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*Cultural Models of Nature and the Environment:
Self, Space, and Causality*

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Editor: Giovanni Bennardo



WORKSHOP

Cultural Models of Nature and the Environment: Self, Space, and Causality

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Organized by Giovanni Bennardo
Department of Anthropology
and Cognitive Studies Initiative
Northern Illinois University

Held at
University Suite, Holmes Student Center
Northern Illinois University

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Introduction

On September 1-4, at the University Suites, Holmes Student Center, Northern Illinois University, a workshop was held entitled “***Cultural Models of Nature and the Environment: Self, Space, and Causality.***” The workshop was sponsored by the National Science Foundation, the Institute for the Study of the Environment, Sustainability, and Energy at Northern Illinois University (NIU), the Department of Anthropology at NIU, and by the Department of Leadership, Educational Psychology, and Foundations also at NIU.

The populations keenly aware of and most at risk of the effects of climate change are obviously those whose livelihood depends on daily contact with the changing physical environment, that is, primary food producers; either farmers, fishermen, or herders. The workshop pursued a deeper understanding of their cultural models of nature and the environment as well as the distribution of such models within the targeted communities.

The first goal of the workshop was to examine the existing literature about the conceptualization of nature and the environment in primary food producers in a number of cultural areas. The second goal was to obtain from these extensive data a number of cultural models about nature and the environment in each of these cultures. The third and final goal was to generate the ground for a new research project whereby the results of the workshop are used as the building foundation. In fact, the intention of the organizer and of the participants is to investigate the hypothesized cultural models by the acquisition of cross-cultural comparative ethnographic and experimental data. At the same time, the ultimate goal is to scrutinize the fundamental role that space may play in the generation of cultural models, and specifically models of self, i.e., proprioception, and about nature and the environment.

The role that space plays in the human cognitive architecture has been widely demonstrated (Gattis, 2001; Jackendoff and Landau, 1992; Jackendoff, 2002; Lakoff, 1987; Levinson, 2003; Mandler, 2004; Mix, Smith, and Gasser, 2010; Slobin, *et al.*, 2010; Talmy, 2000a, b). In 2009, Bennardo clearly showed how a preferential organization of the representation of spatial relationships is replicated in other domains of knowledge (e.g., time, possession, kinship, social relationships). At the same time, that preference contributes to the generation of cultural models in those domains.

Another relevant finding in support of the role of space in mind is the one presented by Shimizu’s (2000a, b, 2011) work on the construction of self (proprioception). Shimizu shows how the cultural models of self in the US, Japan, and China reflect spatial features (e.g., focus on ego or on other-than-ego) in their structural compositions that correlate well with the respective preferences about the representations of spatial relationships (Shimizu, 2009; see also Nisbett, 2003; D’Andrade, 2008). These findings allow one to hypothesize that a preference in the domain of space could be generalized to other domains of knowledge, thus, including one’s and a community’s cultural model of nature and the environment.

Each workshop participants contributed their ethnographic, cultural, and linguistic expertise about a specific culture. The cultural areas (in large brushes) represented are: Amazonia, China, Germany, Japan, Kenya, Lithuania, Menonimee (Native American, US), Namibia, Pakistan, Philippines, Qatar, and US (see Figure 1).

Preferential ways of mentally representing spatial relationships contribute to the construction of specific cultural models. Cultural models of nature and the environment are fundamental to the generation of behaviors that respond to or result from a rapidly changing physical environment. *Thus, the goal and relevance of the proposed large cross-cultural investigation is to obtain insights into the genesis (role of space) and form/content of such knowledge organizations (cultural models of nature).* This newly acquired knowledge will ultimately allow researchers to better understand human behavior in the domain of human relationship to nature and the environment.

The workshop included two full days of work.

Day one was devoted first to the introduction of the theoretical and methodological challenges that the project presents. Second, participants in the workshop gave a brief presentation about their cultural area. They provided the group with linguistic and ethnographic data, e.g., about the kinship system, the religion, and the economy (i.e., farming, fishing, herding) of their own areas of expertise. The impact of climate change on each area and its population were also discussed. Finally, each presenter, after focusing on the existing literature (including their own) about the concepts of nature and the environment in the population/community/culture at hand, advanced an hypothesis about a possible cultural model of nature and the environment held within that culture.

Climate change is one of the most challenging issues that we are collectively facing insofar as it threatens the survival of our species. It is without doubt that before long extensive action will have to be implemented worldwide to try to minimize its potential and disastrous effects (a number of projects including such type of action have already been initiated in the last two decades). The populations keenly aware of and most at risk from the effects of climate change are obviously those whose livelihood depends on daily contact with the changing physical environment. Primary food producers best represent these kinds of populations: farmers, fishermen, or herders. Of course, the whole world population is at risk and we all will eventually be obliged to change our behavior to make our presence on the planet sustainable (see Moran, 2006, 2010). However, the daily and close contact with the environment by primary food producers makes them most directly affected by the effects of climate change. Besides, they are the primary actors who will likely implement whatever new and/or radical remedial policies are proposed.

All of these populations, i.e., primary food producers, around the world hold views about nature and the environment. Recently, insightful publications (among many others) such as *Nature Across Cultures* by Helaine Selin (Ed.) (2003) and *Environment Across Cultures* by E. Ehlers and C. F. Gethmann (Eds.) (2003)—but see also *Earth's Insights* by J. Baird Callicott (1997)—have opened the way to a better understanding of local/indigenous knowledge including beliefs about nature and the environment. What is missing, however, from most of this literature is a deeper insight into how nature and the environment are conceptualized in ways that are out-of-awareness (Kempton, 2001), as most of our knowledge is, e.g., knowledge about language. Such out-of-awareness knowledge structures are typically called cultural models (Holland and Quinn, 1987).

One of the most widely accepted ways of understanding the organization of knowledge in the mind is that of mental models (Johnson-Laird, 1980, 1999). These mental structures are also called “schemas” (Bartlett, 1932; Minsky, 1975; Rumelhart,

1980; Brewer and Nakamura, 1984; Brewer, 1987), “frames” (Fillmore, 1982), “scripts” (Abelson and Schank, 1977) or “idealized cognitive model” (Lakoff, 1987). When a mental model comes to be shared within a community, then we talk of “cultural models” (Quinn and Holland, 1987; D’Andrade, 1989; Shore, 1996; Strauss and Quinn, 1997; Quinn, 2005; Kronenfeld, 2008; Bennardo, 2009). These out-of-awareness mental structures are used to make deductions about the world, to explain relationships in a causal fashion, and to construct and interpret representations from simple perceptual inputs to highly complex information. Importantly, they can also motivate behavior (D’Andrade and Strauss, 1992; Kempton, Boster, and Hartley, 1995; Atran and Medin, 2008), or more precisely, contribute saliently to the generation of behavior. In other words, we use cultural models to make sense of the world around us and at the same time they provide the basis out of which we plan our behavior.

It follows, therefore, that before implementing any strategy directly impacting the lives of these populations, it would be extremely prudent and highly appropriate to understand their cultural models of nature and the environment. This would allow sound policies to be based not only on de-contextualized scientific notions, but also to be grounded in the local knowledge (the one we intend to focus on is the out-of-awareness one) of the people directly responsible for adopting and possibly embracing these changes (see Medin, Ross, and Cox, 2006; Medin, Ross, Cox, and Atran, 2007).

A good number of examples already exists of projects in which indigenous knowledge (IK) and more specifically traditional ecological knowledge (TEK) has been incorporated in the implementation of policies about different ways of relating to the environment (see Dudgeon and Berkes, 2003, for discussion of related issues; Maffi and Woodley, 2010, for a survey of projects; Wallace, 2006, and Vayda, 2009, for specific project examples). One common feature, though, to be found in all of the projects referred to (and many others as well) is the lack of attention to these out-of-awareness knowledge structures or cultural models. These models can only be accessed (and discovered) via laborious and time-consuming methodological procedures (both data acquisition and analysis) that are part and parcel of the cognitive anthropology and cognitive science camp. This is the novelty, we want to stress, that the results of the workshop—and the planned research project—introduces into the already vast work, theoretical and practical in the field, about the conceptualization of nature and the environment.

A cultural model of nature must minimally include a number of causal relationships between fundamental and constitutive categories such as people, animals, plants, weather, physical environment, and the supernatural. Causal relationships may be intra-categorical (e.g., between people, between animals, etc.) or cross-categorical (e.g., between people and animals, between animals and plants, etc.) (see Atran and Medin, 2008).

Day two was devoted to the presentation and discussion of issues concerning methodology. Past experiences were discussed and possible implementations of a number of methods to acquire the data necessary to satisfy the demand of the many goals of the research project were evaluated. Methods aimed at understanding cross culturally the extent to which cultural models of nature and environment correlate with conceptualizations of space and self were also considered.

Even though they are shared, cultural models are not necessarily distributed uniformly within a population/community. Thus, after discovering a model, it becomes imperative to explore its level of sharedness within the communities, i.e., cultures, under investigation and the degree to which it motivates people to act (Gatewood and Lowe, 2009).

A two-tiered investigation is consequently made necessary exactly by this fundamental aspect of cultural models. First, a variety of data, linguistic (e.g., interviews) and cognitive (e.g., experimental), need to be collected and extensively analyzed (e.g., discourse analyses—key words, metaphors, reasoning—on the former and statistical analyses on the latter) to discover the cultural model; second, procedures need to be implemented to ascertain its distribution within the target population/culture (see Kempton, Boster, and Hartley, 1995; D'Andrade, 2005). A differential distribution of the model provides insight into individuals' and/or group's motivations and behavior regarding specific environmental issues (see Medin, Ross, and Cox, 2006; Atran and Medin, 2008; Gatewood and Cameron, 2009).

At the end of the second day of the workshop, the participants agreed on the possibility of adopting a certain number of methodological tools to be used in their future contribution to the research project. Some of the methodologies discussed were deemed as 'core' ones, that is, any contributing researcher regarded them as essential to the acquisition of data in the field and to the analyses to be conducted once back home. Another number of methodological tools were considered optional. That is, some researchers, while acknowledging their usefulness, spelled out how the use of some tasks in their specific field would be ecologically inappropriate.

All participants in the end agreed that a description of all these tools, both core and optional groups, containing suggestions on how they could be employed in the field for acquiring data and used at home to analyze those data, would be highly recommended. It is for this reason that the third section of this proceedings consist of a Field Manual (Appendix 1) and the report of Pilot Study conducted in Northern Illinois (Appendix 2). This manual contains exactly what the participants collectively demanded, a short description of the methodological tools, both for acquiring data and for analyzing them, that each researcher will use in the oncoming stage of the research project the workshop promoted.

These proceedings will be beneficial to area scholars, policy makers, and lay individuals who are active in conducting research on and pursuing solutions to climate change, a challenging species-survival issue. The results of the research project promoted by the workshop can foster sound policies based not only on de-contextualized scientific notions, but grounded in the local knowledge of the people directly responsible for adopting and possibly embracing those changes.

First Day: Cultural Models of Nature and Field Sites.

Introduction.

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The first day of the Workshop included 10 presentations about 10 cultures distributed over 5 continents (see Figure 1). Each presenter gave a short introduction about the population of primary food producers they intend to investigate. Salient characteristics of the culture, of the language spoken, and of the physical environment within which they live were provided. In presenting this preliminary picture, the speakers used their personal expertise—ethnographic and linguistic—and experiences.



Figure 1: World Distribution of Field Sites

The primary food producers communities focused on belong to the following cultural areas: Germany, Lithuania, Qatar, Pakistan, Namibia, Kenya, Philippines, Japan, Amazon (Peru), and China¹. In this Section, the various presentations are introduced in the order in which they were delivered at the Workshop. Thus, this is the sequence of the speakers and consequently of the reports that follow: Andrea Bender, Victor de Munck, Fadwa El Guindi, Stephen Lyon, Thomas Widlok, Justus Ogembo, Katharine Wiegele, Hidetada Shimizu, James Boster, and Wenyi Zhang.

¹ Since Norbert Ross (Mexico), an invited speaker, could not participate to the Workshop, Wenyi Zhang (China) read his contribution instead of presenting it as a poster. The Kingdom of Tonga, Polynesia needs to be added as the cultural focus of Giovanni Bennardo. Similarly, North American cultures such as US and Menominee (Wisconsin) are the foci of two presenters in day 2. Finally, Panama needs to be included as the focus of a participating graduate student.

1. Anticipated Effects of Climate Change on Primary Food Producers in the Kaiserstuhl Area: An Outline.

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Introduction.

The Kaiserstuhl area in the Upper Rhine valley in Southwestern Germany is one of the country's most productive regions in terms of agriculture, with an emphasis on wine- and fruit-growing. Although neither wine nor fruits may appear to be essential for the region's supply with primary or staple food, the livelihood of the wine- and fruit-growing people still depends on their business and makes them particularly vulnerable to climate changes. In fact, the Kaiserstuhl area is expected to be one of those areas to be affected most intensely. Being already one of the warmest areas in Germany, it will literally become a "hot spot" in the near future. During the last century, annual mean temperature has climbed from 7.8°C to 9.5°C, and this trend is very likely to continue. The number of summer days per year, for instance – defined as those days during which the temperature rises above 25°C – will increase by roughly 30% (Stock, 2010).

How these predicted changes are perceived by the local food producers, and how this in turn will affect their production strategies and behavioral responses are two of the questions to be tackled in our project. The target communities comprise the inhabitants of two villages in the interior of the Kaiserstuhl and particularly the families that live on wine- and fruit-growing.

The remainder of this paper first provides background information on the field site and its susceptibility to climate-induced alterations. In compliance with the overall goal of cross-cultural comparison, it then reports some linguistic and ethnographic data, most of which is preliminary, as this project is still in its preparation phase. The final part is devoted to hypotheses on the cultural concepts and models of nature, the environment, and the potential changes, and will briefly sketch the working plan for the project.

The Destined Field Site.

Background on the field site encompasses information on the ecology of the Kaiserstuhl, on the local food-producing economy, and on the possible impact of climate change on food producing.

The ecology of the Kaiserstuhl area.

The Kaiserstuhl is an extinct volcano in the Upper Rhine valley, which separates the Vosges (France) in the West and the Black Forest (Germany) in the East. Rising from the otherwise rather flat Upper Rhine valley, the Kaiserstuhl stretches 15 km from Southwest to Northeast, 12.5 km from Northwest to Southeast and reaches its highest point at 557 m. Its western flank opens gently to the Rhine; the next larger city, Freiburg, lies roughly 15 km beyond its steeper eastern slopes.

The Kaiserstuhl is renowned for its fertile soils, consisting predominantly of thick layers of loess (up to 40 m). Loess is a porous, friable and often calcareous sediment. It

tends to develop into highly rich soils and lays the foundation for some of the agriculturally most productive terrains on this planet. In the Kaiserstuhl area, its soil – together with the warm climate – allowed for intensive farming and viniculture. In addition to its fertility, the mechanical properties of loess, such as its sponge-like constitution, also provide for good aeration and high water storage capacities, which render it important for flood control (cf. Schrepfer, 1993).

While the climate in the Upper Rhine valley is already Mediterranean, characterized by mild winters and hot summers, the specific micro-climate of the Kaiserstuhl tends to be even hotter and, due to its position in the rain-shadow of the Vosges, drier (with an average of 1,720 hours of sunshine per year – 40 hours above the mean for the Upper Rhine valley more generally – and 600–700 mm rainfall) (LUBW, 2010).

The local food producing economy.

Wine- and fruit-growing are the dominant component of the man-made landscape and the regional economy. Wine-growing has a particularly long tradition, presumably going back to the time of the Roman occupation. In the 19th century, the first wineries were established that also started to experiment with plants and cultivation methods. Currently, 25% of the land is used for wine-growing (and proportions are even larger for the villages of Vogtsburg, on which this project will focus), and its high quality earned it international reputation (cf. Gerlich, 1993). In addition to wine, many farmers also grow fruits and vegetables. Cherry trees, walnuts and chestnuts have a rather long tradition, often supplemented by apples, pears and two types of plums.

Livestock breeding, on the other hand, plays virtually no role. The only exception is the *Schelingner Pasture*. It is one of the last year-round pastures in the region, being home to cattle, goats and sheep (and sometimes to more exotic animals such as ostriches or lamas). Its significance for the area, however, is symbolic rather than economic. The *Schelingner Pasture* is maintained by an incorporated society and serves the explicit goal to conserve a unique ecosystem in the Kaiserstuhl area. Compared to US standards, it may appear rather small (with 0.25 km² or 60 acres), but it covers a significant part of the land used for agriculture in the Kaiserstuhl and is highly attractive for local recreation and supra-regional tourism.

Wine-picking in the traditional manner was hard work, as the fruits had to be picked by hand in an uneven terrain, the bucket being carried all along one's back. Over the past decades, this was replaced in most vineyards by harvesting machines – with severe consequences for the environment. To enable efficient usage of these machines, the land had to be re-parceled and re-shaped. Whereas vineyard terraces before the 1960s and 70s were rather small and uneven, nowadays they tend to be much larger, planar and slightly declining towards the mountain flanks. Both these landscaping activities and the heavy machines led to soil compression, which in turn paved the way for damages due to heavy rainfall. Severe landslides and shear failures (as they occurred particularly in the 70s and 80s) are some of the consequences. In addition, the decline towards the mountain flanks facilitated the emergence of cold air traps and ensuing frost damages. Nowadays, the main concern of the authority charged with the reallocation and consolidation of agricultural land holdings (the *Flurbereinigungsbehörde*) is to alleviate and partly undo the most severe consequences of the former landscaping and soil compression.

To complete the picture, it should be mentioned that the Kaiserstuhl is also home to two larger conservation areas, the *Badberg* (0.65 km² or 160 acres), which contains rare plants such as wild orchids, and the *Haselschacher Buck* (0.71 km² or 175 acres). Together with a number of smaller conservation areas in the center, they constitute the *Fauna-Flora-Habitat Kaiserstuhl*. This co-occurrence of ecological concern and commitment among some parts of the population and administration, and of economic interests among others also renders the Kaiserstuhl an interesting case-study for research on environmental decision-making and conflict management.

Possible impact of climate change on food producing

As mentioned above, the Kaiserstuhl is already one of the warmest areas in Germany. It will also be strongly affected by the predicted changes in climate, which include a further increase in temperature, an increase in heavy rainfalls during winter, and an increase in extreme events, which are expected to incur damage or loss. Extreme events include heavy storms, flooding, droughts, and frost, and they are deemed to be so substantial that the University of Freiburg considered putting these issues on a specific research agenda.

Apart from extreme events, the increase in temperature may seem as not critical to a wine-growing business. Yet, while vine plants do require warm climate, they are tuned to a specific range of temperatures and are thus rather sensitive to changes. In other words, types of plants that have been grown in the past, may become more susceptible to unknown diseases or need to be replaced entirely by new types, which are more resistant to plant pests and more tolerant to higher temperatures. Replacing vine plants, however, inflicts considerable costs and uncertainties (Stock et al., 2003).

The Villages and their People.

The Kaiserstuhl is dappled with small villages and settlements, both along its outer slopes and in its interior. The villages in the interior encompass Achkarren, Alt-Vogtsburg, Bickensohl, Oberbergen and Schelingen (with roughly 2,600 inhabitants altogether), all of which belong to the composite town of *Vogtsburg*. Two of these villages will be chosen for our project.

The language spoken in the Kaiserstuhl area is an Alemannic dialect of Upper German, closely related to Alemannic dialects in Eastern France (Alsace), Northern Switzerland, parts of Austria, Liechtenstein, and Northern Italy. As the type of spatial referencing (cf. Bennardo, 2009; Levinson, 2003) is one of the topics focused on in the overall comparative project, a pilot study with students from the University of Freiburg has been conducted to explore respective preferences. Its results indicate that all three basic Frames of Reference (FoRs) are used: the absolute, the intrinsic, and the relative FoR. In small scale settings, the reflexive subtype of the relative FoR is overwhelmingly preferred² (cf. Bender, Beller and Bennardo, 2010). When it comes to large scale space, the absolute FoR is employed more often (typically with cardinal directions), but whether this also holds for our target group (i.e., the food producers in the interior villages of the Kaiserstuhl) remains an open question. It could be hypothesized that they more strongly refer to characteristics of the landscape (as in “uphill/downhill”). It will also be

² With the reflexive subtype of the relative FoR, a figure object between the speaker and the ground object is referred to as “in front of” the ground object, whereas it is referred to as “behind” the ground object, if it is situated beyond the ground object.

interesting to explore whether they regard the opening of the Kaiserstuhl slopes towards the Rhine as its “front” (despite the fact that the country literally comes to an end there), or whether they consider the direction towards the next larger city, namely Freiburg, as the “front” (despite the fact that the roads there have to cross passes).

