losses that we were and still are facing [26]. In *The Condor's Shadow*, David Wilcove drew attention to a number of different ways in which mankind endangers nature and how conservationists the world over attempt to protect nature from human activities [27]. Other scholars attempted to quantify the deleterious effects of the four mindless horsemen on species diversity and the environment [28–35].

The methods that arose out of this phase of conservation history focused on assuaging the past effects of human influence and on figuring out more biodiversity and environmentally friendly ways of conducting our activities. The land sharing (making agricultural land more biodiverse by having various different crops and micro-habitats) versus land sparing (large areas of homogenous agricultural land inter-mixed with areas of protected preserves) argument was one of the major artifacts of this period [36–38]. Other proposed solutions included using biocontrols instead of chemical pesticides and insecticides [39] and regulation of harvesting levels. One of the important outcomes from this phase was the growing advocacy for community based instead of top-down, governmentally or otherwise enforced management [40].

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While this period in the history of conservation marked a significant move in the direction of a healthier perspective on the relationship between people and nature, it also witnessed the popularization of a completely unidirectional perspective on the relationship between humans and nature. The 'nature despite people' line of thinking fails to acknowledge the fact that we humans depend heavily on nature for our sustenance and well being. Viewing humans and civilization as the enemy and only concentrating on the negative influences that we have historically had on other species paints a depressing picture that often turns people off. Many scholars felt the need for a view that recognized the other side of the equation: how nature affects humans and how we depend on nature. This, along with the fact that a lot of the methods proposed by the 'nature despite people' way of thinking were mired in economic, political, and scientific obstacles, set the stage for the next phase in the history of conservation.

1.1.3 Nature for People

Gretchen Daily and Paul Ehrlich spearheaded this new phase in the history of conservation and found support amongst pillars in the fields of ecology and conservation such as Daniel Janzen [41–45]. They advocated for the protection of natural ecosystems because these ecosystems provide valuable services to humans. These services include [41]:

- purification of air and water

- mitigation of floods and droughts

- detoxification and decomposition of waste

- generation and renewal of soil and fertility

- pollination of crops and natural vegetation

- control of the vast majority of potential agricultural pests

- dispersal of seeds and translocation of nutrients

- maintenance of biodiversity, from which humanity has derived key elements of its agricultural, medicinal, and industrial enterprise

- protection from the sun's harmful ultraviolet rays

- partial stabilization of climate

- moderation of temperature extremes and the force of winds and waves

- support of diverse human cultures

- providing of aesthetic beauty and intellectual stimulation that lift the human spirit.

Very broadly, ecosystem services can be separated into four categories [47]:

- Provisioning services: This refers to the provision of goods such as food, raw materials, and water.

- Regulating services: These services result in benefits from the regulation of ecosystem processes. Benefits include carbon sequestration, climate regulation, waste and water treatment, and pest and disease control.

- Cultural services: These are the nonmaterial, often non-consumptive benefits that people enjoy from nature. Examples of such benefits are recreational experiences, cultural, spiritual, or historical experiences, and science and education.

- Supporting services: These services are necessary for the production of the other ecosystem services. These include nutrient recycling, primary production, and soil formation.

Early estimates placed the value of these services at around $33 trillion/yr [46]. The Millennium Ecosystem Assessment in 2005 provided much of the impetus required for the adoption of this philosophy in the conservation world. A major shift in goals was the emphasis on the protection of valuable ecosystems instead of on individual species and habitats important for biodiversity. The maintenance and promotion of biodiversity was also seen as a key goal of the ecosystem services approach since it was assumed that the continued provision of services depended on the complexity, redundancy, and stability afforded by biodiversity. Paul Ehrlich likens biodiversity to rivets on an airliner's wing [48]. Since airliners are built to be much stronger than they need to be, popping a rivet here or a rivet there might not make much of a difference to the structural integrity of the wing. However, beyond a certain point, the wing is compromised and the airliner can no longer fly. Similarly, species extinctions could lead to a situation where we can no longer procure from nature the services that we have come to take for granted.

Recent work however, has shown that there are at least some services where species richness might not be all that important and thus, that ecosystem services alone might not be able to provide satisfactory grounds for conserving biodiversity [49,50]. Critics have seized on this apparent shortcoming and added it to the already long list of criticisms that have been leveled against the conservation through ecosystem services school of thought. The past few years have witnessed a heated and at times vitriolic debate between the proponents of 'new conservation' (the ecosystem services argument) and advocates of conservation for the sake of protecting nature for itself.

During his time serving as the chief scientist at The Nature Conservancy (TNC), Peter Kareiva, along with his long time colleague and collaborator Michelle Marvier, pushed strongly for the adoption of the conservation for ecosystem services ethic. At the same time, he also derided other efforts based on older ideologies [51,52]. Some of the criticisms raised by Kareiva were the same ones that I have brought up in the two previous sections. These include: (i) conservation does not take human welfare into account, (ii) conservation rests

on the myth of wilderness as pristine, untouched nature, (iii) conservationists wrongly assume that nature is fragile and that it cannot recover from the damage inflicted by human activities, and (iv) past conservation efforts have failed to protect biodiversity [51, 52].