The kinship system of the Kaiserstuhl communities does not differ from that in the rest of Southern Germany. It is of the Eskimo type, with a strong focus on the nuclear family. In agricultural families, however, the household tends to include close relatives of the nuclear family, who were required in former times – and to some extent still are – for labor and social support.

Wine growing not only has an economic, but also a social dimension, even if this may be of minor significance nowadays. In former times, the wine festivals (so called *Hocks*) that took place in late September to early October served as a type of harvest festival. Now, their economic significance is prevailing, as they are highly attractive to tourists. Another social event is the annual election of the *Weinkönigin* (“wine queen”) – a highly prestigious position that involves representation tasks.

According to a treaty for religious peace (the *Augsburger Religionsfrieden* of 1555), each village had to adopt the confession of its landlord. As a consequence, and due to the complicated political situation in that time, some Kaiserstuhl villages and even some parts of what is now Vogtsburg became Lutheran, while those which belonged to *Further (or Anterior) Austria* stayed Catholic. Although times and regulations have changed since then, most villages still reflect this pattern, and particularly during planting and harvesting seasons, religious rituals are performed in concordance with the respective confession.

Cultural Models of Nature, the Environment and Potential Changes: Some Hypotheses and a Preliminary Working Plan.

In recent years, a range of surveys has documented the beliefs and values held by inhabitants of Western countries with regard to nature and climate change (e.g., Henry, 2000; Kempton, 1991; Kempton, Boster and Hartley, 1995; Löfstedt, 1992), and although similar cultural models have been reported for Germany (Hanada, 2003), only little is known about how the target population conceptualizes nature and the environment. It seems plausible to assume that the general cultural models of the Kaiserstuhl food producers may be in line with the average German population. However, it is also plausible to assume that they have more fine-grained and first hand experience of changing conditions in their environment. Assessing these instantiations is a task that requires empirical data.

In order to collect the respective data, intensive ethnographic studies will be conducted in two of the smaller villages in the Kaiserstuhl interior. The two villages envisaged for this project are Bickensohl in the East, with 450 inhabitants (predominantly Lutheran), and either Alt-Vogtsburg (just a few houses) or Schelingen (340 inhabitants) in the Western part, both of which are mainly Catholic. One main goal is to assess the villagers’ cultural models of nature and environment and of how their perceptions of climate change are integrated into these knowledge structures. A second goal is to assess the extent to which these models are shared within and across the communities.

Cultural models can be regarded as knowledge structures that are out of awareness (Kempton, 2001; Strauss and Quinn, 1997), but – at least to a certain extent – are shared (hence “cultural”). For cognitive anthropologists, cultural models provide the background from which people try to make sense of the world and from which they generate behavior (D’Andrade and Strauss, 1992; Holland and Quinn, 1987). Cultural models that deal with nature include a range of constitutive entities such as the physical environment, natural phenomena including weather conditions, plants, animals, humans, and supernatural entities; in addition, they describe the categorical and/or causal relationships between these entities (Atran and Medin, 2008).

In order to contribute to the comparative goal of the overall project, a range of procedures will be employed: (1) ethnographic methods to collect information on village life in general and on wine- and fruit-growing in particular, (2) semi-structured interviews to collect information on cultural models of nature, (3) structured interviews and tasks to assess the intra- and cross-categorical relationships as well as causal relationships within these models (cf. Atran and Medin, 2008; Medin, Ross and Cox, 2006; Medin et al., 2007), and finally (4) consensus analysis to assess the distributional features of the various cultural models within the communities (Gatewood and Cameron, 2009; Romney, 1999; Romney, Weller and Batchelder, 1986).

Besides the overall goal to contribute to a comparison of cultural models of space, environment and nature across cultures as envisaged by the larger project, the immediate goal of this specific sub-project is to explore how the food producers of the Kaiserstuhl area perceive ongoing changes and anticipate future ones, and how this affects their strategies and behaviors. If the predicted climatic changes materialize, food producers will be among the first to experience them. In addition, they will also be the first to encounter the action plans aimed at minimizing the potentially disastrous effects of climate change. If, by then, no data is available on the cultural models of the environment among those who are supposed to implement these action plans, the well-intended schemes are likely to fail.

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2. Lithuanian Identification with Nature: a Preliminary Cultural Analysis.

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Introduction.

How do Lithuanians conceptualize nature? What sorts of images of nature are part of “their culture?” Can we tentatively construct one or more cultural models of nature from these data? How are these cultural models and their component images used by Lithuanians in their “interaction” with the environment? Particularly, how do primary producers use these cultural models to make decisions about what they produce, how they produce it and to whom they sell their produce? This paper will provide preliminary answers to the first three questions. The latter two questions focus on the relationship between cultural models and rational, purposive behavior. The answers to these latter two questions are not straightforward and require additional methods for data gathering and analysis. However, the first three questions do partially lay the groundwork for answering the last two questions. The paper is organized as follows: (1) a terse discussion on cultural models; 2) demographic, geographic and historical overview of agriculture, livestock and fishing and demographics on who are the primary producers in Lithuania; 3) a brief description of climate change projections for Lithuania and their projected impact on primary producers; 4) A discussion of freelist results that suggest that Lithuanians have a strong attachment to nature; 5) a proposal of two preliminary Lithuanian cultural models of nature.

Cultural Models.

A cultural model is a collective cognitive-emotive structure that putatively inheres in members of the “same culture.”³ Individuals learn these cultural models through their own primary and second-hand experiences and consider them to be real properties of a group. Members of a group also recognize salient individual variations in cultural models (or tweaking of the culturally generic cultural model) and sometimes apply variations for expressive reasons (because it suites their personal style) and/or for instrumental reasons (because they presume it brings them some advantage). As anthropologists have frequently proposed that kinship is the “social glue” of traditional societies, it may be more accurate to posit that, in fact, cultural models are the real glue of society because they are the basis upon which we communicate and cooperate.

Demographic, Geographic and Historical Overview of Lithuania.

Lithuania borders Latvia, Belarus, Poland and Kaliningrad (part of the Republic of Russia) (see Figure 1, Map of Lithuania). Its resident population is approximately 3.25 million people (there is a great deal of temporary but long term emigration to other European countries for work). Of the 6.5 million hectare that comprise Lithuania

³ ‘Same culture’ is in quotes because the same culture here refers to any social group that is relevant to the individual at the time.

approximately 3.5 million hectare (54% of the total) are arable lands, mostly used for agriculture (80.1%) and pasture or meadow land for grazing(14.2%).

During Soviet times most of the 3.1 million hectare were used by state farms (i.e. *sovkhozes*) and collective farms *kolchozi* (Russian, *kolkhozy*). In 1944-1945, the Soviet Union retook Lithuania and this led to a surge in the wave of refugees leaving Lithuania and, more brutally, mass deportation of more than 70,000 people in the year 1948 alone of which more than 98% were farmers.⁴ The main crops grown on these collectives were cereals and beets on the large-scale farms and dairy and meat products on the small scale farms. During the period of *perestroika*, beginning in 1989, the process of returning the collective and state farms to their previous owners was begun. However, many of those owners had died, and many who were deported or left as refugees did not return. In their absence, most of the land was given to village families who had no previous ownership claims to these lands. The government typically returned these lands in small one to two hectare parcels. Thus the majority of farmers in Lithuania have been small “plotters” as they are called. Some of the collective/state farms have remained joint stock farms called “*bendroves*” or “community” farms. In 1997 approximately 66.5% of all agricultural land was worked by families or household and averaged less than twelve hectares in size. The distribution of land ownership and land under cultivation is presented in Table 1.

Table 1: Demographic and acre distribution of agricultural Land in Lithuania in 1997.*

Number		Average size ha	% of UAA
196,000	Family farms	11.7	42.1
342,700	Household plots	2.2	24.5
1660	Agricultural companies	371.6	18.1
	Other land users		15.3

*Source: Lithuanian Rural Development Plan (RDP,1999)⁵

In 2011 it became legal for foreigner agribusiness to buy land in Lithuania. The new Lithuanian real estate law states that “There are no substantial restrictions related to acquisition into ownership of buildings in Lithuania by Lithuanian or foreign natural and legal persons.”⁶

⁴ These data are taken from the Lithuanian Ministry of Agriculture report on the history of agriculture found at the following web site: <http://www.zum.lt/en/about/history-of-the-ministry-of-agriculture/>

⁵ Taken from Country Pasture/Forage Resource Profiles–Lithuania written by R.G. Hamnett (2000) updated on website <http://www.fao.org/ag/AGP/AGPC/doc/Counprof/lith.htm#2.1%20Major%20topographical>

⁶ This statement can be found in <http://www.infolex.lt/portal/ml/start.asp?act=dobizandlang=engandfile=realestate.html#3>

Consequently, German and other foreign agribusiness entrepreneurs have “discovered” that there were large underutilized tracts of farm land that were extremely cheap in Lithuania many of which were owned by poor families. Many of these lands have been bought or leased to these foreign entrepreneurs who use them primarily for ecological or “eko”-agribusiness. There is no recent information on the effects of this new law but it will be interesting to follow its development and its consequence on Lithuanian primary producers in their response to climate change.

Fishing and farm or pond fishing are economically significant and productive in Lithuania, with fishing constituting 12% of all agricultural exports.⁷ In 2002 there were approximately 6000 people involved in fishing. There are approximately seventy large long-range fishing ships and over one hundred small fishing ships fishing in the Baltics and in the Curonian Bay (by the spit extending from Klaipeda south to Kalnigrad, see map). While there has been some curtailment due to stricter and greater enforcement of EU laws, there has also been an increase in pond fisheries. There are fifty pond fisheries in Lithuania and all are locally owned. There has been a large infusion of EU funding so that approximately 80% of the recent developments in the fishing industry are funded by EU rather than national sources and most of it seems to be directed toward small-scale family owned fishing operations. It is expected that most of the primary producers who are fisherman live in the Klaipeda area where new fishing harbors and loading equipment have been built to accommodate the growth of the fishing industry.

A Brief Description of Climate Change Projections for Lithuania and their Projected Impact on Primary Producers.

Most of this data is a result of a large projects sponsored mostly by the EU to study the effects of climate change on the Baltics and develop “adaptive strategies” (hence, the acronym ASTRA).⁸ The main problems of climate change are increasing temperature change of 2-4° Celsius in summer and 4-8° Celsius in winter. As a result sea level is expected to rise quite significantly, but estimates of how much range from a low of 5 cm to a high of 100 cm. The Baltic sea, rivers and lakes are expected to become more polluted with reduced oxygen and a large increase in the erosion of the shoreline plus more erratic weather patterns. Growth of forest parasites and increase in an already low water table is expected to provide problems in maintaining the health of forest coverage and add to the difficulties in draining the wetlands (which make up approximately 70% of Lithuania’s utilized agricultural land). During Soviet times, 2. 1 million hectares of wetlands had been drained and turned into farm land, but the drainage structures have been neglected and the problem of drainage is likely to worsen significantly.

The Ministry of Environment has proposed policies to meet EU and Kyoto environmental standards. Among these policies are: 1) to renovate 80% old style soviet apartments by 2020; 2) a plan to increase forest growth; 3) develop wind power; 4) increase forest area 3% by 2020, by using land not suitable for farming. Lithuanian studies on climate change have shown that there has been an increase in temperature and

⁷ Most of this was taken from the Fishery section of the Ministry of Agriculture of the Republic of Lithuania Reprot, 2004 report. Found at <http://www.zum.lt/agri04/075.htm>.

⁸ The Repor ton which this portion of thepaper is primarily based is to be found at http://www.gsf.fi/projects/astra/0_home.html

droughts since 1995. Indicative of the increase in temperature is the now common sighting of forest mushrooms in December. It is expected that with significant changes to an already low water table there is going to be structural changes to the soil that will significantly impact agricultural production. However, there seems to be a consensus that the greatest problems will occur to the waterways, lakes, sea and especially the sea shore of Lithuania. The Kurionis Spit is predicted to disappear over the next fifty years and areas of the western seaboard have already experienced a loss of sand and narrowing of the strand. However, predictions on future effects are speculative and necessarily general rather than specific. There have, to my knowledge been no studies done on primary producers and their personal experience (or lack thereof) of climate change. That the climate is changing and will have negative effects on the environment and agricultural production there can be no doubt; but there is no consensus on the severity of effects or what would be the right responses to counter these effects.

Lithuanian Identification with Nature.

Eighty Lithuanians, sixty from rural areas and forty from two urban areas (a total of 120 informants), were asked to “list what they were most proud (*didfiuojat*□s) of about being Lithuanian.” The most frequently cited term was “nature” (*gamta*), the second was “language” (*kalba*). Figure 3 lists the ‘top ten’ terms cited (English translation to the right).

Figure 3 Top ten things about Lithuania or being Lithuanian that Lithuanians are most proud of.

TERM	FREQUENCY	RESP PCT
1 <i>Gamta</i> (nature)	33	29
2 <i>Kalba</i> (language)	30	26
3 <i>Kad_Lietuvis(e)</i> (being Lithuanian)	23	20
4 <i>Istorija</i> (history)	21	18
5 <i>Nepriklausomybe</i> (independence)	18	16
6 <i>Tradicijomis</i>	13	11
7 <i>Lietuviu_Charakteriu</i>	12	10
8 <i>Zmonemis</i>	9	8
9 <i>Sportininkais</i>	9	8
10 <i>Gimtine</i> (birth place)	9	8

This is not an answer that one would expect to find in the U.S. or many other countries. It suggests that Lithuanians, at least relative to other Euro-American cultures, identify unusually closely with nature. The reasons for this close identification as well as the form(s) it takes (i.e., the cultural models of nature and identity) and how Lithuanian cultural identification with nature influences primary producers and Ministry of Agricultural policies are questions to be answered in the upcoming research.⁹ In the final

⁹ Sea fishing and pond fisheries are under the aegis of the Ministry of Agriculture.

section two preliminary cultural models are developed; they are derived from a variety of historical and ethnographic sources.

Two Proposed Cultural Models of Lithuanian Conceptions of Nature.

Lithuanians point proudly to their pagan past, noting that they were the last country in Europe to be Christianized. There is a thriving resurgent pagan movement in that country, that is not just historically rooted in cultural nostalgia, but in an unbroken tradition, in which paganism is also associated with resistance to outside invaders (specifically Russia) and, *ipso facto*, to freedom and independence.¹⁰ The prototypical representation of Christ in Lithuania is not crucified, but as sitting on a rock or cut tree trunk, holding his head and brooding (*rupintojeles*). Thus, Christ is depicted as a man of the forest, a Lithuanian, and an extension, rather than disjunction, of the pagan image of the sacred.

Historically the dominant mode of production has been plow agriculture (which one still sees, using horses as the draft animal of choice). Most Lithuanians are active in gardening and Lithuanians (including students) typically go to work and relax in their *Sodybe* (or village home and garden) during the summer months. An anthropologist remarked to me “scratch a Lithuanian and you will find a peasant underneath.” It is a statement that, I think, most if not all Lithuanians will agree with approvingly. It is this attachment to the land and the pagan identification with nature that is largely responsible for the close identity Lithuanians appear to feel with nature.

From this brief discussion, I propose two tentative cultural models of Nature with which Lithuanians identify: the one is a pagan/Christian model focused largely on the forest; the second is a peasant model focused largely on seeing nature as a productive resource that is at the same time the place in which the traditional (i.e., “authentic”) Lithuanian family lives or should live. The two cultural models, their salient and distinctive features and their prototypical extensions, and whether they are distinct models or often overlap and how they interface with other kinds of cultural models (EU regulations, climate change, etc.) are issues that remain to be worked out.

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¹⁰ This is of course speculative but I think not so controversial.

3. Moon, Sun, Desert, Sea. Knowledge of Space, Time and Natural Environment: The Case of Qatar

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Introduction.

This paper summarizes the PowerPoint presentation by the same title given by the author at the NIU Workshop, Cultural Models of Nature and Environment: Self, Space and Causality¹¹. It is divided into first a brief background on Qatar, the proposed field site. My expert component of the cross-cultural project will cover Arabo-Islamic culture conceptually, and focus on Qatar in the Arabian Gulf ethnographically. The background segment consists of a brief description of the rapid change and development that the State of Qatar and its people are undergoing and adjusting to as Qatar situates itself as an economic, sports and mediatory emergent center in a globalized world that is itself at present undergoing crises of wars and a troubled economy. This is followed by some preliminary ethnographic field-gathered observations on local views that together form a worldview of the Qatari (and perhaps by extension, supported by existing studies, the overall Arabian Gulf) physical and social environment. This worldview however is incomplete without what I call the Islamic rhythm (El Guindi 2008) which provides an overall frame of reference for individuals and groups. The paper concludes with a brief elucidation of my conceptual framework guiding the research orientation.

The project's stated goal allows me to unify my conceptualization about culture (structure and cognition) stemming from my different research projects on ritual, space, time and kinship: my field study among the Zapotec (El Guindi 1986; El Guindi 2006), the study of Space and Time in Islam (El Guindi 2008), the field study in Egyptian Nubia (Callender 1962; El Guindi 1963-1965; El Guindi 1966; El Guindi 1978), my the field study on kinship in Qatar (El Guindi 2009-2010; El Guindi 2010; El Guindi in press), and new preliminary data on the conceptualization of the natural environment by Qataris in the Arabian Gulf¹².

¹¹ I wish to thank Giovanni Bennardo for keeping me in the loop on this project over a period of several years, despite huge distances (between NIU and Qatar University) and busy schedules of teaching overseas. I thank him and all those involved in organizing the workshop which worked out as a successful forum of exchange of ideas. The workshop was held at Northern Illinois University, September 1-4, 2011, at the University Suite, Holmes Student Center. In this regard, I wish to acknowledge invaluable field assistance from my student in Qatar, Shaikha al-Kuwari.

¹² Anthropological Literature in English on the Arabian Gulf region is sparse and limited. Several publications are proposed here :
Dresch, P., and J. Piscatori. Editors. 2005. *Monarchies and Nations: Globalization and Identity in the Arab States of the Gulf*. London and New York: I. B. Tauris; El Guindi, F., In press, *Milk and Blood: Kinship among Muslim Arabs in Qatar*. *Anthropos*; El Guindi, Fadwa, 2008, *By Noon Prayer: The Rhythm of Islam*. Oxford: Berg Publishers; El Guindi, F., 1985. *The Status of Women in Bahrain: Social and Cultural Considerations*. In *Bahrain And The Gulf*. Edited by J. B. T. Nugent, Theodore H., pp. 75-95. London and Sydney: Croom Helm; Fox, J., N.M.Sabbah, and M. Al Mutawa. Editors., 2000, *Globalization and the Gulf*. London and New York: Routledge: Taylor and Francis Group; Nagy, S. 1998. "This Time I Think I'll Try a Filipina": Global and Local Influences on Relations Between Foreign Household Workers and Their Employers in Doha, Qatar. *City and Society* 10:83-103.

Background Qatar.

Qatar is an Arab country, with Arabic as its language and Islam as its religion. The majority of Qatari nationals adhere to the Wahhabi sub-sect of the Hanbali sect of Sunni Islam. Qatar is a small Peninsula of the Arabian Gulf situated on the northeast coast of the Arabian Peninsula, and sharing with Saudi Arabia its only land border. It gained its independence from Britain as its protectorate in 1971. It is ruled as a monarchy by al-Thani family since the mid-19th century. With its independence in 1971 from Britain Khalifa bin Hamad al-Thani became Amir. In 1995 Sheikh (title) Hamad bin Khalifa bin Hamad al-Thani overthrew his father and took over rule.

Today Qatar enjoys the largest per capita production and reserves of oil and natural gas and is the fastest growing economy in world. Today it yields high production and exports of liquefied natural gas, oil, petrochemicals and related industries. It is an Arabian Gulf State and a member of the Gulf Cooperation Council, though it is not one of the Emirates. Exploration for natural resources began in 1935 and the discovery of oil was made in 1940. Discovery of natural gas was made in 1971. In the past the economy of groups who now constitute the nationals of Qatar made livelihoods out of herding, fishing, pearling and trading.

The climate of Qatar is marked by an arid ecology and, despite rapid urbanization and a marked expansion of a built environment, the weather continues to be hot and dry (occasionally humid) most of the year. And while Qatar is undergoing climate change like the rest of the globe, this aspect is not a marked concern in its overall development plan or people's orientation and psyche. It is the exponentially rapid urbanization and development that is preoccupying plan and action. There is rapid shift in modes of livelihood, fast urbanizing, dramatic change in lifestyle, growth in population size and change in population composition and related sociocultural dynamics accompanied by fast pace reform in education and cultural activity. Qatar has too rapidly thrust itself onto the world center stage, striving to meet international standards, as for example its flagship news channel al-Jazeera, which is worldwide famous and was rated as top news channel, Qatar Airways which was rated as top world airline, home for the Asian Games in 2006¹³, and winning home for the Football World Cup of 2022.

The most recent population census, October 31, 2011, shows a total population of 1,722,516,599,323: 1,276,979 are males and 445,540 are females. This does not reflect a Qatari gender imbalance, however, since these figures include expatriate male-majority labor, which is close to 80% of the total population. The size of expatriate labor is now becoming politicized and is not easily accessible from official sources.

The natural wealth of Qatar translates partially into privileges for its citizens in the form of free education, free land, subsidized property, free health care, subsidized animal farms, free social care, tax-free high income, guaranteed employment, generous higher education subsidies (tuition and books), free water and electricity among many more.

¹³ The 15th Asian Games, officially known as the XV Asiad, is Asia's Olympic-style sporting event that was held in Doha, Qatar from December 1 to December 15, 2006.

Kinship, Marriage, and Social Organization.

To summarize a complex aspect of human systems, namely the kinship system of any human group is no minor challenge. For Qatari social organization, descent is the active organizing principle, and the subject of kinship and marriage is live and lived almost 24 hours a day. In marriage the preference is for patrilineal parallel cousin marriage, which in reality ends up being lineage endogamy. Polygyny is allowed and is widely practiced, although it is difficult to quantify its presence. According to the most recent document by the Ministry of Planning (Planning 2011:166-168), “most Qatari households remain large ... [m]ore than 80% of households comprise 5 or more people, and 20% comprise 10 or more. Two-person household are rare, and one-person... even rarer”. The family is considered officially and in practice the core of Qatari society, having moral and religious obligation to care for its members. Kinship in practice is recognized in three forms: *nasab* (by birth), affinity (by marriage), suckling (by woman suckling of non-biological child) (El Guindi 2009-2010; El Guindi 2010; El Guindi 2011-1012; El Guindi in press).

Arabians, Nature, and Animals.

In the Arab world, Arabians are known to have a close relationship with their camels, horses and falcons (for extending insights from data on related topics see Khalaf 1999; Lancaster 1997; Young 1994; Young 1996; Young 2007), which continues despite urbanization and sedentarization (on classic studies of sedentarization of Bedouins see Abou-Zeid 1959; Abou-Zeid 1979). Special relations extend to livestock. According to Cole (Cole 2003: 238), Bedouins were strongly linked to the livestock they raised and took care of. There was complete interdependence between livestock and Bedouin. The Bedouin depended on their animals for much of their own livelihood and sustenance. This interspecies “co-dependency” or symbiosis was a central feature of the old Bedouin economy (on this also see Swidler 1973), wherein the livestock constituted a person’s and a family-household’s capital. These animals were owned individually as private property often by the senior male head of household as part of an inheritance and/or by purchase. Some were owned by women in the household who acquired them in lieu of a right to inheritance or through purchase. That livestock are owned or used for livelihood does not accurately portray the picture. Considering them ‘capital’ or describing the relation as ‘co-dependence’ overstates the economic factor and does not do the relation justice. Are animals considered human food, beasts of burden, tools for individual profit, or are they partners in the human quest for food and companions in raid and trade, or even good to think? Without descending into labyrinths of romanticism, the actual relation speaks to a special quality of life. The economic interdependence is more of a partnership, a mutuality as it were, in life, not simply for life, particularly regarding camels, horses and falcons.

Until recently, before Qatar became a state, many Arabian Qataris were leading mobile, nomadic lives, carrying out livelihoods in close partnership with camels, sheep and goats. Settled Qataris are given choice of remaining close to their animals by offering them a piece of land away from and in addition to the residential lot they get to keep and raise animals. “Land is given by State subsidy but is regulated by stipulations regarding building and regarding the number of animals to be sheltered in it. Expenses of building,

buying animals, feed, water, tools are all on the owner of the *'izba* (farm or ranch). The government concern is to regulate the matter of land and animals. Ten years ago the matter was random. Anybody takes a land and raises animals. The government now is regulating place and manner of land use (Al- Kuwari 2011b). It is clear that the government is not prohibiting people from keeping animals.

Recently¹⁴ a Qatari man, recipient of state granted *'izba* (Arabic for private estate that invokes qualities of farm and ranch) where he cares for sheep, goats and chickens, went to visit his sister to inform her how saddened he was because of the death of his *'anza* (goat). He spent more than half an hour fondly talking about the goat that had just died—he talked of her looks, her color. He then sadly told his sister: “You know Sarah (his sister’s name), this goat is the daughter of Rabbush”. Rabbush is the name of the goat’s mother, another goat he mourned when it died. (Al-Kuwari 2011a , unpublished field observations, March-June 2011). In Qatari Arabic *rabbush* is derivative from *r-b-sh*, which denotes “*imbalance of behavior and always in a rush*”¹⁵. While one story, it represents a larger attitude toward “companion” animals.

Being self-sufficient now, most Qataris do not raise animal for subsistence. The man in the story voluntarily keeps animals for care and subsistence. He has no desire to turn them into capital. He uses goat milk and chicken eggs for home and family consumption. These feed the immediate family, and are given as food (unceremonialized gifts) to extended kin living in separate compounds. In this case, slaughtering livestock is only for Islamic “sacrifice” for the ‘Eid, apportioned between family and needy according to the Islamic prescription, and these sacrificial sheep are especially purchased for the purpose (Al- Kuwari 2011b) .

This kind of relationship of humans and animals, previously partners in Arabian life and livelihood is humanized. Animals do not become “pets”, that is, possessed after being pacified, tamed, spayed or castrated, and trained to “obey” the house master, particularly when the master is lonely and living in isolation from family. In Qatar animals join the human family rather than replace absent members. In order for the Qatari goat owner to express the depth of his emotions from the death of his goat in this recent episode, he tried to remind his sister of the goat’s position in the genealogy, identifying her named mother. To this Qatari man, as to other Qataris, livestock are treated as having kin, whose genealogies are remembered (not as pedigrees for inbreeding purposes), but as kin mourned in death. They become extensions of the human kin unit. While animals as capital are maintained by hired foreign labor in Qatar, kin animals are directly cared for by their owners.

Falcons have a special place in Arabian life and ethos. They are housed with people inside their homes. Many houses in Qatar today would have a dedicated room in the house especially designed and equipped to house falcons. They can be seen (without attracting much local attention) on the shoulders of their owners in public places, even in airports, in queues formed for official passenger travel procedures. Horses and camels, like falcons, are considered partners with humans in racing and hunting. Both activities are ceremonialized and have a strong presence in the lives of the Qatari people.

¹⁴ This note was recorded in Arabic by my student research assistant, Shaikha al-Kuwari, during field observations in June, 2011.

¹⁵ Interview held on August 25, 2011 by Skype chat.

Worldview of Natural Environment: Preliminary Data.

Preliminary content analysis of natural conversations among Qataris in natural setting during visits shows a marked distinction made between *barr* [local usage in Arabic to mean seashore, desert, land] and *bahr* [Arabic for sea]. Note that *barr* would not ordinarily be used to mean desert which is *badiya*, a shared derivative of the triliteral *b-d-* with terms such as Badawi, bedu, Bedouin (all referring to Arabian nomadic inhabitants of the desert, or their settled descendants), or alternatively *sahra* (referring to desert). *Barr* is usually a referent in a contrastive pair *barr-bahr*, and when used singly *barr* refers to seashore not desert.

In casual local Qatari conversations one man would ask another whether he is *Ra'i al-barr* or *Ra'i al-bahr*. *Ra'i*, which is an Arabic referent meaning male guardian, when applied to *barr* refers to animal herder and when applied to sea refers to fisherman. That means that the ecology worldview of recently urbanized, settled Qataris of “desert” background, who in this region both herded animals on land (desert) and fished at sea (the Arabian Gulf) continues to frame their ecological orientation which is described in terms of the contrastive pair land-sea, the two terrains of livelihood of the past. These continue today as recreational pastime for sport and obtaining food to be shared by or exchanged within the family, but not as subsistence livelihoods. “*Hadarized*” *badawis* (bedouins) is a term I am constructing to refer to the old everlasting “*hadar-bedu*” (urban-desert nomad) continuum of identity. *Hadar* refers to urban setting. Most *bedu* are now *hadarized*. This contrast is in full usage today in Qatar. This can be transposed asymmetrically (preliminary idea) onto the *barr-bahr* contrastive pair. *Hadarized badawis* living in urban Qatar today plan weekend recreational (heritage identity) activities going out into the surrounding desert as family and tenting. They continue land animal hunting expeditions using falcons as well. More systematic and in-depth study is needed on this subject.

Islamic Rhythm of Life.

As argued in El Guindi 2008, Islam interweaves for Muslims a particular orientation to daily, monthly, yearly life, a rhythm as it were. This rhythm is entwined with moon and sun. I argue in the conclusion of this study on time and space in Islam that a core element in historically deep traditions underlies and shapes culture, and in turn defines the pulse of a people. I use the notion of rhythm to capture a special kind of energy, one based on a notion shown to be of increasing significance in the psychological and cognitive sciences. This concept is ‘mindfulness’ – a metacognitive skill, a mode, a heightened state of involvement and wakefulness, with essence for change while situated in the present. This Islamic rhythm interweaves with traditional lifestyles in which both season and tides are determined by the moon and by the *hijra* (Islamic) calendar. Moon, sun, dawn, and sunset are all part of a unique and unified rhythm interweaving the sacred and the ordinary, nature and culture in a pattern that is characteristically Islamic.

Cognitive Models of Nature and Culture.

Studying cognitive models of nature and culture implies respect for tradition, acknowledgment of local skills, promoting uniqueness of human cultural traditions and the universality of humanness. Cognitive models based on cultural knowledge interweave nature, culture and the various worlds constructed by humans to impose order and harmony on their disorderly universes. Though perhaps not as obvious as in the case of the material world, this interwoven knowledge is pertinent to issues of sustainability. There is organic wholeness to individuals. Important new aspects of individual and social behavior become apparent as links among bodies of knowledge continue to be explored. It can reveal aspects of harmony in life which ultimately creates a general quality of life which affects the character of sustainability.

Exploring the nonmaterial world of cognitive models, an area less considered in sustainability discourse and policy plans, reveals how coherent mental models are culturally woven to form schemes by which humans perceive nature and culture, integrating the visible and invisible, of material and nonmaterial elements surrounding human life.

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4. Conceptual Models of Nature in Pakistan.

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Introduction.

Conceptual models of nature in Pakistan are the products of the unique sociocultural, historical and political relations that have shaped other aspects of life in the region. To suggest that there are systemic interactions between differing conceptual models is to state the obvious. That such systems exhibit complex interactions, is again, hardly surprising or problematic. Guindi (2008) suggests that complexity does not mean an absence of triviality, but rather something far more conceptually powerful. She argues, instead that complexity refers to nestled interrelatedness. Such a description is fitting for a region which exists in the cross roads between the Middle East, Central Asia and the South Asian plains. Successive waves of migrants, some peaceful and some conquering armies, have left their marks on the modern country of Pakistan. Northern Punjab is perhaps one of the more acute microcosms of such complex intermingling of competing systems to be found in Pakistan. It has endured domination from outside while retaining considerable autonomy in practice. Consequently, despite repeated conquest and political subordination, there is evidence of variation at surprisingly local levels. Shackle (1976) has amply demonstrated the linguistic diversity of Pakistan's Punjab, which is indicative of the extent to which varying populations have influenced one another while nevertheless retaining important conceptual distinctions. Models of nature offer an example of how adaptation coupled with profound conservatism can operate in practice.

Throughout the ethnography of Pakistan, which by and large is not primarily concerned with conceptual models of nature, there are examples of new cultural models being adopted with ease. Such models, be they of time (Mughal 2008), conflict management (Lyon 2002; 2004b), kinship (Fischer 2006; Lyon 2005), political maneuvering (Barth 1959; Lindholm 1982; Lyon 2004a) or systematic gift exchange (Egler 1959), all contain within them the impact of migration and exchange of ideas and people across the region. Competing models are invoked in strategic ways depending on the contingencies of the situation. Core terms and concepts are subject to radical change over time. Yet despite such fluidity, it is possible to identify what Bennardo (2009) calls foundational models of culture. Such models are perhaps not as dominant as Bennardo suggests the radial notion of space is for Tongan society, but they inform diverse aspects of social life, much as radiality apparently does in Tongan social organization.

The Ethnography of Pakistan.

It is fair to say that conceptual models of nature have not been at the forefront of the anthropology of Pakistan. Pakistani ethnography has been largely preoccupied with issues related to marriage, conflict, religion, politics, economics and migration (see Lyon, 2004). This is not to say that there has not been any work carried out on how different populations within Pakistan conceive of nature, but rather that for the most part these conceptual models must be extracted from ethnographies primarily on other subjects.

Ethnographies of Pakistan have been subject to a certain amount of sociological ghettoization as well, which is both defensible and sometimes regrettable. Broadly speaking, the ethnography of Khyber-Pukhtunkhwa (formerly the North West Frontier Province), Balochistan and the Federally Administered Tribal Areas (FATA), have been characterized as ‘tribal’ cultures in which the people espouse fiercely egalitarian rhetorics and carry out cultural practices and discourses which overtly assert idealized notions of masculinity and honor. Ethnographies of Punjab and Sindh, in contrast, have characterized populations there in ‘peasant’ cultures.

This approach emphasizes the hierarchical relationships between groups and the complex interconnectedness between those groups. Caste affiliation and relationship within the systems of production and distribution have tended to be more important in the ethnographies emanating from these provinces. Such ethnographic divides are defensible in part because they map neatly on to public discourses that local people use about themselves and others. There is also the reality that what is true in Pakistani Punjab is not going to be radically different from Indian Punjab, given the long history of co-residence of the religious communities across most parts of the Punjab and in particular in cities like Lahore and Rawalpindi, so it is reasonable for ethnographers of Punjab to pay close attention to the ethnographies produced about the Indian Punjab. Such ethnographies do indeed emphasize aspects of social organization based on caste (*jati* or *zat*) and economic relations between dominant and subordinate groups.

Ethnographies of the so called tribal populations, have tended to look west or north for comparator materials. So Central Asia and the Middle East (including Iran) have come to be important reference points for understanding Balochi or Pukhtun populations. Consequently, there has been a de-emphasis on the complex interdependency of caste and instead a focus on expressions of masculinity and honor, on the practices and ideologies of blood feud and revenge and on the strategic manipulation of shifting alliances in ongoing competition over resources.

This broad division of anthropology of Pakistan has largely persisted despite an increasing body of ethnographic evidence which would suggest that there is considerable continuity across Pakistan and arguably into northern India. It therefore behoves us to be mindful of the traps of both the domain and the level at which research is targeted. If we concentrate on economic relations of production, then we see clear patterns of economic interdependency characteristic of peasant social relations. If instead, we examine aspects of honor and control of women, then a far more egalitarian and tribe like autonomy emerges even in the most peasant like populations across Punjab and Sindh. Therein, perhaps lay one of the dilemmas for developing conceptual models of nature across Pakistan; there are cultural models which rise or sink from the surface based on the social context and the expedient goals of the individuals involved. This is not to say that there are not foundational cultural models that underpin most, if not all, populations across Punjab and Khyber-Pukhtunkhwa at least, but rather that there would appear to be competing foundational models which may get invoked, or not, based on a host of contingent factors. A comprehensive catalogue of Pakistani CMN, will therefore not result in a unified foundational model upon which the various flavors of Pakistani culture are built.

Idea Systems Over Time.

One of the ongoing puzzles with human culture, is of course its communicability over time and space. There are undoubtedly idea systems which are critical for effective cultural communication. That some idea systems seem relatively durable despite changes to economic or political principles of organization provides us a chance to study how knowledge is produced and organized. In South Asia, we are fortunate to have very old texts which provide a glimpse into some aspects of social organization and behaviors over a very long time frame. It is therefore possible to compare contemporary classificatory systems and resource management behaviors with those of several hundreds and possibly thousands of years ago. What we find is changes to the meaning of some terms which reflect changes in major environmental and economic behaviors, as well as retention of many relationships between terms. In other words, the attributes associated with many terms seems subject to change, even if the logic of the relationship between terms may be identifiably analogous or indeed, the same.

Dove (1992), for example, has examined the ways in which the term *jungla/jangala* has changed in meaning over time. The term *jungla*, today refers to forested, hilly land which is peripheral and wet or humid. Using historical Sanskrit texts, Dove argues that *jangala* previously referred to savannah that was central, dry and plateau land. The change has been brought about through changes in agricultural practices which have effected environmental shifts which have, in turn, led to lexical shifts in core terms associated with the environment and more sociologically ideas of nature. Widespread pastoralist practices transformed ancient thorn forests into anthropogenic savannah. So what had previously been culturally desirable *jangala* became culturally undesirable forest waste (*jangal* or jungle). The term has of course also come to be used as a pejorative adjective to describe wild people (*jungli*).

In terms of animal classifications, Smith (1991) has identified a useful set of broad types of animal classification from the ancient Vedic texts which he argues are not only instructive for understanding how ancient Sanskrit speakers categorized animals, but also for developing a better sense of how people were categorized. The models of nature, in other words, are just as much about political social organization as reflections of conceptual models of nature. Smith lists four distinct systems of classification of animals: 1) zoological, 2) domestic, 3) sacrificed/not sacrificed, 4) edible/inedible. Such systemic mechanisms for ordering the natural world persist in contemporary Pakistan, though they have been modified by new waves of people bringing with them alternative ways of interpreting such categories as sacrificed/not sacrificed or edible/inedible. Muslims, for example, would agree in principle that there are animals which can be sacrificed or not, but the animals suitable for such categories are different. Interestingly, there does appear, to be some ambiguity about edible/inedible animals in practice, even if the classification of animals demonstrates high levels of consensus ideologically.

Religious Migration and Transformation.

South Asia is no stranger to pluralist religious communities. Pakistan's currently overwhelming Muslim population belies a far more diverse and turbulent history of religious diversity, contradiction, syncretism and production. Across Punjab and Khyber-

Pukhtunkhwa Buddhism was the dominant religion at one time. The Punjab is, of course, famously the birthplace of the Sikh religion. Hinduism remains an important cultural influence long after the people in formerly Hindu areas have converted to other religions. Islam came to the area now known as Pakistan in various waves of conquest and conversion from shortly after the time of the Prophet Muhammad onwards. The British brought their own brand of Christianity and other missionary organizations have introduced different types of Christianity in various parts of South Asia. Much of the history of religious conversion and transformation goes hand in hand with the movement of people across Pakistan. This passageway from the Central Asian plateaus to the Indus Valley lowlands has seen successive waves of conquering armies and migrant communities either fleeing something or someone, or on the move to some imagined improvement.

Such migration and religious transformation has arguably impacted on a number of cultural idea systems both directly and indirectly related to issues of worship and faith. Dietary changes triggered by religious regulation result in shifting agricultural practices. As in the case of the shifts around the term *jangala/jangal*, changes in agricultural practice can result in profound environmental change over time (sometimes over very short time periods).

It is beyond the scope of this working paper to itemize the types of religious changes which have had such impacts, but it is worthwhile commenting on the varieties of religious idea systems which seem to pervade the Punjabi countryside in particular, and which are perhaps most likely to be understood as affecting foundational models both of nature and other domains.

Hinduism is undoubtedly the oldest extant religious system in South Asia. There are a number of sacred texts which lay out much of the mythological context in which Hinduism is supposed to have emerged; and there are descriptions of rituals practiced by various religious priestly elites over the centuries. But Hinduism lacks the same coherence and orthodoxy (however contested) of some other world religions, such as Christianity, Islam or Judaism. Central to the idea of Hinduism is the hierarchically organized caste system, or *Varna* system. The *Varna* are the principle classifications of Hindu caste and they indicate a person's station in the current life. Through reincarnation it is possible for people to move from one *Varna* to another, but within a single lifetime, there is no mechanism for legitimate mobility through *Varna*. Marriot's (1976) suggestion that personhood in India should be understood as a partible entity in India reflects a number of what might be understood as important idea systems in Hinduism. Such partible personhood, or the related notion of dividuality, offers a logical explanation for caste segregation in general and ritual separation of food preparation and consumption between groups in particular.