Needless to say, this ended up ruffling quite a few feathers and prompted a number of conservationists to speak out against him and TNC. They accused TNC and Peter Kareiva of selling out to corporate interests [54], of trying to repackage a centuries old approach that was already a big part of conservation efforts [53, 55], and of promoting an overly anthropocentric view that could not possibly solve all of the problems that conservationists had been trying to address because it completely marginalized all other concerns [53]. The trouble stemmed from Kareiva claiming that 'nature for people' was the only ideology that we should be using to guide our conservation efforts; that all other schools of thought were useless and were no longer required. To some, this seemed more like a business strategy aimed at trying to attract new investors by disavowing the older, less economically favorable approaches to conservation [Rob Pringle, personal communication]. In practice however, there is no reason why ecosystem services cannot simply be used as another tool in our growing conservation toolbox instead of replacing all the other tools.

Personally, while I agree with the critcism that 'nature for people' is too anthropocentric and therefore, cannot possibly address all of conservation's concerns, I believe that it does have an important role to play in conservation. Putting conservation in terms of ensuring the continued survival and well being of the human race appeals strongly to rationality and policy. Before ecosystem services considerations became so mainstream, conservation was dominated by emotional, cultural, philosophical, and aesthetic appeals; none of which are easily amenable to legal or political instruments. When put in terms of how much money we stand to lose or gain from the protection of important ecosystems however, we can begin employing innstitutions that are already in place to protect and regulate public goods.

However, the ecosystem services argument does seem to be a very short term approach to conservation. If some technological innovations happen to provide the same services at a lower cost that an ecosystem was providing earlier or if the services are no longer required, there would be no reason to continue preserving the ecosystem under the 'nature for people' ethic. Moreover, the services that an ecosystem provides often become apparent only after the degradation of the ecosystem. Most disturbingly, there are studies that suggest that the valuation or monetization of nature might lead to the weakening of intrinsic motivations for conservation that existed prior to the realization of these utilitarian values [56]. At best then, an argument from the 'nature for people' perspective could be used to protect an ecosystem that is at risk of immediate destruction or degradation and where the services provided are obvious and quantifiable, but its applications on a long time scale seem somewhat dubious and untenable.

'Nature for people', like 'nature despite people', adopts a fairly unidirectional perspective on the relationship between nature and people. Both approaches fail to recognize that people are just one of the many components of nature,

although 'nature for people' probably comes a bit closer. A view propounding nature as subservient to human needs and desires seems to be just as unhealthy as a view depicting humans as the enemies of nature; and just as incorrect as a view portraying humans and nature as wholly separate entities. We are products of a long evolutionary process and are only here on this planet now because this process, through the interactions between its numerous components both extinct and extant, happened to produce conditions that can support us. Similarly, our interactions with the rest of nature creates conditions that favor or hurt other species. Any conservation methods based on ideologies that ignore this bidirectional relationship is doomed to fail.

In recent years, there has been a growing acknowledgement of this bidirectional relationship, giving rise to the last of the phases in the history of conservation, the 'nature and people' phase.

1.1.4   Nature and people

In this most recent phase of conservation history, the emphasis has been on revising our views of society and culture to include biodiversity and ecosystem services in them. In the scientific world, this phase has been marked by increasing collaborations between ecologists and social scientists. These collaborations are directed at trying to understand how cultural structures and institutions can be used in developing sustainable and resilient interactions between humans and their natural environments [1, 57, 58]. This is still a fairly utilitarian approach since the ultimate goal is still the sustainable use of our natural capital. However, it takes a much more holistic view of the relationship between humans and nature than previous approaches did.

Among conservationists, there has been a growing recognition of the fact that local communities have very different, and often far more inclusive ways of perceiving nature and their role in it than others do. The social norms and other social and cultural structures present in these communities can lead to highly effective community based stewardship of ecosystems and natural resources. This has given rise to the Rights Based Approach to conservation [59] [and peronal communication with Corine Vriesendorp, Director of the Andes-Amazon program at the Field Museum]. The Rights Based Approach (RBA) stresses the importance of including traditionally marginalized populations in decisions about how to manage the land that they subsist on. A lot of effort is put into educating them about their rights as citizens of their countries and as human beings. Conservation efforts guided by this approach are more bottom up than top down. Even in situations that require a behavioral change to protect a particular species or class of species from over-exploitation, efforts are aimed at informing the locals about the impacts of their actions and about the alternatives available to them [60].

Although these are significant steps in what I consider to be the right direction, they still have some significant limitations. Their biggest limitation is that they seem to be addressing a very narrow sector of the human population. The intended targets are usually individuals and communities who live in close

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proximity to the affected ecosystems. However, there is evidence to suggest that the biggest threats to biodiversity come from those that are farthest from the ecosystems on which they are vitally dependent. This evidence comes from looking at how consumption of natural resources differs across different societies.