Subsequent South Asian religions like Buddhism and Sikhism, unsurprisingly, share many common idea systems with Hinduism and unproblematically use notions like *karma* or *dharma* even while shedding some aspects of the *varna* system. Islam, ostensibly introduced a radical break from many aspects of Hinduism which might have led to more profound shifts in foundational cultural models, but of course it was not embraced in a vacuum not entirely, or even primarily, by force. South Asians were attracted to Islam for different reasons and the Muslim practices that developed across

South Asia were and are considerably more heterodox than they may appear from popular representations of South Asian, particularly Pakistani, Islam.

Conclusion.

The idea of competing models of social organization is compelling throughout the ethnographic record of South Asia (see Leaf 1972; 2005). Pakistani representations and understandings of nature are impacted by foundational cultural models which are derived from the environment, as well as other domains of social life. Conceptual models of nature have reflected, and continue to reflect, political relationships between socially recognized groups of people. Foundational cultural models are pervasive and underpin aggregated instantiations of culture which are derived from a complex interaction of idea systems (Leaf 2007; 2008). The terms, and relationship between terms, is subject to fundamental change over time, as economic and environmental conditions change, as well as in less predictable ways as people in situations bend, manipulate and contort aspects of competing idea systems to suit their interests.

To date, there has been a relative lack of focus on conceptual models of nature within the ethnography of Pakistani Punjab. There is, however, sufficient reason evidence from existing ethnographies to begin to sketch out some preliminary ideas of aspects of nature. Firstly, that much of the organization of the natural world (animals and plants), reflects the organization of the cultural world (caste, class, gender and other hierarchical relationships). Such an association perhaps renders existing differential access to resources and power more 'natural' in context (though this is not to suggest that the losers in these societies are content to remain so). Secondly, that the economic drivers of activity have a strong impact on models of nature. Dove's (1992) demonstration of how a shift in agricultural practices effectively flipped a key term on its head is illustrative of the importance of economic drivers for conceptual cultural models. Thirdly, that religion, although ostensibly very powerful and pervasive across South Asia, is perhaps not as important to foundational models of nature as one might predict. Pakistani Muslim farmers would appear to be comfortable with adopting Islamic symbols of nature, while retaining practical conceptual models of nature for use in everyday agricultural practices.

The demonstration of these three sketchy points is both feasible and relatively straightforward. Such a project, if done in coordination with the more global ambitions implied by the other papers in this volume, promises to not only yield valuable insights into the mechanisms for cultural adaptation in rural Punjab, but also more widely for human populations confronting environmental, political and economic change in the context of a persistent need to sustain viable food production levels for themselves and their communities.

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5. Producing "Wild" Food in Africa: San Mangetti Groves in Namibia.

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Introductory Remarks.

Anthropology has shown that the dominant western cultural model of the environment is strongly influenced by a notion of nature as set apart from culture (see Argyrou 2005 for a critique of environmentalism). This cultural model developed on the basis of a particular cultural history of primary food producers, the potato growers of this world, as Brody (2001) has put it. My contribution aims to broaden the spectrum of data and perspectives by including a case study that is conventionally not included in the category of food producers namely the San "Bushmen" of southern Africa. In this short presentation I shall outline (1) that it is useful to include this group of foragers in a comparative study of primary food producers, (2) what the specificities of this case are with regard to the human-environment relationship, (3) what possible future research strategies there are to investigate the issues at hand comparatively.

Foragers as Producers of Primary Food.

Foragers, or hunter-gatherers, are usually not included in the category of food-producers. Early economic anthropology textbooks drew a sharp line between "production" and "appropriation" and the assumption was that foragers did not interfere and shape their environment in a way that would allow us to call their subsistence a productive economy. This view has been fuelled more recently by so-called revisionist arguments according to which foragers should not be considered a separate category to begin with since the ethnographically known cases had much more contact with agriculture, horticulture, pastoralism, trade and wage labour than had previously been realized. They were therefore, according to the revisionists, not constituting a separate mode of subsistence at all but rather formed the impoverished appendix of more dominant groups. After several decades of intensive field research among forager groups in the second half of the 20th century and in the course of long debates surrounding revisionism towards the end of the last century the following picture emerges (see Widlok 2004, 2008a):

Hunter-gatherers had a greater impact on their environment than was previously thought, not only because of their links to other economic groups but rather as an inherent feature of their own mode of subsistence. The dimension that has been studied most intensively is the forager use of fire. There is good evidence from Australia how foragers there have altered their environment through the systematic use of fire which, at least to some extent, followed specific cultural rules of "looking after the country" and was thus not simply driven by ecological necessity in any narrow sense (see Rose 1995). Indigenous Australians travelled the land, setting the bush on fire in a manner that would create a patchwork of more or less recently burnt patches and of patches of land at various stages of regrowth (Pyne 1991). This helped preventing the kind of larger scale and more destructive fires that emerged after Aborigines were stopped from burning the

land but it nevertheless gradually shaped the land and the communities of plants and animals living on it (Widlok 2008b). In Africa, fire has also been used to shape the land but discussions have focused on the environmental effects of gathering and in particular on hunting as a practice.

With regard to hunting the involvement of indigenous hunters in large-scale trade of hunted items in the colonial period has been investigated by historians who have also documented that southern African foragers did construct labour-intensive pit-traps for large-game animals. In the course of colonization foragers have often been dispossessed of their land, removed from nature reserves and penalized for "poaching" because of their hunting practices (see Widlok 2003, 2010, Dieckmann 2007). In other words, here foragers were indeed recognized as providers of primary food with considerable environmental effects but their use of the environment was discriminated against as "harmful appropriation" while many forms of agropastoralism that often led to more serious environmental degradation were considered to be "productive" and worth of support by colonial and post-colonial governments.

With regard to gathering apparently "typical" statements of the San such as "why should we plant if there are so many Mongongos in the world" (Lee 1979) were interpreted as evidence for the self-sufficiency and economic autonomy of southern African foragers but also as an explanation why the San did not become food producers unless being forced to. As I have argued elsewhere (Widlok 1999) there is some likelihood that the original statement was actually not meant as a refutation of all forms of food production but rather as a more specific statement about Mongongo/Mangetti trees, namely that there was neither need nor sense in trying to plant them. Moreover, there is evidence that the regular use of paths between waterholes (by humans and animals) has led to particular growth patterns of Mangetti trees in northern Namibia (Widlok 2006). Up to today Hai//om San store grinding stones at certain places along these routes which allow them to utilize the Mangetti nuts more easily and efficiently en route. While this seems a long way from more elaborate forms of food production that involve more material technology for transforming food, more investment in soil, workforce and machinery, it is fair to say that this is a difference of degree rather than kind. Foragers may not have entertained an ideology of progress and certainly no ideology of wild nature that needed conquering and domesticating but their patterned choices did transform their environment.

Studies of cultural change show that what stopped foragers from taking over other modes of production was not some cognitive or cultural inability but a combination of environmental factors (with foraging being the more productive subsistence form, for instance in coastal north Australia, see Triesch 2001) and social factors (with foraging allowing for more social equality and individual autonomy than other forms of subsistence, see Widlok 1999). The recent policy shift towards sustainable economic development has led to a reorientation which also includes not only a greater recognition of hunting and gathering as legitimate land use practices but also greater attention to the ecological and cultural value of the "production of wild food" as I will discuss in more detail below.

By including foragers in a comparative study of food producers I am not arguing that there are no differences between the cultural models of foragers and those of people with other subsistence pursuits. There is diversity to be expected even within the category of

hunter-gatherers as there is diversity within the category of agriculturalists (and that of pastoralists, horticulturalists etc.) and there are differences to be expected between these categories at a more general level. My argument is, rather, that there are sufficient similarities between all these groups to contrast them with non-food producers, i.e. producers of neither "wild" nor "domesticated" plants and animals. I base this argument on the similarities as described above but also on the fact that there are many "mixed economies" in the world where foragers engage in other forms of food production and where pastoralists and horticulturalists engage in forms of wild plant gathering and wild animal hunting. By contrast, many people - including those in charge of national and international environmental policy - have extremely limited engagement with primary food production, at all, be it domesticated or "wild". Moreover, the hypothesis of the research proposed below is that the interaction with "primary food" at its source in everyday situations has an effect on how people think about their environment which in turn has an effect on how they deal with issues of natural change, including global climate change.

Forager Cognitive Models of Space and Mobility.

As I have shown at greater length elsewhere (see Widlok 1997, 2007, 2008b, 2009) we have some evidence that San people in southern Africa conceptualize space differently from what was up to recently considered the prototypical form of spatial orientation, namely ego-centred space based on the bodily axes of left/right and front/back. San groups such as the Hai//om have therefore be classified with other systems of "absolute frames of reference" such as those found in Aboriginal Australia where linguistically, cognitively and culturally the cardinal directions east/west/north/south are the basis for everyday spatial perception and for thinking about space more generally. However, there is an important specific feature that marks out the Hai//om system and that is the fact that the "absolute" or "geocentric" reference points are not exclusively cardinal directions and not exactly like cardinals either. Rather, we find a system of landscape terms whereby people use terms such as "land of the river", "land of the Mangetti groves", "land of the hills", "land of the soft ground" in order to refer to direction and place. These landscapes work like cardinals in some places but they are also replaceable by other environmental features (some ad hoc landmarks, others culturally recognized names of places and regions) and indeed they have to be replaced as one moves between these regions (so that the "land of the river" that may be to the north when you are in the hills becomes "south" when you are in the "land of the Mangetti groves"). Furthermore, the landscape terms refer not only to environmental regions but always also to the people who live in these regions so that I have called them *people-cum-land* units (Widlok 2008c).

The distinction, so deeply engrained in the Western science, between generic terms of landforms and the names for particular landscape places also, in the contexts under consideration here, appears to be far less prominent - if it is to be found at all. Hai//om topographical talk, for instance, that is the references made to the environment in everyday conversation, seems not to consider the environment as merely an external "frame" that surrounds human existence but rather as being intertwined with human actions to the extent that human agents are still considered to be part of the land by origin as well as through their continuing reliance upon it. In other words, human and non-

human aspects of the landscape, natural features and man-made settlements for instance, are not rigidly separated but cross-referenced in spatial language, through action in space, as well as in cognition. This raises the question as to whether the "cultural model" as it emerges from research with Hai//om and other San is indeed a particular cultural model or whether it is a much wider phenomenon that unites many primary food producers. In any event such a model constitutes a stark contrast to the assumption that landscape and place terminology is primarily a matter of reference to nature from a position of detachment as it is cultivated by sciences dominated by non-food producers. To tackle these issues a research project is proposed that makes use of comparative methods from cognitive anthropology as laid out in more detail below.

Research with San people therefore poses a critique of the underlying notion dominant in Western science about the relation between a generic universal template and cultural specific models of that underlying template. This is not just a critique based on language but also on other aspects of representation. Anecdotal evidence with mobile San suggests that they do not conceptualize their territory in a two-dimensional map-like way. Evidence comes from attempts by indigenous people organizations seeking to map forager land tenure in the process of a recognition of land rights. Southern African San rejected the required maps of clearly demarcated "blotches" of land and instead drew their land in terms of intersecting routes of movement taken into an area from permanent water points.

Colonial courts seeking to establish pre-colonial boundaries between indigenous pastoralist groups constantly ran into conflicting testimonies by locals because the Bantu-speaking groups in the region would not accept the image of mutually exclusive and fixed boundaries (see Widlok 2000). Covering case studies from across sub-Saharan Africa, Kopytoff (1987) concluded that the "internal African frontier" of Bantu migrations was very different from the European idea of a frontier. If it had to be mapped, he maintained, it would have to be in the format of a weather map with shifting high and low pressure systems representing the policies that grow and shrink in relation to one another. The descendants of agropastoralist groups draw maps not unlike those that European historical atlases use but with two main differences: Firstly, the movements are represented not as changes but in terms of reproducing the original polity and secondly the arrows used combine spatial routes of migration with genealogical lines of descent. In other words, every migratory move was considered not as a community moving but as a new kin group descending and splitting from another group that was genealogically older.

As Ingold (2009) has pointed out, the lines used in these genealogical models are quite different from the lines that are drawn in modern science which are, strictly speaking, not lines emerging from a movement but simply "fictive" connectors between data points. The latter conceptualization of a "line" is rather recent and Ingold shows that, for instance, Darwin's theory of evolutionary change still alternates between the statistical "line" and the pre-modern lines that indexically reproduce movements of genealogical descent, growth or expansion. Moreover, just as we should not project modern maps into pre-colonial Africa, the genealogical lines of the Bantu migrations in Africa should in turn not be projected further into the world of forager systems that are not predicated on genealogical lines of descent. When trying to represent the state of affairs in forager movements, and of the state of mind of the agents involved, we need to strip our model of those layers and assumptions that have been added to it in the hindsight and perspective

of the very different movements and geometrical assumptions of the Western cultural model.

We may then go one step further in an attempt to reconstruct the situation of forager agents in its phenomenology. Ethnographic research with San indicates that present-day foragers when recounting their journeys typically do not make any drawings that would resemble our maps. Instead their narration includes an indication of the duration of their movement with reference not to a two-dimensional flat surface but to the "volume" of their strength and that of the environment they are dealing with. Typically, the gestures indicate the time spent walking (referring to the position of the sun) in the course of a day. The often onomatopoetic narrations indicate whether it was heavy walking (through soft sand) or easy walking (over hard ground). In other words, the experience of moving is not one informed by the geometry of Greek philosophy that draws a line between point A and point B. Resting (and moving) is not described in terms of fixed points in the landscape because typically the landscape features (other humans, animals, resources, rainclouds and the sun) are in movement themselves and therefore do not easily serve as reference points that are kept constant, as geometry requires us to do. Rather, the notions of "resting" and "moving" are expressed on the basis of the experience of life as a process of increasing and decreasing volume (breathing in and out, gaining strength and losing strength, being repelled and being attracted, waxing and waning). On this basis we can attempt to relate this reconstructed mode of mobility perception to the environmental changes reconstructed by the natural sciences.

Landscapes can be depicted as being attractive and promising (or repelling and unpromising) instead of as surface spaces that one crosses in order to get somewhere, to reach a certain point or region. Rather, their attraction or repulsion seems to be conceived of in parallel to experiencing one's own bodily condition of gaining or losing strength, of building up volume or of thinning out. What the forager ethnography suggests is that we are not dealing with a process of mapping a conceptual frame onto a pre-existing natural environment but rather that humans in these contexts consider environmental changes in connection with their own capacity to deal with these changes and describe them in similar terms. This opens up a new research perspective that re-connects the study of cognition with the study of agency in particular situations of change. We are no longer studying reference to the landscape in isolation but in the context of agency within a certain environment.

A Namibian Case Study.

Over the last few years community-based resource management schemes have spread across southern Africa. In Namibia these have taken the form of so-called "conservancies" with a particular legal status. So far these conservancies, at least as far as the San groups are concerned, are constructed around areas that are home to large game animals that have an attraction both for tourism but also for commercial hunting and for local use. In principle, however, conservancies may also be created around landscape features such as forests and the proposed project will look at such cases. There are several places in Namibia that are well-known for their large Mangetti (Mongongo) groves, above all Mangetti-West (locally known as /Gomais) in the Hai//om language area and Mangetti-Dune in the !Xu language area. Despite of their traditional importance as local

areas of high food security and as regional areas for emergency food provision none of these groves has, as yet, been declared a conservancy even though there have been attempts by national NGOs to secure these areas for the local San population. There is, thus, an interest on the side of the local population and the national agents to learn more about these Mangetti forests and to see whether the knowledge generated in a research project could also facilitate the application process for a conservancy. Part of the anthropological contribution to this endeavour is to clarify the ideas that locals, NGO representatives and officials have about these forests, to see whether there are different cultural models and if so where there may be bridges and links between these models that can help overcome potential sources of disagreement, misunderstanding and conflict.

A first step into that direction will be free list tasks and other open forms of data gathering whereby the relevant names and terms are elicited that play a role. This elicitation will be done through informal methods (transcription of informal interviews and conversations) but also with the help of more formal listing tasks. In a second step the elicited terms will be used for sorting tasks. Here we will focus in particular on tasks that allow us to see whether and how expressions are used as generic spatial terms and/or as specific place names. Since debates and discussions on these matters are multilingual, an important feature will be the sorting and matching of terms across languages. In other words, what the research should show is how San cope with the problem of translation and of categorical assignment across languages when being forced to integrate their terminology with the categories of the relevant NGOs (WIMSA, the Legal Assistance Centre) and of government agencies (such as the ministries for environment and that for land and resettlement) dealing with environmental issues. This will involve a number of mapping exercises whereby linguistic as well as non-linguistic stimuli (photos, maps) will be used. The task of mapping terms and categories across cultural models also applies to the facilitators (employed by the NGOs) who try to convert the legal and economic requirements involved in establishing and running a conservancy. The elicitation and matching tasks will therefore not only be carried out with local San speakers but also with the non-San employees of these agencies. Moreover, we seek to work closely with San staff employed by the NGOs which would allow us to discuss the preliminary results of the tasks with native speakers, to see whether tasks have to be adapted, changed or complemented in the process.

We expect that not only do we get insight into the construction of cultural models by studying interaction across language groups but also across time as people respond to changes in the environment. Mangetti trees are fast growing but they are also renown for being short-lived and for breaking up without warning. Moreover, although they grow better on sandy soil and under arid conditions than many other trees of this size they are susceptible to falling underground water tables. Water tables in Namibia are influenced by climate change but also by direct intervention through well-drilling (which in turn is often related to climate change since drilling deeper is one response to perceived or factual lack of water). Studying Mangetti groves is therefore a potentially rich source for investigating the perception of natural change, ongoing "normal" change of the past, as much as much-discussed "extraordinary" changes in the present.

Concluding Remarks.

What are the theoretical issues that we expect this case study of "wild" food production in Africa to speak to beyond a better understanding of the case study at hand?

- Comparative insights into similarities and differences in the ideas of primary food producers.
- An assessment of the hypothesis that the degree of engagement with primary food production correlates with changes in cultural ideas about the human-environment relation.
- The role of cognition in environmental behaviour.
- Reconstructing the universal experience of how cognition and movement in the environment works.
- Understanding the way in which cultural models are generated from this shared experience.
- The transformation of cultural models under conditions of climate change (and vice versa).

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6. Climate Change in Kenya.

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ABSTRACT

Parts of Kenya (and Somalia, Ethiopia, and Tanzania) are under a scorch of the worst drought in 60 years, resulting in famines, starvation, interruptions in national economies and threats to national and regional security. The drought and its effects on populations are further evidence of increasing climate change and global warming. Folk perceptions and reactions to these changes of climate are culturally unique. In this paper, I focus on the Gusii folk perceptions of climate change that are marked by such incidences as the hitherto unseen proliferation of malarial mosquitoes in their settlements on the highlands and the disappearance of streams of water and certain species of plants and animals that used to help them forecast the weather.

Eastern Africa is experiencing adaptively challenging climatic and meteorological patterns, some precipitous, some subtle. The precipitous weather events are the prolonged droughts that are punctuated by devastating floods with consequent loss of human and animal life. Subtle weather events are the increasing temperatures that have affected the region's ecology in noticeable ways. Each of the various indigenous ethnic communities in this region perceives and responds to these adaptive challenges in unique ways that are worthy exploring. In this essay, I highlight the challenging weather patterns in Gusiiland and the nature of Gusii folk responses to that adaptive challenge.

I

Human adaptive strategies involve the use of technology. Anthropologist Leslie White (1988) conceives of technology as one of three subsystems of culture, the others being the sociological, and the ideological subsystems. For White, technology, the pre-eminent subsystem, is composed of "the material, mechanical, physical and the chemical instruments, together with the *techniques of their use*, by which man, as an animal species, is *articulated* with his natural habitat." (1988:338, italics mine). This rich definition contains elements of the other subsystems and points to the need for rethinking the concept of culture itself.

White's phrase "techniques of their use" intends the human capacity for learning and for teaching. Learning is a personal event; teaching is a social one. In learning, an individual grasps and manipulates the properties of a "material, mechanical, physical and material" object in order to operationalize and capitalize on its instrumentality for adaptive advantages. In teaching, learning experiences are organized for others – the basis for, and essence of, educational institutions in society, an element in White's second subsystem of culture, the sociological (White 1988:338).

A third dimension to White's conception of culture is implied in the technological subsystem. By organizing learning experiences for others (in the form of teaching), humans anticipate and prepare for their future responses to similar ecological challenges.

This preparation for the as-yet-to-emerge future is often ensconced in ideologies and hence is part of White's third subsystem of culture, the ideological (ibid.).

For White, as for other theorists (e.g., Harris 2001), the technological sub-system is as determinant of the other two subsystems of culture as Harris' "infrastructure" is determinant of its structure and superstructure. In prioritizing the technological (or infrastructural) subsystem, the theorists aim at explaining cultural diversity. Yet what distinguishes humans from all brutes is culture, that unique blend of its three subsystems. Moreover, if White's technology "articulates" humans to their natural environment, then their relations to fellow humans should be viewed as mediated by the laws, rules, and conventions that govern interpersonal relations while relations to their absent that is yet-to-be-experienced is mediated by beliefs about, and faith and trust in, that absent. For this reason, I propose that culture be conceptualized as composed of these mediating mechanisms – technology, laws and conventions, and beliefs and trust – that function to relate people to their total environment.

In this essay, I argue that the Gusii patterns of adaptive responses to ecological changes reveal a conceptualization of themselves and their total environment as being a unity of person, space, and time. Their adaptive responses seem to be motivated and guided by a collective project for individual person-space future. The increasing availability of more efficient technological tools has helped hasten degradation of their natural environment and with that, threaten their very survival.

II

The Gusii are an agricultural community living on the cool and fertile highlands of southwestern Kenya and surrounded by pastoral communities. Ethnographic information about them can be found in LeVine and Lloyd (1966), and Mayer ((1966; 1949). Their high population density has combined with increasing global warming to aggravate noticeable ecological changes to which they have responded in ways that underscore the unique features of their adaptive strategies.

In the past, the high altitude of the Gusii highlands rendered the region inhospitable to malarial mosquitoes that inhabit the low-lying land marsh along Lake Victoria. But in the last few decades, human encroachment on virgin land and natural vegetation has combined with the changing climatic and weather patterns to result in the disappearance from the area of certain animal and plant species, the reduction of water volumes of rivers, and an emergence of malarial mosquitoes (Hay *et al.* 2002; Barclay 2008).

The changing climatic and weather patterns has disrupted and, to a certain extent, obscured the traditional meanings of Gusii terms for months of the year. These names often hinted at the modal activities and/or behavior within their environment. Only a few of these meanings are familiar; the rest would have to be researched:

- | | |
|--|---|
| 1. January, <i>Monugu nobarema</i> - | literally, refinement of soils by farmers |
| 2. February, <i>Eng'atiato</i> - | |
| 3. March, <i>Egetamo</i> - | |
| 4. April, <i>Amaumuntia</i> - | period of long drenching rains |
| 5. May, <i>Rigwata</i> - | |
| 6. June, <i>Ebwagi</i> -) | period of food scarcity during which |
| 7. July, <i>Engoromomi</i> -) | visitations are unwelcome |
| 8. August, <i>Riete</i> - | |
| 9. September, <i>Bureti a kebaki</i> - | period of judicial sittings and covenants |
| 10. October, <i>Egesunte kia Masaba</i> | |
| 11. November, <i>Egesunte gia Chache</i> | |
| 12. December, <i>Esagati nyamaagonga</i> | period when flamingoes relocate |

Unlike the meanings of the names of the months of the year which were known society-wide, the names for the days of the week differed from one locality to another, depending on the prominent places at where certain local activities, as, for instance, trade, took place.

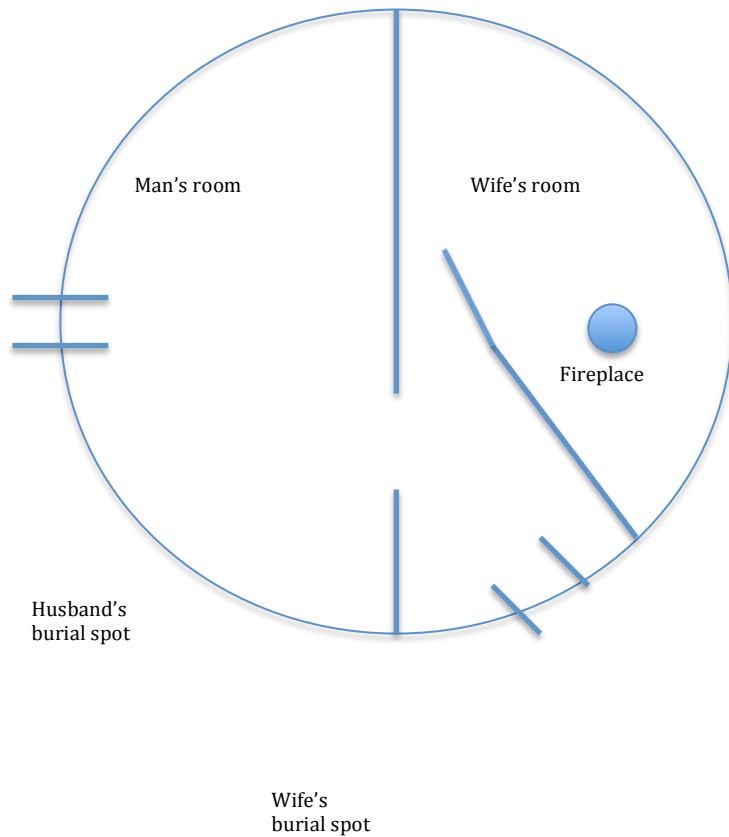
If temporal durations like months of the year and days of the week were named after significant activities within the natural environment or centers of social activities, the onset of significant meteorological changes were often foreshadowed by the behavior of certain bird species. The migration of flamingoes from one end towards the opposite end marked the end of a season and the onset of a new one. All these signaled to the residents to attend to relevant adaptive, social, or recreational activities. This association of place and time with social and personal activities found greatest expression in female creative potential and in the Gusii traditional house.

III

The word for menstruation is the same one for “moon” and for “month,” most likely because of the association of this natural flow with the regular monthly phases of the moon. Temporal lapse is thus associated with the potential formation of person whose life trajectory is figured out in the traditional house.

A Gusii traditional house is a simple two-roomed round structure (diagram below) that condenses the philosophy and meaning of Gusii life; it defines a man's and woman's space in life and in death (see LeVine and LeVine 1991). Temporally, every man and woman is destined for maturation from birth through initiation and marriage to old-age and eventual death and transition into ancestorhood. A termination of life before marriage is a rude and an unwelcome disruption. Spatially, men are identified with the right-hand side and women with the left, minus the evaluative connotations associated with either in some parts of the world although, of course, no one should greet another or eat with the left hand.

Gusii Traditional House Design



In sum, the Gusii perceive ecological changes in terms of a life project in which person, place and time are an inseparable unity. Adaptive responses to such changes aim at forestalling disruptions to this social project. Not all responses to consequences of ecological changes have been adaptive for all individuals in this society. For instance, until recently, Gusii folk interpretations of and responses to such unknown causes of premature deaths as those caused by malaria were in terms of human complicity with cosmological evil. Technology, as conceptualized by Leslie White, has helped humans understand and appropriately respond to the disease. Nevertheless, that technology, especially in its efficiency at dominating the natural environment, may have helped people degrade their environment and help hasten the warming that facilitated the migration of the mosquitoes to the highlands.

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7. Cultural Models of Nature Among Fisherfolk and a Fishery-Oriented NGO in the Philippines.

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Introduction.

Fish account for more than half of the animal protein consumed in the Philippines. Small-scale coastal fisherfolk who are directly engaged in fishing for food and livelihood face declining harvests and rising poverty rates (Añabieza et. al. 2010). It is widely believed that illegal and destructive fishing, loss of fish nursery habitat, and overexploitation are to blame. But efforts to establish Marine Protected Areas (MPAs) throughout the Philippines have seldom improved municipal small-scale fishing. Non-governmental organizations (NGOs) have often found fishermen's participation to be problematic. What are the conceptions of nature found among fishers in these communities, and how do they understand their own role in the marine ecosystem? What are cultural models of nature implied by major NGOs that deal with MPAs? Are there differences in the way these two important groups conceive of the nature-human relationship, especially in regards to the marine environment, and if so, does it have any impact on the effectiveness of MPAs?

This paper presents background for proposed research on cultural models of nature among fisherfolk and a fishing-oriented NGO. Ethnographic information is presented in order to begin hypothesizing research questions and relevant methods. The proposed research draws on my experiences with lowlanders and mainstream culture in the Philippines, my development work in the Philippine education system, and my ethnographic research on traditional beliefs and ritual in fishing community. Because religion is often the wider context within which nature is conceptualized, my research on religious change and popular religion in the Philippines will provide a general background in this work.

The proposed project will engage the fisherfolk of two Tagalog communities in Batangas Province, Philippines: Mabini and Bauan, constituting two separate and distinctive field sites for comparative purposes. The fishers of Mabini municipality are linked with Pamana, a major fisher-oriented NGO and national grassroots fisherfolk alliance. As a result, the Mabini area is part of a network of marine protected areas (MPAs). Bauan will offer a comparison with Mabini, since the fishers there are not part of the Pamana alliance; there are no protected areas in the municipality's coastal region.

The Philippines is composed of 7,107 islands, with a population of 94 million (plus 11 million overseas); 22 million are Tagalog speakers. Its coastline is 6,000 km longer than that of Africa with only 300,000 square kilometers of land. 120-170 languages are spoken, and most have several dialects. There are more than 100 tribal/indigenous groups. The main cultural-historical influences are Malay, Hindu, Islamic, Chinese, Spanish, and American. The majority of the population is Roman Catholic, but Pentecostal and charismatic forms of Christianity have increasing relevance in the past two decades.

Among large Asian countries, the Philippines have the highest annual per capita consumption of fish at 36 kg (Silvestre and Pauly, 2004). There is widespread recognition of the Philippines as a global priority for marine conservation (Añabieza, et. al., 2010). At the same time, Filipino fisherfolk face a variety of issues. Their poverty rate is 62%, well above the national average of 34%. They face declining fish harvests due to overfishing (by trawlers and other large-scale commercial vessels as well as small vessels), illegal fishing methods (such as cyanide fishing and dynamite fishing), and degradation of marine environments. Approximately 30% of their income is spent on health care, and their children are ten times less likely to finish college than the general population (Añabieza, et. al., 2010). In addition, there is a general lack of Philippine resources for government programs for small-scale fishers, estimated to number more than 700,000 (Luna et al., 2004).

However, according to anthropologist James Eder, “most coastal resource management projects have not reached their goals” (2009: 95). “Widespread agreement now exists that whatever laws and regulations might be, fisheries management cannot succeed without the cooperation of the men and women who fish to make those laws work.” (2009: 94). Fishermen have more nuanced knowledge of coastal habitats than outside environmentalists, better understanding of resource use problems, better understanding of the connections between resource issues and their everyday lives and livelihood (Arquiza 1999, cited in Eder 2009: 99). However, local notions of resource management are scarce. “The Philippines has a long history of government regulation of fisheries, and whatever folk notions of resource management or property rights might have existed in the nation’s coastal areas have long since weakened or disappeared in the face of technological change and outside political and economic forces” (Eder 2009: 94).

Marine Protected Areas.

The number of Marine Protected Areas (MPAs) in tropical areas in the past 20 years has surged worldwide. In 2006, the Philippines alone had approximately 600 MPAs (Alcala and Russ, 2006). They are used in integrated coastal management programs to protect and potentially rehabilitate coastal ecosystems. However, conflicting interests between the various stakeholders often impede implementation. Stakeholders include fisherfolk, government officials, tourism industry, businesses, and local communities. (Rawlins 2009). In many MPAs, the focus has shifted from benefitting fisheries to the more profitable tourism and diving industries, which are often promoted as viable, non-extractive use of coral reefs (Rawlins 2009). Restricting use of what was previously a common property resource frequently leads to conflict and resistance. To make matters worse, those involved, especially fishermen and fishing communities, may not see demonstrable environmental and economic benefits of restricted use (Rawlins, 2009: 55).

Mabini. Mabini, Batangas a municipality three hours south of Manila, is a well-known tourist destination for beaches, diving, and coral reefs. Reefs in Mabini have been damaged by overfishing, coastal development, sedimentation, boat anchor and diver damage, and waste and sewage disposal. The tourism industry has been actively involved in MPA management; the first coastal management projects were started in the area by NGOs in 1988 and 1991 by the Haribon Foundation. The established marine reserve

allows non-destructive fishing, but three of the sanctuaries have been declared “no fishing zones.” Diving is allowed for a user fee collected by dive resort operators, who now manage all three of these areas (Rawlins 2009).

Differing understandings of the aim of sanctuaries is a source of conflict. In a 2008 survey of all stakeholders in the Mabini area, everyone understood the goal of improving reef health and increasing fish stocks, but none of the fishermen agreed with the aim of attracting divers and increasing tourism. Fishermen believed the aim to be the possible benefits to local fishermen and their communities (Rawlins, 2009: 59-60). Similarly, Rebecca Austin also found that over time, especially with the advent of community-based programs in a Palawan community, fishermen understood the sanctuary goals to be increased fish production (Austin 2011: 15). The goal of fish sanctuaries in Palawan was originally conceived by transnational environmental organizations as biodiversity and wildlife protection.

In addition, despite organizations’ goals of sustainability and shared responsibility for MPAs, Rawlins noted a distinct lack of community involvement in MPAs. Among the problems cited, Mabini fishermen attended meetings only on full moon days when they could not fish. Although they saw slight improvements in their catch in the MPAs, fishers saw no effect in fish populations in adjacent non-protected areas. Many of the fishermen felt their views were not taken into account, and there was resentment that diving industry was the main beneficiary of the protected areas. They held the perception that resorts and resort boatmen were profiting from the MPA user fees. In addition, there were political issues at the mayoral level in the delegation of management duties, and in enforcement of the protected areas. Significantly, it was physically easier to enforce small-scale illegal fishing than the illegal fishing of larger vessels (Rawlins, 2009).

Pamana, one of the NGOs devoted to the marine environment in the area, is a fisher-oriented NGO constituting a grassroots alliance of more than 6,000 fishers nationally and their 30,000 family members. Pamana uses a grassroots “ecohealth” strategy linking ecological health with the health of coastal people and communities, and will therefore be an interesting case study in cultural models of nature among fisherfolk and NGOs. There are currently 122 Pamana MPA member communities (170,000 residents). It was initially supported by local and international agencies. According to the organization, they monitor fish sanctuaries, promote supplemental incomes such as seaweed production for human consumption, and monitors fish harvest and coral reef conditions (Añabieza, et. al., 2010).

Bauan. The nearby municipality of Bauan, Batangas has a population of almost 80,000 people, with 40 *barangay* (barrios). The region is rapidly industrializing, especially the provincial capital, Batangas City, which is less than 10 kilometers from Bauan. The author has done research in the early 1990s in the San Andres community, one of the coastal *barangay* of Bauan, and plans to return for this project (see Wiegele 1993). Fishing and fishing related economic activity were the primary source of income at the time. Fishing in Bauan was mainly small-scale commercial fishing called *pukot*, or baby purse seining, using a gill net and a crew of around 15. In 1991 the community had 62 such purse seining vessels (Russell 1997). Hook and line fishing was also used. However, at least 10 major corporations had already located along the shore and locals were increasingly working in nearby factories and abroad; overseas remittances were on the

rise. Most of the fishermen had sold their farmland. Boat owners faced labor shortages for their boat crews, declining catches, and declining income (Russell 1997).

Pukot fishing involves a high level of capital investment and expenses and is characterized by a high degree of danger and uncertainty. Predictably, it was also characterized by an extensive lore of animistic and Catholic-based beliefs and rituals to increase, ensure, or change fishing luck. Boat *kumpare* relationships (boat blessing ritual kinship—boat godparenting) allowed for mutual support (Wiegele 1993).

Suerte, a cultural model of success among Bauan fisherfolk, helped explain fishing success and failure.¹⁶ Like karma, *suerte* is responsive to internal and external factors. It may be protective and can be manipulated with specific rituals or with potent fishing amulets (*bisa*-filled, see below). Lack of fishing success may be explained by *malas* (*suerte*'s opposite), but increasingly fishermen in Bauan cited diminishing resources (lack of fish from overfishing by large-scale vessels and other forms of illegal fishing). Bauan fishermen recognized that practices such as boat blessings, ritually parking or fumigating the boat, and fishing amulets were only potent when one's equipment was well-maintained and when there were fish in the sea to catch (Wiegele 1993). It is likely that these and other alternative explanations have since replaced or transformed earlier ones and that the rituals and social relationships associated with *pukot* fishing have also changed if catches have continued to diminish in the area and locals abandon fishing as a livelihood. Have conceptions of nature and human/nature relationships fundamentally changed? How do these ideas influence fishermen's understanding of ecological and livelihood breakdown, if indeed this is the situation that is playing out? How do these compare to the context of Mabini, in which a different course of action is being pursued? How do these conceptions differ from those of fishermen linked with Pamana, who may adhere to the notion that ecohealth and human health are inherently linked?

Concepts and Models of Nature in the Philippines.

The Filipino ethnographer, F. Landa Jocano, has described a somewhat reified rural Filipino "worldview." Despite the reductionism, it is useful to survey some of the fundamental concepts of nature described by Jocano even as I seek a locally specific approach in my own comparative case studies.

According to Jocano, rural Filipinos distinguish between *man-made* (not nature) and *not man-made* (nature). Nature includes physical and non-physical components. Natural objects are animated with an internal "life force" or *bisa*, which distinguishes them from man-made objects. Humans are part of nature, which was created by the Christian God (thus humans have a spiritual substance). Many indigenous origin myths depict humans as part of nature. Furthermore, humans have both animal and human nature.

Foods, like rice and corn, may possess *bisa* and are therefore capable of generating energy or inducing weakness (e.g., rice can "get hurt or run away" if not handled properly) (Jocano 2001: 24-25). Soil can also have *bisa* (and can get "tired" and "overworked"). Families have suffered misfortunes because "they were not careful in handling the grace of God" (likened to *bisa*).

¹⁶ *Suerte* is not just a folk model of fishing, but is a cultural model of success much the same way the "skipper effect" is in other well-known maritime case studies.

Equilibrium/balance is a fundamental element of life. Interplay between positive and negative forces such as decay and growth (like a metabolic process) is necessary “to keep things moving, growing, developing” (2001:26). Adaptation or adjusting oneself to events (*pag-akma*) is integral to this interplay, and may require changes in our values, attitudes, relations. *Pag-akma* is inherent in man-nature relations and includes favorable temporary imbalances that bring about growth (2001:27). However, unfavorable disequilibrium can bring disaster, natural calamities, disease, or mental derangements. Humans must help nature to reintegrate broken elements into a whole again through prayers, rituals, medicines, etc.

Nature is a system of binary oppositions and contradicting positive and negative forces (e.g. hot-cold, growth-decay, male-female, day-night). These contradictions are the natural means of facilitating harmony. As the opposing forces of nature hit humans, they must stay neutral in order to survive (2001: 27). In addition, opposing natural elements attract each other, combine, and provide balance in the man-nature relationship itself (2001: 31).

Illnesses, misfortune, and other problems (and their remedies) involve the balance of, for example, hot and cold. Hot and cold are essential qualities, both internal and external, that explain human relations with the environment. Foods, bodily conditions, water, winds, celestial bodies, and events may be inherently hot or cold. For example, certain soils are inherently cold (favorable to crops) or hot (crops won’t grow, even with fertilizer) (2001:31-34). Winds are especially important to fishermen, who recognize four wind seasons that vary with wind strength, movement, direction (as opposed to farmers, who classify seasons by rain). Winds can lead to hot or cold illnesses and atmospheric imbalances. Bad winds, such as cold earth vapor, can be caused by earth or atmospheric spirits (Jocano 2001).

A study of Filipino fishermen in five coastal villages on Panay island in the Philippines described the salient local concept of *mari-it*, or dangerous (Magos 1994). Far away, deeper waters had sea spirits, and were therefore *mari-it* and should be avoided. Fishing in these areas involved rituals and taboos. Humans had a caretaker role in marine resources, since misuse, destruction, greed, and overuse of resources from these *mari-it* places resulted in fisher endangerment or misfortune (Magos 1994).

In Bauan and Mabini, what, if any, are local concepts of human-nature relationships, and do local fisherfolk conceive of individual and community health and success as linked with the equilibrium and balance of human and natural forces, as in Jocano’s broad descriptions? It is hypothesized that the extent to which marine-oriented NGOs understand and integrate local concepts of human-nature relationships in their projects will impact project outcomes and the level of support of local fisherfolk.

Jocano’s descriptions of underlying Filipino concepts of space may also have implications for fishermen’s perceptions of the ecological and livelihood issues they face. According to Jocano, rural Filipinos conceive of space as either distant, near, or intimate. “Distant” space is reserved for strangers or people one does not like. It is characterized by physical distance, emotional indifference, or intellectual aloofness. “Near” space characterizes the space between friends in which they can interact without conflict. “Intimate” space is reserved for kin, or for someone dear or loved. Dangerous spirits typically inhabit places far away and deep, as is the case with dangerous sea spirits (Jocano 2001).