Scholars have argued that the scale of the human enterprise is responsible for most of the threats to biodiversity [28]. The impact of the human enterprise can be thought of as an interaction between three measures: population size, per capita affluence (measured by per capita consumption), and the environmental damage caused by technologies used to produce each unit of consumption [61]. There is ample evidence to show that the average consumption (in terms of energy, food, etc.) in developed countries far oustrips that in less developed countries [62, 63]. Research also clearly shows that this culture of consumerism is on the rise and has been for the past 30-40 years [64], and that the consumer culture is starting to become deeply ingrained in us [65]. Taking consumption into account, Western Europe and North America pose much more of a threat to biodiversity than does the rest of the world. Many Asian, African, and South American countries that are rich in biodiversity and are therefore more vulnerable to biodiversity losses seem to simply be responding to pressures offset onto them by their more developed, capitalistic, and consumer driven counterparts. In order to achieve our conservation goals, we need to focus our efforts just as much on individuals and societies that comprise the developed countries of the world as we do on the under-developed countries.

One of the major problems in trying to address such issues however, is that we do not understand why people behave the way they do. Why do people make the decisions they make? Why do people from different societies make different decisions in similar situations? How much of our decision making process is influenced by social norms and how much of it is influenced by personal norms? How situational are different social norms? There are no satisfactory answers to any of these questions. In order to design interventions aimed at influencing people's behavior, we need to have a good understanding of why people behave the way they do. Since social norms, considered by some to be the grammar of society [66], play a critical role in determining people's behavior, we need to understand how social norms work in order to do truly effective conservation.

1.2   Social Norms

Social norms dictate what is and what is not acceptable in a society. Like other social phenomena, they are the unforeseen results of interactions between different members of societies. Recently, social norms have been getting increasing attention from scholars in a wide range of fields, including economics [67], law [68, 69], and the environmental movement [70]. The aim has been to understand how rules governing behavior might evolve in the absence of explicit government or other institutional regulations. Attempts have been made to model the emergence and evolution of norms, but our understanding of norms remains very incomplete [71]. Given that conservation is not, for the most part,

subject to market or utilitarian forces, it is unlikely that we are going to be able to make use of explicit regulations in order to achieve all of our conservation goals. Hence, it becomes crucial for us to develop a better understanding of social norms in order to explore alternative means of conserving what we still have left to us.

In general, people tend to conflate social norms with observable behaviors. Others however, think of them only in terms of beliefs and expectations. All of them struggle to explain the observed variance in norm-induced behaviors and conformity to different norms [72]. In this section, I will discuss the three most prevalent ways of thinking about how norms induce behavior. I will point out some of the deficiencies in each of the theories, while mentioning how each of them makes important predictions about the behavior of social norms and how we might be able to use these predictions in guiding conservation policies. The three canonical theories of conformity are: the Socialized Actor Theory, the Social Identity Theory, and the Rational Choice Model.

1.2.1   Socialized Actor Theory

The Socialized Actor Theory, as propounded by Talcott Parsons, posits that people behave in ways that are utility maximizing [73]. However, utility in this case is not defined in terms of money or other explicit values, but in terms of satisfaction. Satisfaction is maximized by minimizing the guilt or pain associated with making choices that are contrary to one's moral system. Through repeated interactions with members of one's society (parents, friends, colleagues, etc.), societal values become ingrained into the individuals comprising a particular society. People's personal values thus become a mere reflection of social values. If members of society are well socialized, they all share a common value system. Expectations about others' behaviors or beliefs play no role in determining an individual's decisions. There is no room for any discrepancy between social norms and personal attitudes in this theory (attitudes refer to dispositions towards objects, whether material or immaterial, that are based on previous experiences with that object [56]). Behavior will always conform to social norms since violation of social norms would also lead to a violation of one's own moral system.

While this theory makes no pretensions to explain how a shared value system evolves in the first place or why it might change, it nevertheless makes important predictions about why norms should change, and why and to what extent people conform to them. Some of these predictions have been empirically tested and the results of these experiments have found the theory wanting.

One of the predictions that the rational actor theory makes is that even in situations where there is an observed discrepancy between attitudes and social norms, behavior should conform to personal attitudes since expectations about others' attitudes do not factor into the decision making process in any way. However, experiments have found that stated attitudes are generally poor predictors of behavior. For example, in a much cited field study by Richard LaPiere conducted in the 1930s, he found that even though hotel managers expressed

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strong anti-China attitudes, they were quite unlikely to behave in ways that manifested these attitudes [74]. When approached, the hotel managers seemed more than willing to accomodate Chinese customers. Allan Wicker provided further evidence of this discrepancy through a number of different experiments [75].

Instead, people's perception of social norms and expectations are far better predictors of behavior. Bicchieri and Xiao showed that in a laboratory experiment, participants' observations about others' behavior was a much better predictor of their own behavior than were the stated attitudes of the participants [76]. Deborah Prentice and Dale Miller also showed that college students' consumption of alcohol was strongly affected by how much they thought others expected them to consume even if they themselves were not comfortable with consuming as much [77]. These and other studies seem to clearly show that our behavior is driven much more by what we expect others to do or by what we think others expect us to do than by our own attitudes.

Secondly, according to the socialized actor theory, the only way to change norms is through extended socialization. This would suggest that norms change slowly. However, there have been situations in which long held social norms changed very quickly. For example, the centuries old practice of foot binding in China was overthrown within just a generation [79]. Fads and fashion trends also tend to change on a relatively fast time scale. The socialized actor theory fails to account for any of these observations.

In addition, the socialization process is most often incomplete. There are large differences between people's personal attitudes and the social norms of the societies to which they belong. In a year long field study, Richard Schanck showed that there were quantitatively significant differences between attitudes that residents of 'Elm Hollow' stated publicly (a measure of perceived social norms) and their privately held attitudes [78]. Clearly then, the socialized actor theory does not present a complete picture of social norms. On the other hand, it is definitely true that individuals in most societies do share a common value system. Not only are there norms that are inviolable, but there are also norms that people do not ever think about violating. For example, most people would never think about killing another person for no reason. To this extent, some norms are internalized, inviolable, and do not depend on expectations. These norms seem to coincide more with moral norms, which are generally treated as being separate from social norms.

In terms of its applications to conservation, the socialized actor theory serves to remind us that there are beliefs and norms, whether moral or social, on top of which other, efficient or inefficient norms are built. For example, the superiority of humans over all other animals and living organisms is not a belief that is often questioned. It is also a belief that people in developed countries almost universally subscribe to. Norms related to treatment of animals and public use of natural resources can directly be attributed to this underlying belief. The ideal goal for conservationists would then be to question and change or moderate this belief. However, given the cultural, religious, and historical precedents that have established this belief, and that this normative belief is most likely a product of socialization, changing this belief would probably be a

very ambitious and highly infeasible goal, at least in the near term. Since the threats facing species and populations are immediate, we need to set ourselves goals that we can achieve on a relevant time scale.

1.2.2   Social Identity Theory

In response to the growing attention to theories of indvidualism in social psychology in the 1960s and 70s, there was a movement to address the problems frequently observed with these theories. Many scholars provided compelling evidence that ignoring the role of society in defining a person's identity was the root cause for most of the observed problems [87, 88]. In this movement, there was a marked shift from assuming a Hobbesian state of nature to assuming a more Humesian state (the Hobbesian state of nature refers to Thomas Hobbes' conception of humans as being completely individualistic and wholly utilitarian. In the absence of law, people are constantly at war with each other since everyone is only trying to further their own individual goals. David Hume had argued in his *A Treatise of Human Nature* that this conception was at best a philosophical fiction and that thinking of humans as anything but social animals was completely misguided [81]).

One of the major theories that came out of this movement was the social identity theory. The social identity theory was formulated by Henri Tajfel and extended on by his student John Turner. The corner stone of this theory is the assumption of a social identity in addition to a personal identity. Social identity refers to the part of our self-concept that arises out of our identification with one or more groups [82, 83]. Personal identity on the other hand refers to personal definitions of self, such as character traits and abilities.

Social identity can be very fluid. We might identify as members of different groups in different situations or at different times and so, our perceptions of our social identity will change correspondingly. It is important to point out that while social and personal identity are defined as being mutually exclusive, they constantly interact with each other. We might, for example, be more inclined to see ourselves as members of groups whose ideology is similar to our own. Conversely, membership to a group might alter our personal attitudes to be more in line with the group's norms. In this sense, the social identity theory is capable of including the socialized actor theory and thus portrays a much more complete picture.

In this theory, social norms are defined in terms of the norms of groups. Norms are the result of an implicit collective consensus about which behaviors are appropriate and which are not. Members of a group conform to the norms of the group in a particular situation inasmuch as they perceive themselves to be a part of the group in that given situation. For example, as a graduate student in the ecology and evolutionary biology department at Princeton, my frame of reference is other graduate students in the department. My social identity is defined in terms of my perception of how similar I am to the other students. As a member of the ecology and evolutionary biology department as a whole, my frame of reference includes my professors, post docs in the department, and

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staff members. Accordingly, my social identity changes as well. Depending on which of these identities is invoked at any given time, I might be induced to behave in different ways. Figure 1.2 depicts a simple scheme of how a person could be a member of many different groups, each larger group subsuming all of the smaller ones. It is also possible to belong to groups that do not completely overlap. You could be a supporter of two different football teams with each fan base having its own set of norms and shared beliefs.

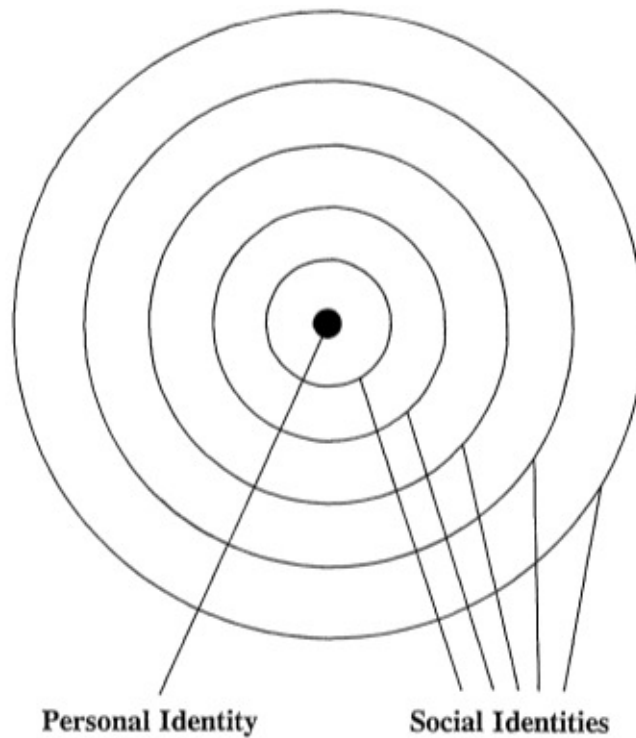**Personal Identity**   **Social Identities**