Fabinyi's ethnographic investigation of fishermen and MPAs in Palawan found that Tagalog fishermen overwhelmingly ascribe the cause of environmental degradation to the activities of people "not from here." Tensions with new arrivals and "outsiders"—fishermen from other areas who come to fish in their waters—are manifested in the association of outsiders with wealth and illegal, destructive fishing that should be regulated. Local fishermen on the other hand, are associated with family, morality, poverty, and legal fishing. Legal fishing is therefore overlooked as a possible source of environmental degradation (Fabinyi 2009:122).

Fabinyi found that culturally specific discourses of morality and legality contribute to Tagalog fishermen's understandings of human-nature relationships and environmental and livelihood problems, more so than, for example, the distinction between large-scale and small-scale fishing. The discourse of the "poor, moral fisherman," influenced by Christianity, impacted how fishermen sought to address and assign blame for problems. Legal, local, poor fishermen take "just enough to survive," unlike greedy outsiders who fish illegally and destructively as a means to wealth (Fabinyi 2009). Destructive fishing techniques are transformed into moral transgressions against society and environmental degradation is attributed to outsiders or new arrivals. Legal fishing is associated with morality, family, and poverty, and should not be regulated.

Rebecca Austin studied fisherfolk's cultural models related to community-based coastal resource management on Palawan, namely models of the environment, coral reefs, MPAs, and *batay dagat* (guards of the sea). She found fisherfolk had a mix of cultural models that had been internalized from NGO seminars, and what she calls transcultural models of the environment (those that complexly combine local perceptions and those imposed from the outside) (Austin 2011:1). These were "truly blends of inputs from many directions and histories resulting in models that incorporate traditional Filipino cultural values, transnational environmental discourse, and deeply rooted histories of empowerment discourse" (Austin 2011: 6). For example, Filipino environmental professionals tend to see humans as part of nature, unlike transnational or western environmentalists. Fisherfolk had mixed perceptions, but were more likely to include humans as part of the nature after being exposed to seminars hosted by Filipino NGOs (Austin 2011: 13)

Conclusion.

This paper has provided a summary of background research that will inform the design of a research project investigating cultural models of nature and the environment among fisher folk and within locally relevant transnational and community-based environmental organizations. This endeavor has suggested some potentially relevant models related to space, nature, the human-environment relationship, morality, and legality, as well as cultural, social and economic issues specific to Filipino fishing communities and efforts to establish marine protected areas.

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8. Cultural Model of Nature and Environment in an Agricultural Region in Central Japan: A Preliminary Proposal.

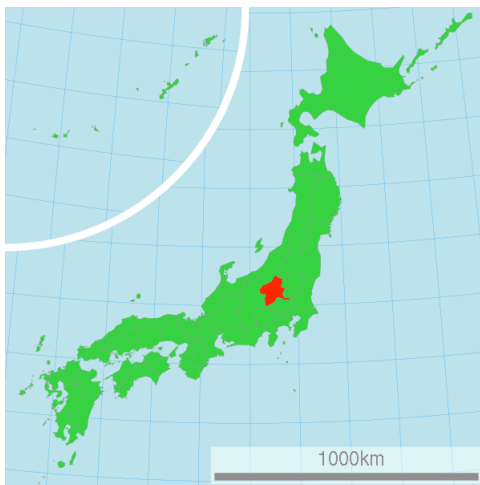
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The proposed research will take place in Gunma Prefecture, Japan, which has a population of about two millions and is located sixty miles north of Tokyo. I am a native of Gunma. What follows is a summary of my research plan for the project from my “native’s” as well as a researcher’s perspectives. First, I will describe the research site and its primary food producers. Then I will highlight some of the anticipated cultural models, which might connect the primary food producers’ senses of nature and environment with their food producing strategies and processes.

Gunma Prefecture.

Gunma (goo-n-ma) prefecture (highlighted in red below left) is located in the center of Japan’s mainland (Honshu). This is also the northwestern tip of Kanto Plain (below right) – the largest flat land in the nation spreading southeastward toward the Pacific Ocean. The southern section of Kanto Plain includes the Greater Tokyo Metropolis, the largest urbanized and industrialized region of the nation. The northern section in which Gunma is located (to the West), however, maintains much of its unique rural and agricultural roots thanks to its history, location and landscape.



Gunma is ripe with archeological remains from the Paleolithic to what is called Jomon (14,000-300 BC) and Yayoi (300 BC – 250 AD) “Pottery Eras.” During the historical time, Gunma’s main industry was horse breeding since horses were introduced to Japan from mainland China and Korea in the fourth century. Horses then became much needed commodities for agriculture and warfare for the Samurai Warriors, who came into power after the eleventh century. Hence the name Gun-ma, wherein *ma* (馬) means horses, and *gun* (郡), means, “a large congregating entity.”

Geologically, volcanic mountains (currently inactive for the most part) surround Gunma’s northern and northwestern borders. Gunma’s topsoil is thus made of volcanic ashes that accumulated over the centuries. The northern mountains also block the mass of moist air coming from the Sea of Japan, causing the precipitations—in the form of rain in the summer and snow in the winter—to fall in the *ura*, or “backside” of the mountain range before reaching Gunma. This makes up Gunma’s temperate climate with many sunny days throughout the year; Gunma, in fact has the most sunny days per year among all prefectures throughout Japan. The precipitation in the form of snow, if any, is confined to the high altitude of the mountain range. In the lower plateau, there is very little snow.

Another characteristic of Gunma’s landscape friendly to agriculturalists is the varying levels of altitude created by the slopes of the mountain ranges gradually tapering down to the Kanto Plain. This allows the food producers to alter the growing temperatures by switching the altitude on which the crops are planted. When combined, the fertile volcanic soil rich with minerals, the temperate climate, and the terrace-like farming fields produce nearly ideal condition for producing a variety of agricultural products. As one informant (a *konjac*-yam producer) spoke of Gunma as a “farmer’s heaven” where “you can produce many different kind of products within very little proximity.” He said that Gunma, however, was not suited for producing a large quantity of a limited number of products such as corn and rice, as this is done in other parts of Japan such as Niigata (the “back” coast near Sea of Japan) or Hokkaido (northernmost island), respectively.

Primary Food Producers.

Gunma is the largest producer of *konjac* (kon-nya—koo) in Japan; in fact, 90 percent of konjac in the nation is grown in Gunma. There is also a thriving plum farming near my hometown. Growers of these two products will be highlighted as the “primary food producers” for this research. I chose them because both products are regarded as *kyodo no saku motsu* ‘farming products indigenous to the local area.’ Furthermore, the dishes and recipes produced from them are considered Japanese dishes (*nohon shoku*) set apart from the “Western” or even “modern” dishes. I reasoned that cultural significance of *konjac* and plums to people by and for whom they are produced may add additional depths and layers of meaning and analysis to the research.

Konjac.

Konjac is made from the roots of konjac plant. The roots are delicate as they are easy to rot and do not tolerate extreme temperatures. Gunma’s volcanic soil and the precise range of crop-growing temperatures give an ideal condition to grow konjac. The ground composed of what

used to be ashes flush water well, helping to avoid the decay caused by excessive wetness. Farming on the sunny slope of “tapered” foothills gives farmers opportunity to select the ideal temperatures for growing konjac. While there are several kinds of konjac, one that is target for the higher-end market is sashimi konjac. Sashimi konjac use slightly more finer grain fiber than others. It is so called because of its smooth taste and texture similar to those of sashimi, fresh slice of raw fish. Generally, konjac is regarded both as a healthy food for its extreme low calorie (nearing zero) and high fiber content. Also as a traditional Japanese food, it is a basic ingredient for indigenous popular Japanese dishes such as *sukiyaki* ‘hot pot dish with meat and vegetables,’ and *hijiki no nimono* ‘sea weeds with konjac.’

Plums.

Plums are also widely produced in Gunma Prefecture, making it the second largest producer of them in the nation. Gunma’s volcanic soil is also ideal for growing plums for their roots are shallow and easy to rot. The volcanic soil is rich with minerals and carry water well, hence, making Gunma an ideal place to grow plums. Plums, more than konjac, are rich with culturally symbolic meanings. While cherry blossoms which come in April are generally regarded as the official beginning of spring, plum blossoms which come in February are treasured as a signal of the end of the winter and a foretaste of spring. Plums are also pickled with salt and *shiso* plant and used as preservatives. One good example is *hinomaru bento*, or Japanese Flag lunch box (see below). During the modern times, the red plum (the color of *shiso*) is placed in the middle of *obento*, making it look like the Japanese flag.



“Naturalness” of Nature.

Before Japan opened itself to the West in 1868, the Japanese word for nature, *shizen*, meant “naturalness,” or “the mode of being that is natural” (Earhart, 1970). However, it did not signify “nature” in the modern Western sense of the world existing alongside or in opposition to human existence. The 13th Century Buddhist, Shinran, who founded one of the most influential sects, Jodo Shinshu Buddhims, for example, taught that *shizen* [自然、which was pronounced *jinen*, self-becoming] is that which is naturally self-becoming, or “to be made to become so” (Unno, 1998, p. 70). In the Western, existential philosophical sense, one may think of *shizen* (self becoming) as the “power of being” and the “fulfillment of meaning” (Unno, 1998, p. 79). I will first explore the root of this “cultural model” as it is explicated in two major religious traditions in Japan: Shintoism and Zen. Then I will describe how this traditional view is carried over to the

modern Japanese notion of *amae* – the sense of “being one with” one’s surrounding as a “natural” mode of being.

Shinto.

For a native Japanese, it seems redundant to speak of Shinto’s view of nature because Shinto itself is a religion based in natural phenomena. Since it is an animistic religion, it seems more appropriate to say that Shinto itself is part of nature rather than it presents a certain views about nature that is set apart from it. Such a characterization of Shinto is most apparent in its view of *kami*, gods, who were attributed to have created both the land and the nation of Japan – i.e., people with common ancestry which goes back to *kami* themselves. A Western observer, Earhart, correctly described this worldview when he noted: “In the creation story of Japanese mythology many gods participate in the emergence of the cosmos, and the gods remain intimately connected with all phases of life. Almost any dimension of nature, streams, mountains, thunder – may be or become sacred or *kami*” (Earhart, 1970, pp. 2-3).

For example, Nihonshiki, *The Chronicles of Japan*, which contain the creation story, describes the beginning phase of the creation with heaven “already in existence,” while the “earth still a formless thing, floating about below heaven” (Pelzel, 1974, p. 5). Out of this preexisting universe emerges a “thing like a reed shoot” – suggestive of a phallic symbolism – which, in turn, gives rise to a few deities (*kami*). This phase of creation is then followed by the emergence of a few pairs of *kami*, a male and a female, described as “brother and sister” (p. 5). The last one of these pairs engages in what amounts to a symbolic act of incest—in the like of an adolescent couple exploring and discovering their emerging sexuality. The end product of this humanly orchestrated courtship between *kami* resulted in the creation of the land which the chronicle claims to had become the nation of Japan. Hence, it would be appropriate to say that *kami*, or gods, themselves are part of the nature. Or to put it another way, “nature itself intrinsically manifests the sacred or is *kami*” – in such a way that “*man basically is one with nature... [by which] the three factors of gods, man and nature tend to coexist equally on the same plane*, rather than in a hierarchical ranking (Earhart, 1970, p. 3, emphasis added)

Buddhism.

Japanese Buddhism, Zen Buddhism in particular, cherishes the idea of “merging” oneself with nature. It is not that one begins with a separate self that needs to be integrated into nature. Rather, one is of nature to begin with, and that the task of every person is to “wake up” – which is what the word Buddha means as the “waken” one – to this natural state of being (*honsho*, or 本性), or “Buddha nature” (*busshou*, 仏性). One can get a glimpse of this natural manifestation of nature – *honsho* or *busshou* -- in *all* beings through the haiku (a form of Japanese poem) of a haiku master such as Boshō Matsuo, who sang:

The ancient pond,
A frog leaps in,
The sound of water.

Here, the dualistic identify of the poet disappears, and nature “emerges” as the voice of the poet – hence the “two” worlds of the poet and of the world “out there” are merged as one – a

harmonious unity of the moment, which arose in and of itself through the power of “self-becoming” (*jinen*). Buddhism generally and Zen Buddhism in particular explains that the natural world is “self-becoming” as such. Furthermore, this state of original being is peaceful and devoid of “suffering” (*niverna*), and gets obstructed only by the human tendency to look the world through the ego – the sense of “I,” “me,” and “mine.” So it teaches to transcend this “small” sense of self (ego) in order to awaken to one’s “big” self, or the Buddha Nature. As the modern Japanese Zen master, Shunryu Suzuki, explains, for example, one is exhorted to live without a sense of a “doer” behind whatever one does. He says, “When you do something, you should burn yourself [ego] completely, like a good bonfire, leaving no trace of yourself” (Suzuki, 2001, p. 62). Hence comes the well-know concept of “mindfulness,” where one focuses on whatever he or she is doing and experiencing at an each and every moment – “If you are eating, ‘just eat’; if you are cooking, ‘just cook; if you are sitting meditating, ‘just sit.’” Do not even think about attaining enlightenment because that in and of itself is a work of ego. Being without being “someone” – that is, *atta*, or “self” – is the most natural and joyous state of being. As Suzuki noted: “Moment after moment, everyone comes out from nothingness. This is the true joy of life (Suzuki, 2001, p. 107).”

Cross-Cultural Psychiatry.

How can the ideologies about nature taken from such ancient religions as Shintoism and Buddhism be translated into the modern Japanese people’s senses of nature? In this respect, we can turn to a native scholar of Japan with sufficient experiences in both Japanese and Western cultures (primarily the United States). The case in point is Takeo Doi, a Japanese trained psychiatrist whose work, *The Anatomy of Dependence*, became widely read by Western audiences since the publication of its English version in 1973 (Doi, 1973). When he came to the United States as a research fellow at the National Institute of Mental Health, he experienced what is commonly known as a “cultural shock.” For him, Americans seemed to not understand one of the key Japanese concept, which he came to characterize in his book as an essential component of “Japanese mentality.” That idea is *amae*, a word for which it is difficult to find an English equivalent. The book’s translator thus defined the concept: “any situation in which a person assumes that he has another’s [including non-animate surroundings, or spiritual beings] good will or takes a – possibly unjustifiably – optimistic view of a particular situation in order to gratify his *need to feel at one with, or indulged by, his surroundings*” (Doi, 1973. p. 8, emphasis added). Doi, for example, talked about how, when invited as a houseguest, the American host told him to “help himself.” This was diametric opposite to his culturally acquired expectation that the guest’s desires and needs should be met without him even indicating his intention (e.g., being offered a drink before he has to declare that he wants it).

For the purpose of this paper, I would define *amae* as a “fusion wish” — desire to fuse with others and one’s surroundings — not as an indication of psychological “neediness” as might be expected in the West (e.g., “dependency need”), but as an expression of what is natural, or *shizen*, the way things originally are. When I myself was a child (1960s’), for example, it was naturally expected that the parents co-sleep with their young children. I, for one, slept in the same room with my parents, each on a *tatami* mat, until I was age nine. A Japanese household, even today, has a deep “soaking tub” that each family member uses. The same (clean) water is kept and shared because everyone is expected to wash his or her body thoroughly before entering the tub. Moreover, in the case of a young child (pre-adolescent), it was considered a “natural

joy” of life for a parent and child to be soaked in the tub together. Co-sleeping and co-bathing are only two examples of daily activities of Japanese people that are conducted in the spirit of “co-engaging.” I have noted, for example, that education of children and adolescents both at home and school is conducted on the basis of cultural assumption that one must put oneself in the position of others – because it is through this empathic perspective that the rules and process of teaching and learning are regulated and practiced in Japanese education settings (Shimizu, 2011).

Implications.

It would be interesting to see if the idea of nature embedded in the ancient religions tradition of Japan as well as the ethno-psychological concept such as *amae* influence Gunma’s primary food producers’ notion of nature and environment. Consider another example — the way people in Northeastern Japan conducted themselves in a calm and collected way after the Tsunami took the world by surprise and awe. Yet, from the Japanese perspective, such behavior was nothing extraordinary. As a native, what I saw was what we say in Japanese, *atarimae*, what you are naturally and intrinsically supposed to do. This behavior, in other words, is part of “nature” as well – i.e., it’s “natural” or “naturally arising of people.” Thus, for the sake of the proposed research project, it would be informative to investigate the interrelationships between such culturally shaped notions of nature and those of aforementioned primary food producers.

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9. Temporal Rhythm of Change in Village Jhokwala, Pakistan: Ethnographic Insights from Calendars

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Calendars, Culture, and Environment.

Time is perceived through movements of objects in sky, seasonal cycles, and biological changes, which appear to be universal and every society makes their sense. Studying change in the temporal models therefore provides understanding about cultural change in a broader context (Geertz, 1966: 389-409). Temporal organization represents the relationship between culture and ecology through different informal and formal markers in the same way as space is linked with the environment (Engel-Frisch, 1943). Calendars are one of the temporal markers, which represent the people's association with and understanding of their environment both in ecological and astronomical sense. These also explain the cultural dynamics involving social and technological change because of their association with social, economic and biological rhythms of the people representing time as a resource as well as an identity (Rappaport, 1999: 190-193). The broader experience of temporality and temporal relationships, of course, cannot be reduced to clocks and calendars independent of any context or, in other words, spatial frame of reference (Adam, 1994; Munn, 1992). Therefore, radiality including both temporal and spatial aspects of culture provides a better explanation of temporal relationships beyond just movement and change (Bennardo, 2009: 198-203). The local context of the global temporality can provide insight into temporality through adoption of different calendars or changing the contextual use of the existing calendars (Holtzman, 2004; Burman, 1981).

This paper tries to explain the use of multiple calendars by farmers into a broader context of social change in a Pakistani village. A luni-solar calendar, namely Bikrami, based on local ecological and astronomical knowledge has been used over centuries in the Subcontinent with different regional variations. The solar component makes it easier to work through these calendars for agricultural purposes by marking the seasonal cycles. It was used to manage the social, religious and agricultural activities mainly in Hinduism. After the advent of Islam in the eighth century C.E. (Jaffrelot, 2004), the Islamic Hijri calendar was brought into use by Muslims mainly in the areas now included in Pakistan to regulate the religious activities. Bikrami calendar, however, remained in use for agrarian purposes as the indigenous knowledge about seasons and ecology was linked with this calendar. During the British Colonial period, Gregorian calendar was introduced and was adopted for official purposes in Pakistan after 1947, which was initially adopted in the cities. Due to contact with cities and a shift from seasonal agrarian economy to the market economy, the use of Gregorian calendar in the villages has been ever increasing. This changing use of different calendars tells the story of social change and people's vision for development.

The field work for this ethnographic study of time and space was carried out through 2010 in Jhokwala Village, Lodhran District, Pakistan. The total area of the village is not more than two square miles, including the settlement and agricultural fields, and a population of approximately 1,200. It is an agricultural area famous for its cotton crop and mango production in the country. The village is located not far from the highway between the two major urban cities of the South Punjab, namely Multan and Bahawalpur. Muslim Rajputs from Haryana

region of India migrated to this area and Hindus of this area left for India as part of the Great Partition in 1947. Haryana has been part of the Greater Punjab in history and the people migrating to this village also belonged to agricultural professions (Singh and Thandi, 1996: 361). Therefore, the local Saraiki and the migrating Rajput populations share a lot of cultural similarities.

Bikrami Calendar: Traditional Agriculture.

Many different forms of luni-solar calendars have been used in different areas marking the local festivals and seasonal cycles. These calendars have similar origins in the ancient astronomical knowledge of the Subcontinent. Therefore, a collectivist term as Hindu calendar has been used for its various forms. Due to its importance in Hinduism for religious activities and its firm importance in agricultural practices for Indians, the Government of India formalized the different eras and forms, mainly Bikrami and Saka, of this calendar to devise a uniform solar calendar throughout India in 1957 (Freed and Freed, 1964). Calendars in different regions mark significant eras that might be relevant to the history of that particular region (Kennedy et al, 1965). Most of these calendars mark the Hindu festivals and the later forms of such calendars may have undergone variations depending upon which religious or social group adopted any of the form of such calendars. For instance, the Sikh or Nanakshahi calendar, an altered form of the Bikrami calendar, was officially adopted in 1999. It marks the eras and calendric festivals linked with Sikhism (Purewal, 1999).