Figure 1.2: Personal and social identities [85]

Identification with a group leads to depersonalization. When we see ourselves as members of a group, we tend to focus on how similar we are to other members of the group. Group identification also serves to differentiate us from members of other groups. Conversely, our personal identities are comprised of perceived differences between us and members of groups to which we belong [85]. Group membership can thus be made salient either through emphasizing similarities to the in-group (group that we are members of) or by bringing up differences from the out-group (group that we are not members of). Similarly, personal identity can be made salient by stressing differences from members of the in-group. These mechanisms have proved to be fertile ground for experimentation.

The social identity model has enjoyed much empirical support. In the Stan-

ford Prison Experiment, one of the most famous and morally dubious psychology experiments of the 20th century, Zimbardo showed that perfectly normal college students could be induced to behave in inexplicably terrible ways by simply assigning them different group memberships [84]. Marilynn Brewer, through numerous lab experiments, has also shown the importance of the perception of group membership. Depending on whether social or personal identity is made salient, subjects in lab experiments choose to either support group goals, such as the sustainable use of public goods, or not [85–87].

Although this theory has considerable explanatory power, there are situations in which it does fall short. There are instances, particularly in lab experiments, where there is not much room for identification with a group. However, cooperation is still observed in these situations if the participants are allowed to converse amongst themselves prior to the experiment [89]. It seems then, that perhaps group identity, at least in cases where group memberships are at best weak, is not as important as getting more information about others. Maybe group norms take on more salience when people either do not have much information about the outcomes of the choices they have to make or if individuals do not trust their personal information. It seems obvious that group norms should hold more sway over those who have stronger ties to the group, but other than a few observations in Schanck's seminal paper on the different communities in Elm Hollow [78], I have not found direct evidence to support this hypothesis. Additionally, the theory offers no clues as to how we make decisions in cases where we have to choose between our allegiance to different groups.

Another issue with the social identity theory is that it does not explain why people want to belong to groups. While some group memberships are forced upon us (nationality, race, color), we have considerable choice in relation to other groups (democrats vs. republicans, which sports team to support, whether to be a vegetarian or not). Do we choose groups based on the social or other benefits we foresee enjoying in lieu of membership? While this might explain some of our choices, it certainly does not explain why many of us choose to embrace marginal group membership where there are no tangible benefits. It seems that group choice could depend significantly on factors that are difficult to put into rational terms. From a conservation perspective, this is an important aspect to explore. If we want to create groups in which both people and other species are accorded membership, we need to know how to get people to subscribe to these groups. How should we define these groups in order to make them appealing to people?

Finally, while this theory allows for rapid norm changes (if all or most members of a group adopt a new norm, the group norm should change as well), it does not reveal anything about which kinds of norms are more or less susceptible to change. Why do fads, memes, and fashion trends change so quickly while even inefficient norms such as female genital mutilation linger despite extensive efforts to change them [79, 80]?

Notwithstanding these and other shortcomings, the social identity theory has some important implications for using the power of social norms to do more effective conservation. For example, this theory tells us that whatever policies

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we design have to make group membership salient. Focusing on individual level moral values as opposed to group ethics might not be a very effective approach. At the same time, the groups that these interventions are aimed to address cannot be very big and they should be precisely defined. Research has shown that positive evaluation of a group is inversely correlated with how large the group is proportionate to the out group. Additionally, evaluation is directly correlated with how sharp the distinction between the in group and out group is [90]. More positive evaluations of a group should translate into increased conformity with group norms. So, appealing to people as members of a majority will most likely not be as effective as a multi-pronged approach that addresses different small, well defined groups separately.

What this theory does not help with is how norms within a group change. It tells us that norms can change and are much more flexible than in the Parsonian view, but it sheds no light on mechanisms through which change occurs. Do groups have a nucleus in the form of group leaders that drive change? Is change a consensus arrived at via democratic processes? Work done on norm interventions are more informative about these questions than are the different theories of norms themselves. However, there are no definitive answers and the answers appear to be situation specific. In order to design appropriate conservation related norm interventions, it is imperative that we get a better handle on the answers to these and related questions. I hope to start contributing to this knowledge during my time as a PhD student.

1.2.3   Rational Choice Model

The rational choice model is similar to the socialized actor theory in that they both assume that there is a rational basis for people conforming to norms. The two theories differ about what the rational basis is. While the socialized actor theory focuses on guilt and self conflict associated with acting in ways that do not conform to social norms as the motivation for conforming, the rational choice model states that social sanctions imposed on non-conformers by other members of society constitute the primary cause for conformity [92]. The sanctions might take on different forms such as shaming, ostracism, or in the case of Donald Trump's rallies, punches administered to protestors. Since no one wants to be subjected to such sanctions, it is more beneficial to conform.

Clearly, sanctions can only be enacted against observable behaviors. Thus, this is a very behavioral approach to thinking about social norms and proponents of this approach have mostly been interested in why people coordinate their efforts, particularly in the equitable and sustainable use of public goods. Due to its emphasis on rational and self-centered actors, it is also easy to adapt this model to cost-benefit analyses. For these reasons, economists, political scientists, and philosophers have been very attracted to this way of thinking. Brian Skyrms, Peyton Young, Cristina Bicchieri, and many others have used game theoretic methods based on this model to explore questions of coordination in the use of common pool resources and to explore the evolution of social norms more generally [98–100].

In modeling the dynamics of norms using this line of thinking, the tendency has been to define individual payoffs from either cooperating or defecting in terms of money. Experimental evidence has not supported this definition of utility. A number of studies have shown that even if utility maximization is the driving force for conforming to social norms, monetary values do not serve as good proxies for utility [95]. Ernst Fehr has argued vehemently against using game theoretic approaches based on monetary utility functions by employing a number of different lines of evidence that cast doubt on the assumptions that these models make.

Under the rational choice model, one of the principal requisites for social sanctioning to be effective is repeated interactions between the individuals comprising a society. If there is very little probability of two people ever meeting again, there is little incentive for them to cooperate when cooperation is costly. There is also very little incentive to sanction cheaters in one-off interactions because the sanctioners gain nothing even if the imposed sanctions make the cheaters change their behavior in the future. However, Fehr and his collaborators have shown through a series of clever experiments that people do cooperate and that they do punish cheaters even in interactions where there is a negligible possibility of interacting with the same person again. In fact, people punish cheaters even if the actions of the cheaters do not directly affect them, but instead affect some unrelated and unknown third person [94–96].

Fehr stresses and shows the importance of social sanctions to establish and maintain conformity in his experiments; but he also shows that sanctioning is observed even if it is costly and even if the sanctioner has nothing to gain from the act of sanctioning. Her actions are not visible to other individuals, so an increase in social reputation cannot be used as an explanation either. It might be that norms of fairness and justice are internalized in most people to a degree such that not punishing violators produces feelings of guilt and self reproach. Experiencing such negative emotions could be costlier than bearing the expense of sanctioning the violators, even if the expense to the sanctioner is considerable. In such a case, even though the motivation for sanctioning is selfish and rational, quantitatively comparing costs and benefits becomes difficult.

One way to get around this problem has been to assume that norms of justice and fairness already exist in the community being modeled [72]. This transforms the outcomes so that payoffs resulting from cooperating are greater than from not cooperating. As is obvious however, such a model cannot possibly explain the emergence of all norms. How could the norms of fairness and justice have originated in the first place under such a system?

Also, many of these models play out as pairwise interactions between individuals. However, most real world situations involve many people, all of whom have to coordinate their efforts in order to achieve some common goal. When the game theoretic approach is extended to multi-person interactions, the conditions under which conformity is established and maintained turn out to be very restrictive [97]. For example, when the number of individuals is large, achieving conformity is nearly impossible. When the number of individuals is small, the model dynamics closely approximate the pairwise interaction models. It seems

to me then such game theoretic approaches are not going to be very useful when applied to the problems that I am most interested in.

Additionally, there is evidence to suggest that social sanctions are not the only way of ensuring conformity. A.S. Diamond, in his book *Primitive Law*, cites examples of many cases in the tribes he studied where norms were not upheld by sanctions [91]. Also, as mentioned in the previous section, group membership can also be very effective for establishing and maintaining conformity. In fact, group membership, even in the absence of any possibility of social sanctions, can produce a high degree of conformity and cooperation [86]. Rationalists often try to explain these observations in terms of utility as well. For example, one of the explanations proposed for why group membership might ensure conformity is that once someone has wilfully identified with a particular group, violation of any of that group's norms would be very costly because it would result in a lowering of his self-esteem [92]. While one might be able to couch these alternate mechanisms in utilitarian terms, it is much harder to formulate these arguments into explicit utility functions. It is also improbably that these utility maximization based arguments tell the whole story. Modeling people as purely rational agents is extremely unrealistic. While these rationality based models might conform to reality some of the time, it is hard to imagine that a model arising out of such restrictive assumptions will be of much use in predicting human behavior more generally.

Finally, one of the big issues with the rational choice model comes from the observation that sanctioning could at times be costly. Why then would a perfectly rational individual ever want to sanction someone else, especially as a third party? In order to address this problem, rationalists invoke the concept of metanorms [92]. Metanorms are second order social norms that instruct members of society to sanction individuals who do not punish violators of other norms. This line of thought can be carried on *ad infinitum* however, and in order to achieve conformity, society would need to have infinitely many levels of norms, each level punishing violators of the level immediately below. Additionally, Fehr's work has shown that people will punish defectors even when they themselves are not subject to any social sanctions whatsoever [96].

To me, the rational choice model is probably the least useful way of thinking about conservation related norms. It has been shown that in order for social norms to be effective, rewards for conformity or punishments for violations have to be immediate [101]. Unless there is some external incentive provided, there is no tangible immediate benefit to people conforming to conservation friendly norms. Benefits, if any, will be far into the future and will not accrue to the conformers.