Bikrami calendar has been used in the Jhokwala village as in most of Pakistani Punjab for centuries (Mughal, 2008). The calendar has two components, lunar and solar. The synodic period or the time required for the moon to complete one series of its successive phases is known as the lunar month. Twelve such synodic periods of the moon compose one lunar year. A lunar month is roughly equal to 29.5 solar days. The moments of new or full moon have been used as the marking points of beginning or ending a lunar month due to the visibility of moon during these moments. The lunar component will be adjusted with the solar component through intercalation. *Saghraand* is the first day of each *desi* month. In other words, it is the time or day when sun enters into a new zodiacal sign within a lunar month. Bikrami calendar starts with the month of Chaitr which comes in the mid of March in Gregorian calendar. Each month is recognized by its peculiar weather conditions, movement of migratory birds and other such changes in the natural environment.

An interesting fact about this calendar is that people of Jhokwala do not recognize the formal name of Bikrami calendar. Instead, they describe the calendar as *desi maheenay* which means local or indigenous months. This calendar is primarily of Hindu origin, marks only the Hindu festivals, and was formalized by a Hindu king, Vikramaditya, in 56 BCE (Balfour, 1885: 502). Muslims use this calendar for agricultural purposes only because its solar component is very helpful in regulating the seasonal cycles. Muslims in Pakistan do not use the formalized Indian National Calendar, which is a solar calendar and marks the Hindu festivals only. The elderly people who were young before 1947 knew certain significant dates like Hindu festival of Diwali because they were in social contact with Hindus at that time. However, at the moment there are no Hindus living in this area.

The dates of Bikrami calendar are available in some national and local newspapers in Pakistan. Elderly un-educated persons can be found asking the educated youth to check the dates of a *desi* month in newspaper for them so that they could cross-check their own calculation.

Since the reason behind their query is mainly agricultural, they are never interested in the chronological year of this calendar. *Oluk*, exchange of goods with services at the end of a season, has been prevalent in Jhokwala till the last couple of decades. The so called serving professions like barbers and shoemakers are “rewarded” at the time of agricultural production for their services they delivered throughout the year to the agrarians.

Since agricultural production is linked with the time reckoning in terms of agricultural cycles so season has been an important aspect of rural economy. Seasons are therefore reckoned on the basis of agricultural cycles. For instance, the time of wheat harvesting is called *kanrrak* or wheat season and cotton-picking season is called *phutti* or cotton season. A pair of *desi* months is regarded as a season in proverbs associated with these *desi* months. For instance, Badra *bad bla wat wee* Sawan *hovay ha* ‘Badra is a bad month, would that Sawan may have been continued.’ Badra follows Sawan and both months are considered as part of the rainy season, but Badra is disliked in this proverb because of unexpected timings of showers and cold during this month. Similarly, many folk and modern songs use these months in analogies that highlight features attributed culturally to these months. Like elsewhere in the non-Western societies (Ohnuki-Tierney, 1969: 490), the younger generations, especially school children, recognize the concepts of four seasons due to media and modern education.

Elderly people can easily calculate *desi* months and they learnt the knowledge of seasons and *desi* months from their elders. They believe that when there is no traditional style agriculture there is no need of counting *desi* months. But this does not mean that people from younger generations do not calculate the *desi* months at all. Many people can tell the exact name of the month though they were not sure about the date and use the expressions like “...month would be ending” or “...month would be starting”. This becomes tricky when they are asked to tell the name of the current month in the first or last couple of dates of that month as they can confuse the inception and ending of the months.

Islamic Hijra Calendar: Religious Rhythm.

The origin of this calendar marks the year during which the Islamic Prophet Muhammad migrated from Mecca to Medina in 621 C.E. (Guindi, 2008:115). Migration is called *hijrat* in Arabic, therefore this calendar is also called the Hijra calendar. This is a lunar calendar comprising of 354 days in common years and 355 days in the embolismic years divided into 12 lunar months. The lunar months drift 11-12 days earlier in every seasonal year and the seasonal relation repeats every 33 Islamic years (Richards, 1998: 231-235). Sindh and South Punjab are among the regions where Islam first came into the Subcontinent in the eighth century when this calendar was introduced.

Although it is not directly associated with agricultural production, the economic significance of ceremonies listed in this calendar makes it an important part of the socioeconomic set up. All the religious events like Eid, *Milad-un-Nabi* (Birth of Prophet) and fasting are regulated by this calendar. The economic significance of shrine festivals, especially in the agrarian communities, is a common phenomenon almost everywhere in Punjab (Lyon, 2004: 209-223). The *urs* (annual ceremony) at the shrine of Hazrat Pir in Jhokwala is celebrated soon after the wheat harvest usually in the summer. It is however kept in consideration that the corresponding Islamic month should be a suitable month for festivals. For instance, the timing of a ceremony can be shifted forward or backward if it coincides with the mourning month of Muharram, which commemorates the martyrdom of the Prophet’s grandson. The same rule applies to any other

events of happiness like marriages. Marriages are not performed in the fasting month of Ramadan as it is only a month of worship. Playing music and dancing, which are common at marriage ceremonies, are not considered appropriate during this month.

It is mandatory to sight the moon in order to mark the start of a month according to Islamic principles. This becomes critical when in the preceding month religiously significant event like Eid or fasting have occurred. Before the introduction of telecommunication and media, people had to rely on the local witnesses of moon sighting to celebrate any event. Therefore, it was quite possible that one town would have celebrated the event on one day while the other would celebrate on the next day depending upon when there had been enough witnesses of crescent sighting. Now, the government announces the sighting of crescent in any part of the country meaning that the whole country would celebrate the event on the same date.

The exact date according to this calendar may not be known to the people, unless there is any significant event during a month and people must remember the date for that purpose. Nearly all the people in the village however tell the name of the current month and the order of the months fairly accurately.

Gregorian Calendar: Modernity.

Gregorian calendar came into practice in the Subcontinent during the British period as early as the seventeenth century (Lawson, 1993). After 1947, Government of Pakistan adopted this calendar for civil purposes as part of the colonial legacy. Gregorian calendar, locally called as *angrezi maheenay* or English calendar is considered a Western symbol and is associated with modernity and urban life. Introduction of radio, television and mobile phones have increased its importance and use in the everyday life in Jhokwala.

People have increasingly tended to use this calendar and even after a single generation it replaced the Bikrami agricultural calendar, primarily due to a shift from agricultural economy to market economy. Gregorian calendar provided an alternative to the Bikrami calendar, whose knowledge was restricted to elders and people had issues in counting dates accurately as mentioned earlier. It is much easier to calculate dates in this calendar as it is only a solar calendar and has no issue of intercalating between solar and lunar components. Gregorian calendar also translated the seasonal context for December and January as the coldest months, coinciding with the *desi* month of Poh, and June as the hottest month, coinciding with the *desi* month of Haar. Knowledge about crop and other agricultural cycles, as mentioned before the government provides literature to the farmers in this calendar, is now very much linked with this calendar.

The only issue in the context of Gregorian Calendar in Pakistan has been the controversy over Sunday as a weekend (Esposito 1998:175). Sunday holiday has been officially adopted, but it has been replaced with Friday various times in Pakistan due to the demands from religious parties, Friday has a great religious significance in Islam. Sunday is officially practiced as a weekend in Pakistan, especially in government offices, private organizations, and urban markets. In rural areas like Jhokwala, the concept of Sunday as weekend is fully or partially absent.

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10. What I Learned Studying the Classification, Cultivation, and Selection of Manioc among the Awajun of Northern Peru.

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Subsistence practices are intimately bound up with many other aspects of social life: gender roles, social organization, aesthetics, understandings of the sacred and the universe; in short, everything. Here I review what I learned about the Awajun from my study of their cultivation, identification, and on-going domestication of sweet manioc (*Manihot esculenta*), their principal crop (Boster, 1984a).

Over time, I have done field work with four different Shuar groups: the Awajun, Wampis, unturi Shuar, and Achuar. I use the term Shuar to cover all of these linguistically and culturally related groups and the term unturi Shuar 'true Shuar' to refer to the Jivaro of the ethnographic literature. Figure 1 shows the locations of my field sites; Table 1 shows the group at each of the numbered locations and the year(s) I was there. The unturi Shuar and Awajun for the most part inhabit the rugged foothills of the Andes while the Achuar and Wampis tend to live in lower terrain. They practice swidden horticulture, planting crops such as manioc, yams, sugar cane, cocoyam, papayas, plantains, and sweet potatoes in their gardens. The relative frequencies of Awajun crops are shown in Table 2. The Awajun follow the typical lowland Amerindian division of labor, with women cultivating gardens and men hunting game.

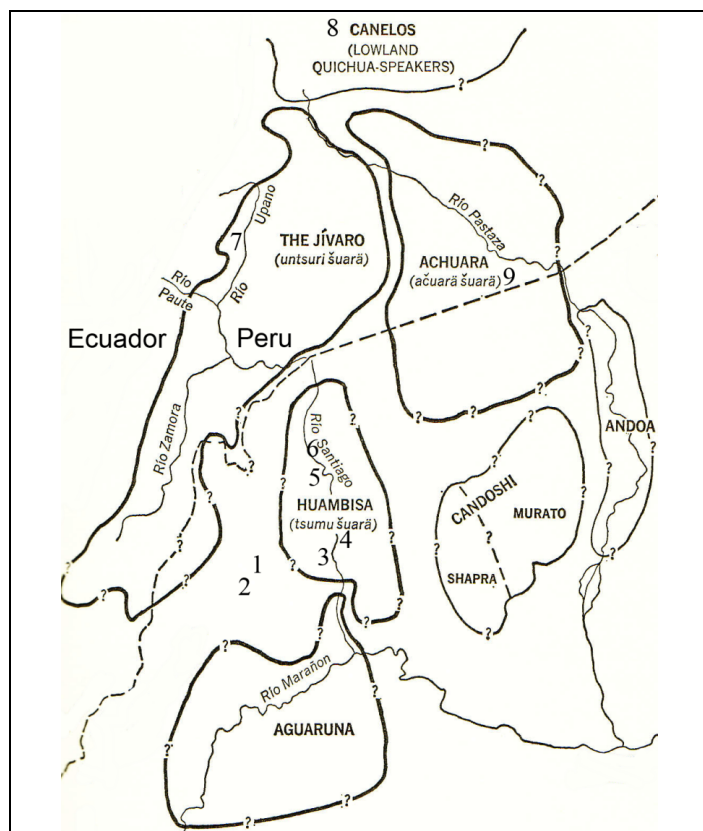


Figure 1. Locations of Field Sites

Table 1. Shuar Field Sites

Groups	Locations on Figure 1.	Years of fieldwork
Awajun	1, 2	1976, 1977-1978
Wampis	3, 4, 5, 6	1978
untsuri Shuar	7, 8	1999, 2003
Achuar	9	2003

Table 2. The 20 most frequent crops as determined by samples of 120 m² in each of 74 Awajun gardens.

Awajun name	Common name	Latin name	Count
mama	manioc	<i>Manihot esculenta</i>	11,857
basu	huaca	<i>Clibadium strigillosum</i>	1,086
kukush	cocona	<i>Solanum</i> spp.	519
kegke	yam	<i>Dioscorea trifida</i>	464
pagat	sugar cane	<i>Saccharum officinarum</i>	109
ajeg	ginger	<i>Zingiber officinale</i>	109
kakau	cacao	<i>Theobroma cacao</i>	91
sagku	cocoyam	<i>Xanthosoma sagittifolium</i>	89
papai	papaya	<i>Carica papaya</i>	68
paantam	plantain	<i>Musa balbisiana</i> x <i>acuminata</i>	52
idauk	sweet potato	<i>Ipomea batatas</i>	46
pituk	taro	<i>Colocasia esculenta</i>	42
timu	barbasco	<i>Lonchocarpus nicou</i>	37
kumpia	achira del monte	<i>Renealmia alpinia</i>	29
uyai	peach palm	<i>Guiliellma gasipaes</i>	27
pijipig	piripiri	<i>Carex</i> spp.	26
idak	--	<i>Gustavia</i> sp. nov.	18
wakam	macambo	<i>Theobroma bicolor</i>	14
yuwi	calabash	<i>Cucurbita maxima</i>	13
ujush	cotton	<i>Gossypium barbadense</i>	9

Garden Diversity

Swiddens have been claimed to model the diversity, complexity, and architecture of the surrounding tropical forest; culture is said to model nature. I computed the diversities of 74 Awajun gardens using counts of the crops and manioc varieties in 120 m² transects and compared them with the diversities computed using counts of tree species from various Peruvian forest ecosystems. Awajun gardens are very diverse but do not come close to rivaling the diversity of tropical forests. Indeed, there is more diversity among manioc varieties than among crop species (Boster, 1983) in Awajun gardens. More than 100 varieties of manioc were cultivated in the vicinity of my principal field site, Wampami, indicated with the digit “1” in Figure 1. Crop diversity increases over the life of the garden as cultivators manage secondary succession, ending in secondary forest with enhanced representation of many useful species, especially palms.

Manioc Varietal Selection.

Awajun cultivators are economically rational in choosing which manioc varieties to plant most frequently, favoring high yielding and good tasting varieties. Table 3 shows the questions I asked cultivators in interviews to discover the reasons for growing some varieties more than others. By comparing the frequency of the varieties with the features attributed to them, I was able to infer why Awajun cultivators grew certain varieties more than others. Table 4 shows that for every 120 m² transect, they plant a mean of 4.6 of every variety they have. They plant 10.6 more if it can be harvested rapidly, 9.5 more if it is good for boiling, 8.4 more if it does not rot rapidly, and 5.9 more if it produces big roots (Boster, 1984b).

Table 3. What kinds of manioc ... ?

- | | |
|--|--|
| 1. are in your garden? | 16. have the most amount of fiber in the root? |
| 2. are in the gardens of other women? | 17. have the least amount of fiber? |
| 3. do you plant most in your garden? | 18. can rapidly get bitter? |
| 4. makes the best manioc beer? | 19. mature quickly? |
| 5. makes a strong foam on manioc beer? | 20. mature slowly? |
| 6. do you only use for manioc beer? | 21. can one harvest rapidly? |
| 7. is best for boiling? | 22. can one harvest slowly? |
| 8. is best for roasting? | 23. are easy to peel? |
| 9. can you eat raw? | 24. are hard to peel? |
| 10. grows the biggest roots? | 25. grow their roots on the surface? |
| 11. grows the tallest? | 26. grow their roots deep in the ground? |
| 12. grow roots most rapidly? | 27. do not rot after harvest? |
| 13. grow roots most slowly? | 28. rot rapidly after harvest? |
| 14. roots do not go hard? | 29. do not rot after a flood ? |
| 15. roots rapidly get hard? | 30. are not blown down by the wind? |

Table 4. Reasons for growing manioc varieties.

Property	Number 120 m ²
Grow at least	4.6
Can be harvested rapidly	10.6
Best for boiling	9.5
Does not rot rapidly	8.4
Produces big roots	5.9

There were many additional reasons for growing particular varieties. Some were good for roasting, others for making manioc beer, and some are prized for making a good foamy head on manioc beer. One variety was said to make a man oblivious to his wife's adultery (the only variety the men banned). But even though the cultivators are mostly economically rational, the reasons they had for growing varieties came to an end long before the varieties did. At the end, they would explain by saying *pegkeg asamtai* 'because they are pretty.' The cultivators clearly took pleasure in maintaining varieties for their own sake, not unlike rose or orchid fanciers in western society. Most of the manioc varieties in women's gardens were given to them by close kin, especially mothers and sisters. But many senior women also participated in larger manioc exchange networks and maintained varieties that had come from hundreds of miles away (Boster, 1986). They then served as the respected local sources of these varieties to other women in the community. In short, by maintaining diversity for its own sake, they showed that it pays not to think too hard about which varieties to grow and that the limits of rationality may have adaptive significance (Boster, 1984b).

Perceptual Selection.

The existence of more than one hundred manioc varieties in this small region raises the question of how the cultivators are able to distinguish so many varieties. My inquiry into this question led to my positing of a third kind of selection of crops. Crop plants like all organisms are subject to natural selection for resistance to plagues, pathogens, floods, etc. They are also subject to cultural selection for characteristics such as high yield, good flavor, and special uses. These two types of selection are well recognized and understood. However, crops are also subject to a third type, perceptual selection, for combinations of non-adaptive taxonomic characteristics that allow the varieties to be distinguished. A cultivator can only maintain varieties she can differentiate from other varieties. The more different a new variety is from existing ones, the better the chance it has of being maintained in cultivation. This leads to three characteristics of crops that distinguish them from their wild relatives: increased, more continuous, and more independent variation in taxonomic characters—the characteristics that the cultivators pay attention to in identifying the varieties. Table 5 shows the most important taxonomic characters for Awajun cultivators of manioc. Perceptual selection results in an inventory of crop varieties that are vividly distinguishable on a variety of dimensions, a collection of "pretty" varieties (Boster, 1985b).

Table 5. Most important distinguishing characteristics of manioc varieties

numíji	stem
pushuújin	white
shájam	cream
wauwaútu	chestnut
tuntú	dark brown
bukúsea	black
wawáke	petiole
putsú	white
chamíg	bright green
kapántu	red
kijítu	dark red
shuín	black
dúke	leaf
etsegtúgmau	very narrow
puyaí	long and thin
wíju	lanceolate
wakájam	wide
tenté	round

Patterns of Intra-Cultural Variation.

The study of manioc also led me to a deeper understanding of the flow of cultural knowledge in the community. I planted two test manioc gardens, the ‘easy’ garden with 5 examples each of the 15 most common manioc varieties and the ‘hard’ garden with 61 examples of supposedly different varieties. I then asked women (and men) to identify the plants and examined the pattern of agreement between the participants; I constructed an agreement matrix such that the cells of the matrix held the number of times the woman associated with the column identified the variety with the same name as the woman associated with the row. The strongest result was that the pattern of agreement on both tasks showed the intellectual division of labor; women agreed with each other in identifying the varieties and the men agreed with no one. Furthermore, there were two patterns of agreement among the women depending on the difficulty of the task. On the easy task, pairs of women agreed with each other proportional to the amount they agreed with everyone else (overall agreement). The women with the highest overall agreement were often the same senior high-status women who participated in large manioc exchange networks while the women with the lowest overall agreement tended to be the youngest women. In contrast, on the hard task, there were many more pairs of women who agreed with each other more than would be expected given their overall agreement (e.g., mothers and daughters, sisters, co-wives). This led to the inference that agreement reflects cultural knowledge; that

“there is a single Aguaruna model of manioc identification and that deviations from the model are patterned according the sexual division of labor, membership in kin and residential groups, and individual expertise” (Boster, 1985a).

The Spiritual Aspect of Gardening.

Awajun cultivators are dependent on the cooperation of *nugkui* ‘earth mother.’ She gave the Shuar all of their traditional crops, the dog, and pottery. She helps crop growth by pushing the plants from below. She needs ‘babies’ (crop plants) and places to dance in the garden, that is, places that are free of weeds. If a garden is not well-tended, she will abandon it all together and the garden will rapidly become overrun with weeds. Women sing *anen* to *nugkui* to entreat her to stay in the garden and help the plants grow.

Nugkui figures in a larger Shuar cosmovision that divides the world into different realms. *Nugkui* rules under the earth; *tsugki* ‘master of fishes’ rules the rivers and lakes; *yaya* ‘star’ and *iwanch* ‘monster’ inhabit the sky and the deep forest respectively. *Aents* ‘humans’ occupy a realm in the middle. This cosmovision is shown in Figure 2.

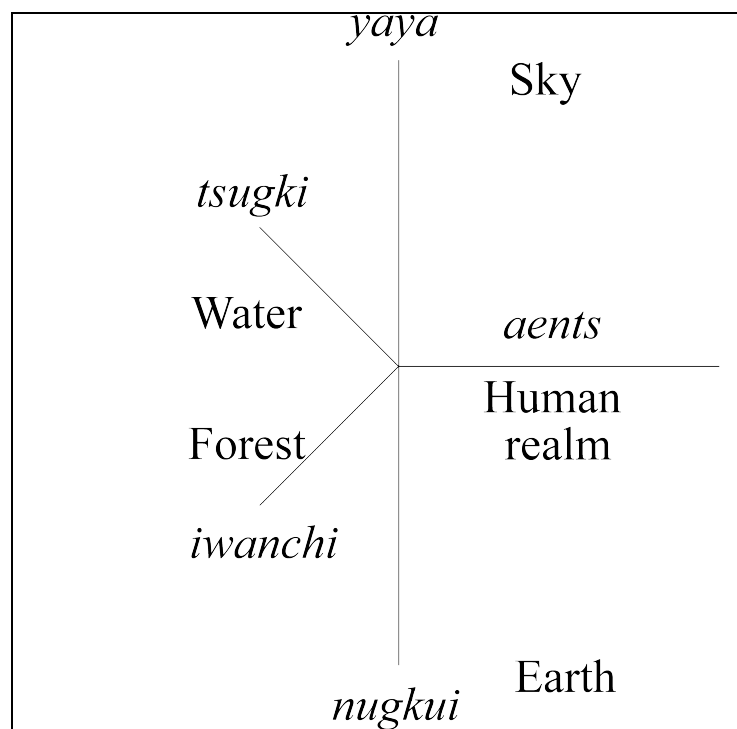


Figure 2. Shuar cosmovision

The principal spatial axis has the directions *nujinmaya* ‘upriver’ and *tsumunmaya* ‘downriver’, rather than cardinal directions.