The environmental movement faces similar problems, and efforts have been made to make the benefits of pro-environmental behavior more personal and immediate. For example, in one of the more famous norm interventions of our time, a utility company called Opower started including the average electricity consumption of relevant neighborhoods in customers' monthly electric bills [102]. If a particular customer's energy usage was less than the average, she would get a smiley face on her bill. This simple intervention reportedly led to close to a

2% reduction in monthly energy consumption. Of course, this raises a number of important questions about what happens if the incentive is taken away. Does consumption return to pre incentive levels? Does consumption increase because earlier motivations for using less energy get replaced by the provided tangible incentive? How long does it take for incentive induced behavior to become a norm, either personal or social? What incentives are best at affecting change? There are no clear answers to any of these questions.

Given that people often act in ways that are beneficial to their identified group members, for reasons that are not yet well understood and that are not fully explained by pure rationality, maybe a better approach to making pro-conservation behavior a norm would be to frame policies in a way that allows people to think of members of other species and of nature in general as part of their communities. The 'nature for people' approach to conservation has tried to do precisely that, but the role that this approach assigns to nature and biodiversity is a socially precarious one. The role is that of a resource or a servant to the larger human enterprise, not as a member enjoying any degree of equality with the human part of the community. While I do think that the ecosystem services approach is a step in the right direction towards a more inclusive view of the relationship between humans and nature, it gives rise to a whole host of other problems (as discussed in section 1.1.3). I am much more in favor of the 'humans and nature' philosophy, but on a much larger scale than the one on which it is presently being implemented on.

I hope that by this point, I have convinced you that we need a more effective way of doing conservation and that social norms might provide us with this effective new way. I also hope that I have convinced you that we do not understand norms well and that we need to understand them better in order to be able to make use of their considerable power. In the next chapter, I will inform you about my ideas for exploring whether changing social norms can lead to any positive conservation outcomes.

Chapter 2

Can Norms Make a Difference?

While it seems logical to conclude that changing behavior on a large scale in developed Western countries could lead to positive conservation outcomes, there is little evidence to support this line of thinking. Paul Ehrlich has argued that the high rate of energy consumption and consumerism in general is responsible for much of our biodiversity loss [28,61], but his analysis of energy consumption lumps household level and industry level consumption together.

While behavioral interventions have the power to change household energy consumption [102], it is unclear how effective this approach will be at reducing industrial energy consumption. Industrial energy consumption is driven, to a large extent, by production demands which are in turn driven by consumer demands. Changing industrial energy consumption will require not only better technology in order to make industrial processes more efficient, but it will also require changing consumer behavior to reduce consumption in general.

When thinking about social norms to achieve environmental goals, the tendency has been to think about encouraging many small behaviors, such as recycling or car pooling. Each of the individual behaviors by themselves might not make much of a difference, but if most members of society practice these behaviors most of the time, the result could be transformative. This is probably the approach we would have to take if we were trying to curb industrial energy consumption as well.

Such an approach has a major problem: it is very difficult to police each of the smaller behaviors. Rewarding someone for throwing a plastic bottle in a recycling bin instead of a trash can or punishing her for doing the opposite every single time she does so is not feasible. Of course, once social norms are in place or if these behaviors become sufficiently internalized, there will be no need for external rewards or punishments. Establishing these behaviors initially, either through norms or through internalization, is the big issue.

A more profitable approach might be to identify behaviors that have the

greatest impacts and to try to address those behaviors first. It is also important to be opportunistic. It is far easier to use the momentum of already existing movements and to add further momentum to them instead of trying to start a new initiative from scratch. To this end, I intend to analyze what the conservation impacts of currently popular movements directed at changing large scale behavior might be.

The movement to reduce meat consumption in the United States seems to be garnering increasing support from many different parties. Importantly, it has accumulated a number of popular media personalities as ardent supporters as well. Natalie Portman, Mike Tyson, Al Gore, James Willstrop (my favorite squash player), and many others have publicly voiced their support for the vegetarianism movement. While the environmental and animal rights issues regarding meat consumption have been well explored [103–105], the effects on biodiversity have been largely ignored.

In order to start identifying norms and norm interventions that could have a large impact on protecting species and populations from extirpation, I will start by analyzing the impacts of varying levels of meat consumption. The primary variable of interest will be the amount of land needed to support different levels of consumption. However, one could also look at the location of the land and the effects of byproducts from animal facilities to get a better understanding of the true impact of the meat industry on non-human species. I plan on taking a multi-step approach to this part of my thesis:

- The first step will be to collect data about the amount of land devoted to animal housing facilities and to look at whether converting these lands to greenspaces would lead to an increase in species diversity, populations, or both. This step by itself will be broken up into two parts. The first part will look at the land freed up on a very coarse scale. I will use country-wide data on average species richness and population sizes to arrive at a very rough estimate of whether this land could support more species or populations. For the second part, I will take a closer look at how the location of the land could lead to more specific predictions about whether or not freeing up this land could have favorable outcomes.

- The second step will be to figure out how much agricultural land could be converted to wilderness or natural areas as a result of not requiring millions of animals to be fed. This step will also include estimating how much land would be required for crops if everyone were to adopt a vegetarian diet. I will then run similar analyses as in the first step to estimate resulting biodiversity outcomes.

- Finally, I will attempt to build some realism into the above predictions. It is of course impossible to expect every US citizen to become a vegetarian. It is probably also unhealthy to subsist on an entirely vegetarian diet. So, I will attempt to estimate conservation related outcomes at different levels of reduced meat consumption. What would happen if everyone cut their

meat consumption in half? What if we only wanted dairy products from the meat industry?

In addition to providing the basis for the rest of my thesis, this part of my thesis will also serve to address an important concern brought up by a few different people - that even if we are successful at changing social norms, it might not help in achieving conservation goals. If it does turn out that changing food and energy related or other social norms does not prove very beneficial to non-human species, we will have to look to other approaches to do conservation effectively.

Chapter 3

A Model for the Evolution of Societies

The model of social norms and society that I am hoping to explore both mathematically and experimentally borrows its components from a few different areas. The model operates on two scales: intra and inter group. Clearly, this is a model based on the social identity theory (section 1.2.2). Details of the model are nowhere close to being adequately fleshed out yet, but I will attempt to provide a basic skeleton here.

In this model, society is comprised of a number of different groups. The groups overlap to different extents, i.e., members of society are allowed to belong to multiple groups simultaneously and different groups can share norms, beliefs, and values to differing degrees. Individuals are allowed to migrate between groups. Emigration and immigration between groups is mediated by intra-group dynamics. Also, if a group grows very large, it tends to break up into smaller groups, thus giving rise to new groups in the society [90].

At present, the only way of new groups forming is through the fission of large groups. This is fairly unrealistic and restrictive because there are other ways of new groups forming. For example, you could imagine a society in which there are disenchanted individuals in different groups that come together because of their shared disenchantment and thus create a new group. There are plenty of historical precedents for this mechanism. For example, new religions and cults seem to follow this pattern. Usually, the formation of such groups is caused by the influence of a few central powerful figures that are able to rally others to their cause. More reliable information can also give rise to new groups, as can be seen in the anti-cigarette or environmental movements. Currently, I have no good way of fitting such observations into my model.

Also, there will be no dominance relationships between groups to start with; although if I am hoping for any degree of realism, I will somehow have to incorporate group hierarchies into this model. Different norms can be associated with the different groups.

Within a group, individuals and their interactions are conceptualized as nodes and edges on a graph. The topology of the graph is vitally important. Brian Skyrms, in his game theoretic models of the evolution of societies [98,99], and Damon Centola, through his online experiments [106], have both shown how important the initial social structure can be in establishing and maintaining behaviors. I will experiment with different network topologies, but I will also try to characterize what real world interaction networks look like. Details of how I will attempt to do this are provided in the next chapter.

Individuals will make decisions based on rules provided by Ian Couzin and his collaborators' model of decision making in which social information is taken into account by both informed and uninformed individuals [107]. However, my treatment will be slightly different because the individuals in my society will not all be the same. The information provided by some of the individuals will carry more weight than that provided by others. The reason why I am using this decision making method is because it explicitly takes social information into consideration, which is an important part of the social identity theory. I am assuming a non-homogenous society because I think that this is more realistic and because there is some evidence to suggest that this is actually the case [108].

The within group networks are dynamic. Links between nodes are dissolved by both random drift and through experience. If past experiences with an individual have been unpleasant, the individual on the receiving end of the un- pleasantness will sever the link. If past experiences have been very pleasant, the probability of the link being dissolved decreases. Pleasantness and unpleasant- ness are vaguely defined as of now. I am still working on trying to decide on good metrics that do not simply have to do with utility to measure how pleasant a particular interaction is. New links are formed randomly at a low background rate and on the basis of social reputation. Individuals will tend to form links with people that are popular in a society. Social reputation or popularity will simply be a function of connectedness - the more connections an individual has, the more popular he is, and the more likely new members are to connect to him. This should lead to the evolution of scale free networks, and there seems to be some evidence to suggest that a lot of real world networks are scale free [109].

I believe that this model has a few advantages over current models. Firstly, I have not come across any models yet that employ the social identity theory as their starting point. This is surprising given the importance of group mem- bership in determining people's behavior. I am also trying to stay away from arguments of rationality and utility as much as I can in order to see how far I can get without recourse to them. I would like to see if a model that does not assume rationality is as good or better at predicting reality. Finally, and prob- ably most interestingly, a model based on the salience of group memberships will also allow us to examine when and how norms can spread from one group to another. This will have important implications since it could help us focus efforts to change norms in a few groups instead of trying to address all or most of society.

The model is far from complete of course, and has some obvious weaknesses (as pointed out in the discussion above). However, I believe it is important to

start modeling norms using a different perspective given that current models have a hard time explaining empirical results. The model presented here would, for instance, easily predict people sanctioning violators of social norms even in one-off interactions if those people belonged to the right groups. On the face of it, it would appear that this model does not allow for any internalization of norms whatsoever, but I think I could get around this objection too by assuming that the nodes in the network have some definite internal states that define proclivity to one or another course of action. These internal states could themselves be subject to very long time scale dynamics.

All in all, even if this model itself does not pan out well, I would still like to explore alternative approaches to modeling the evolution of society and its norms. I am particularly interested in the role that groups and perceived group memberships have to play in this process and would like to investigate other models that look at these so far under-appreciated but immensely important social factors.

Chapter 4

Field Studies and Experiments

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