Cultural, Climactic, and Environmental Change.

About 35 years have passed since I first visited the Awajun and much has changed. They have much greater contact with the outside and have become much more integrated into Peruvian national society. They also have become less dependent on hunting and more dependent on introduced domesticates such as chickens, pigs, and cattle, largely due to the scarcity of game. The pasturing of cattle has had a particularly important effect on the environment. Peruvian and

Ecuadorian law mandates the transformation of the landscape in order to be able to claim title to land. The easiest way to demonstrate that transformation is to convert tropical forest to pasture. Unfortunately, this results in the desiccation and desertification of areas that had once been covered by moist tropical forest, especially on the Upper Marañón. It will be fascinating to learn how their cultural models of nature have shifted to accommodate these environmental, climatic, and cultural changes.

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11. A Kachin Cultural Model of Climate Change in Terms of the Local Time and Space Schemes.

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Introduction.

In 2009-10, the five provinces in Southwest China (Yunnan, Guizhou, Guangxi, Chongqing, and Sichuan) incurred the most serious drought since the establishment of the People's Republic of China (1949). According to a report by the China Foundation for Removing Poverty, up to May 20th, 2010, the drought had caused economic damage for more than 2.3 billion hectares of arable land and influenced over 58 million people¹⁷. Worse, the drought is the result of a recent deterioration of the climate in south China. For instance, in 2000 about 40 million hectares of arable land in south China had been affected by drought. In 2006, Chongqing Municipality encountered 53 days of unbearably scorching sunshine, which brought two-month's water scarcity to about 8 million urban people¹⁸.

In this article, I will use the concept of cultural model (Bennardo 2009, 2010; Kronenfeld 2008; Strauss and Quinn 1997) to examine how the ethnic Kachin in southwest China conceive the drought. Kachin live astride the borders of Burma, China, and India. They were once well-known in anthropological literature owing to Edmund Leach's study (1954). From 2003 to 2011, I conducted 29 months of ethnographic and linguistic fieldwork, mostly in Sama village and its four neighboring villages in Tongbiguan Village Tract, Yingjiang County, Yunnan Province¹⁹. There are about 500 adults total in these villages, with over 90% of them ethnic Kachin. Sama is a Kachin cultural center in China. Before the Chinese Communists took the Kachin Hills in 1953, Sama was the headquarters of the most powerful Kachin chief in China, who controlled most areas of today's Yingjiang and Longchuan Counties. Currently, the Jianbian Administrative Office (the local lowest governmental office) is set in Sama, which controls Sama and its four neighboring villages.

I will construct a cultural model of Kachin understandings of climate change by analyzing and integrating Sama villagers' default constructions, or schemes, of nature and the environment. These schemes, though connected, are not consolidated into a consistent model by villagers. They are rather convenient conceptual tools that can be mobilized and combined for tackling a specific task²⁰, and villagers do not bother to specify connections among these tools so as to generate a more or less uniform model for their understandings of nature and the environment. I will consider these conceptual tools as building blocks in my construction, and specify the connections among them.

I will identify these building blocks, or schemes, by exploring the basic notions and principles of the Kachin tradition of animal sacrifice that serves as the primary resource for

¹⁷ <http://news.sohu.com/20100521/n272247152.shtml>.

¹⁸ <http://news.163.com/special/00014868/drought2010.html>

¹⁹ My fieldwork was supported by a Doctoral Dissertation Improvement Grant from National Science Foundation (09-18290 DISS), a grant from the Lewis and Clark Fund for Exploration and Field Research, a Dissertation Travel Grant from Graduate College of the University of Illinois, and a Cognitive Science / Artificial Intelligence Award from Beckman Institute at the University of Illinois.

²⁰ This way of using local conceptual tools was called *bricolage* by Lévi-Strauss (1966).

attributing causes for major problems in people's daily life. I analyze animal sacrifice in terms of the local schemes of time and space. These schemes capture a number of causal relationships between fundamental and constitutive categories such as people, animals, plants, weather, physical environment, and the supernatural (Atran and Medin 2008). In terms of these causal relations, I propose a cultural model of nature and the environment, and in particular, of climate change (c.f. Kempton 2001). As villagers in my fieldwork base are currently influenced by four knowledge systems: the Kachin animal sacrifice, the Chinese folk beliefs, Christianity, and modern science, I will also analyze briefly how my proposed model based on animal sacrifice is modified by the other three systems.

The Time Scheme as Local Causality.

Traditionally animal sacrifice was deemed the most effective disease treatment. It saves human life by sacrificing animal life to spirits that make people ill. Spirits penetrate people's lives. They allocate preordained fates to individuals, shaping the latter's life, death, achievements, and even the afterworld life. Animal sacrifice thus captures basic causal relations between humans, spirits, animals, plants, and natural environment. It functions as the source of local causality. Here I will present the basics of animal sacrifice in terms of the Kachin traditional schemes of time and space.

The time scheme is expressed through local oral history. History in Kachin is called *la³¹bau⁵⁵*, and history-telling is to trace the origin of things (*la³¹bau⁵⁵hkai³¹*; *hkai³¹*: "to tell by tracing the origin")²¹. The genesis chanted by the specialist of the highest rank is referred to as "history from the beginning to the present" (*gin³¹ru³¹ gin³¹sa³¹ la³¹bau⁵⁵*). Lasting three days and nights with interruptions only for eating and drinking, it narrates the creation of the sky, the earth, and everything in between. Each phase of creation is marked by procreation of a couple consisting of spirits and/or humans. Accordingly, the genesis is essentially a "Genealogy of Everything;" everything is hung on a certain position in the Genealogy and so is set in a web of relations with everything else. As all things are genealogically, or mythologically, connected, history as genesis is considered the source of human development. It possesses power that legitimizes practices, reason that justifies current life conditions, and sources that facilitate life experience. Therefore, villagers are prone to attributing everything that happens to history, tracing back to its position in, and relations with, all other things within the Genealogy of Everything.

The overwhelming importance of oral history in villagers' daily life makes villagers feel stuck in a time scheme. I analyze such a time scheme into two parts. The first part describes the local alternation of the rainy and wet seasons and people's concomitant activity pattern. It establishes the local cycle of agriculture and a relational pattern between humans and plants. The second part describes the network of relations according to the Genealogy of Everything, which formulates individual life and death, sickness and health, fortune and fate in terms of the temporal fortune of their activities.

The first part of the time scheme is an arrangement of the twelve months of a year, which is divided into the rainy and the dry seasons (c.f. Ho 1999). A year starts from the dry season when

²¹ The Jinghpo Orthography used in this article is consistent with the standard Jinghpo, namely, *nhkum³³ ga³¹* (Jinghpo spoken in the political domain of the *Nhkum³³* chief, in today's Tongbiguan Village Tract, Yingjiang County; *ga³¹* means "language"). Four tones of Jinghpo are marked by 33 (mid-level); 31 (low falling); 55 (high-level); 51 (high falling). Details see Xu *et al.* 1983.

things fade and die. It is the male's time, beginning with men's killing of small animals in making sacrifice to spirits and praying for fortune and protection for their trading trips. During the major part of the dry season, men conduct business far from home. The dry season ends when males come back home and sacrifice big animals to spirits to thank the spirits for their blessing and to seek blessing for a new cycle of cultivation in the coming rainy season. The rainy season is wet and hot. It is the time when women grow gardens, gather wild vegetables, exchange agricultural products in local markets, and exchange gifts with relatives. As most rituals for cultivation have been conducted by males at the end of the dry season, the rainy season, short of rituals, is under the direction of the dry season.

The second part of the time scheme describes the network of relations among everything in the world. Nature and everything in it are characterized by the Genealogy of Everything, that is understood only by religious specialists. In daily life, people use the divination table (see appendix) to acquire information on the rhythmic activity pattern of everything in the world so as to plan one's activities accordingly. The table is a categorical elaboration of the Genealogy of Everything. It divides a day and a night into 10 periods of equal-length. Each period is associated with a certain (mis-)fortune that influences activities of humans and spirits. Such correlations between the temporal fortune and humans/spirits' activities are further classified into five sets. Each set is represented by a symbol (one circle, two circles, a cross, four circles, and a blank), and each symbol is associated with an unlimited number of properties, meanings, or relations, such as time, directions, colors, shapes, spirits, order, and numbers, etc. The table then maps the recurrence of the five sets of relations onto the cycles of five consecutive days of the lunar calendar. Accordingly, a column in the table represents a day and a night, and a row represents the period of about two hours and a half. In addition, each cell is associated with a specific meaning expressed by the words contained in it. The cell meaning and the symbol define the temporal fortune of a period represented by a cell. Accordingly, the table specifies an individual's life and death, sickness and health in terms of the temporal fortune of his/her activities.

To sum up, the first part of the time scheme defines human activities within a year, and the second part specifies details of activities within a two-hour period. Taking together, the time scheme characterizes the relations among humans, nature, and the environment into a rhythmic pattern. According to the pattern, people plan their activities, regulate their relations to the surroundings, and search for synchronization among humans, other creatures, and the physical environment. I treat the time scheme as the first building block for my construction of a Kachin cultural model of nature and the environment.

The Space Scheme as Local Causality.

The space scheme is the second building block that will be used in my construction. It captures the relationship between humans and their reliance on the productivity of the land (animals, plants, and other materials). In a sense the space scheme derives from the time scheme, which in turn derives from the Kachin genesis legends. The genesis ended when humans lost the ability to communicate with spirits through language. From then on, mythological connections between humans and spirits were blocked, and animal sacrifice became the only way for humans to communicate with spirits. Since then, relations between humans and spirits have been re-formulated in terms of the spatial arrangement of the residence of humans and spirits. Humans reside only on the earth while spirits inhabit every part of the space. Each spirit has a specific

divine residence allocated in the Genealogy of Everything; without knowing it, a religious specialist cannot call on it to receive sacrifice. According to their spatial distribution of residence, spirits are classified into three categories: those whose residence is in the heaven (such as the thunder spirit); those whose residence is below the floor of a house (like the land spirit: A traditional Kachin house is a rectangular, shed-like wooden structure with its floor about one meter above the ground), and those whose residence is in-between (such as human souls and the spirits closely related to humans). All sky spirits are considered as the source of fortune and power for humans, and the land spirit as the origin of the land's productivity. They all should be exalted. By contrast, spirits on the earth are real or mythological relatives to humans. The floor of a house, then, marks the distinction between spirits that possess mighty power taking charge of human development and spirits that are human counterparts in the spirit world. All spirits on the earth that receive sacrifice in a house come into and leave a house through apertures in the floor. Sky spirits receive sacrifice either on the top of a house or its altar is located on a place higher than a house. Sacrificed food to the land spirit, by contrast, should be buried under earth. The house, then, models relations between humans and spirits by a three-layered sandwich configuration (the sky, the land, and in-between. C.f. Leach 1968).

Such a sandwich configuration derives from the residential arrangement of the primordial couple who produced most of the things in the world. At death, the male ascended up to the sky and became a heaven spirit governing the world below, the female became the land spirit governing the land and its production. Their youngest son, *N-gon³³ Du³³* (*N-gon³³ Wa³³* or *N-gon³³ Wa³³ Ma³¹ gam³³* in the literature), later became the first orthodox human chief and governed the world between the sky and land. All Kachin orthodox chiefs were considered as offspring of *N-gon³³ Du³³* following the youngest son line (ultimogeniture). They are mundane representative of the sky and land spirits. Accordingly, each year a chief organizes his followers to conduct two communal rituals. The first is to the sky spirit, killing dozens of mithans and feeding hundreds of people. Only a chief can make sacrifice, through specialists, to sky spirits praying for blessing on behalf of his followers. The sacrifice endows a chief with merit from the greatest sky spirit (*ma³¹ dai³³*), which establishes a client-ship between commoners and a chief and so legitimizes his chiefly status and power (Kammerer and Tannenbaum 1996). The latter is intended to transfer merit to his followers by imploring the land spirit to produce food. Only a chief who receives merit from the sky spirit can organize such a sacrifice. The sacrifice thus establishes a chief as the nominal owner of the land of his domain (Tannenbaum and Kammerer 2003). With these two rituals, a chief and his followers are blessed by sky spirits and nourished by the land spirit. Through these rituals, a chief puts his followers into a status of "indebtedness", and they have to pay the debt by, for instance, paying a hindquarter of a big animal following a sacrifice ritual or a hunting trip (hence a Kachin chief is known in the literature as a thigh-eating chief)²².

A Cultural Model of Climate Change.

According to the above described schemes of time and space, nature and the environment are embedded in a network of relations among humans, spirits, animals, plants, and other materials.

²² The chieftaincy disappeared in 1953 when the Chinese communists took the Kachin Hills. Since then, except during the extreme communist movements such as the Cultural Revolution, the annual rituals have been practiced without a chief. A religious specialist in the community and village officials organized villagers to make sacrifice to both the thunder spirit and the land spirit so as to initiate the production of the land.

As climate and its changes are a particular form of nature and the environment, I will construct a cultural model of the Kachin understanding of climate and its change using the schemes of time and space as the building blocks. The time scheme captures rhythmic activity pattern for everything, and the space scheme captures the land's production.

Kachin as an agricultural people pay close attention to three aspects of weather – rain, heat, and land. In Kachin, weather is called *la³¹mu³¹ ma³¹rang³³* (*la³¹mu³¹* means “the sky”, and *ma³¹rang³³* means “rain”), and both weather and climate can be called *ga³¹tsi³³ ga³¹htet⁵⁵* (literally, “cold and hot”). Rain and heat are the basis of seasonal alternation, and they precondition agriculture. Land is the source of agricultural production. Agriculture needs the initiation of the productivity of the land, and its development requires a balance between rain and heat. For Kachin, weather follows its natural rhythm (*a³¹hka³³ la³¹do³¹*: *a³¹hka³³* means “things related to season and weather”, *la³¹do³¹* means “stages”). The first part of the time scheme and the space scheme capture such a rhythm, and the second part of the time scheme specifies details of human activities that are meant to comply with the rhythm. According to these schemes, climate is predictable and humans set up synchronization with it. The tradition of animal sacrifice endows Kachin with the ability to regulate their behaviors so as to arrange and predict their relations with the world. I consider such a predictable arrangement as a cultural model of Kachin understandings of climate and its change.

The basic principle of this model is human adaptation to the natural rhythm of climate. For Kachin, climate change is part of nature. On the one hand, if changes can be managed and predicted, they are not disasters, and *vice versa*. Changes are catastrophic only because they are beyond human adaptation. On the other, if humans lose synchronization with the world, they will not adapt to the changes of the world therefore will suffer from the changes²³.

Modifications from the Other Three Knowledge Systems.

In my fieldwork site, villagers do not live with a single integrated faith, which previously connected humans and everything else through animal sacrifice. Rather, they live in a mixed world that apportions their faith into pieces, with only one piece being devoted to animal sacrifice. Three other knowledge systems—modern science introduced by the Chinese government, Christianity, and Chinese folk beliefs—compete with animal sacrifice to claim people's faith. Such split faith adds new elements, either complementary or contrastive, to the above described cultural model of climate and its change.

The Chinese government intends to eliminate cultural understandings of nature and the environment and impose modern science on all Chinese citizens. The government provides competing explanations of nature and the environment, aiming to convert all its citizens, especially ethnic minorities, into modern people with belief *only* in science. And in science, nature and the environment becomes an object, rather than a subject with which Kachin strive to establish synchronization.

In the late 1890s Christianity started to influence Kachin. About one-third of the population in my fieldwork base had been converted by 2010. Christians intend to convert each Kachin into a child of God, irrespective of cultural differences among His children all over the world. Kachin

²³ When catastrophic climate change occurs, the Jinghpo will try their best to make animal sacrifice to the thunder spirit and the water spirit. The ritual is intended to gain sympathy from nature. In the chanting, the specialist exaggerates how hard humans life becomes under the changes; they are pauperized and crippled. He then supplicates the spirits not to deteriorate human situations any more.

Christians provide an alternative knowledge system about nature and the environment. They also added moral implication to the recent catastrophic climate changes, and interpreted the drought in 2009-10 as an instance of the outcome of betrayal of God's teaching.

Kachin animal sacrifice makers treat Chinese folk belief as a resource for daily life regarding relations between humans and spirits. From the Chinese, Kachin have learned to associate catastrophic environment changes with social-historical changes. Chinese have a long tradition in which environmental and weather changes (such as earthquakes and floods) foretell great socio-historical changes. For instance, in the eyes of ordinary Chinese, recent natural disasters, like the Wenchuan earthquake in southwest China in 2008, the Yushu Earthquake in Northwest China in 2009, and the severe snow storms in early 2010, all are signs from the Universe that indicate possible future big socio-historical vicissitudes.

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Appendix: the Kachin Divination Table

				West		
		1 st , 6 th , 11 th , 16 th , 21 st , 26 th	2 nd , 7 th , 12 th , 17 th , 22 nd , 27 th	3 rd , 8 th , 13 th , 18 th , 23 rd , 28 th	4 th , 9 th , 14 th , 19 th , 24 th , 19 th	5 th , 10 th , 15 th , 20 th , 25 th , 30 th
5	17:36 – 20:00 20:00 – 22:24	<i>Hpung</i> O <i>Chyut Ten</i> Time for asking each other to go home	<i>Hka Long</i> OO <i>Ginsup Ten</i> Time for hurting people by using sorcery	<i>Tsa Na Ten</i> Drunken time	<i>Hkai Li</i> X <i>Hkai Ten</i> Time for planting seeds	<i>Ding Hku</i> OO <i>Li Ten</i> OO Time for being pregnant
4	15:12 – 17:36 22:24 – 24:48	OO <i>Baren Num</i> <i>Lu Ten</i> Time for having a dragon wife	<i>Hpyen Sum</i> Ten Time for being defeated	<i>Lu Sat</i> X <i>Ten</i> Time to kill	OO <i>Shingai Lu</i> <i>Ten</i> OO Time for baby- delivery	<i>Lawa Shan</i> O <i>Sha Ten</i> Time when wild people eat meat
3	12:48 – 15:12 24:48 – 3:12	<i>Htong Hkat Ten</i> Time to be imprisoned	<i>Jo Sat</i> X <i>Ten</i> Time to kill by using poison	<i>Hka shaton</i> OO <i>Ten</i> OO Time when water is level in all directions (in a balanced state)	<i>Mason Chyu</i> O <i>Ten</i> Time to be jabbed by a spear	<i>Hkring Ga</i> OO <i>Nong Ten</i> Time for religious chanting
2	10:24 – 12:48 3:12 – 5:36	<i>Hpyen</i> X <i>Rot Ten</i> Starting time for a war	<i>Hko Hkam</i> OO <i>Mying Lu</i> OO <i>Ten</i> Time for naming a prince	<i>Sharo Shan</i> O <i>Sha Ten</i> time when a tiger eats meat	<i>Ganu Gawa</i> OO <i>Hkong ten</i> Time for meeting parents	<i>Nam Dum</i> <i>Hkrat Ten</i> time for falling into a latrine
1	8:00 – 10:24 5:36 – 8:00:	<i>Hko Ya</i> OO <i>Hko La</i> OO <i>Ten</i> Time for giving each other benefit	<i>Hko Hkam</i> O <i>Tai Ten</i> time for enthroning a prince	<i>Gumhproi</i> OO <i>Bum</i> silver mountains	<i>Nta Du Wa Ten</i> Time for going home	<i>Htung</i> X <i>Pru Ten</i> time for being set free from a prison
		1	2	3 East	4	5

Second Day: Toward a Common Methodology.

Introduction.

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The second day of the Workshop included 6 presentations about methodologies that had been employed in research about cultural models. Salient experiences were shared in these presentations and were then plenary discussed in the second half of the day. Three fundamental goals were intended to be achieved by this part of the Workshop:

1. Share methodological experiences;
2. Arrive at a common protocol to be employed in the various field sites;
3. Discuss feasibility of such a protocol in each field site.

The day started with a presentation by Bennardo in which he outlined possible experimental tasks to be used to discover specific mental preferences in the use of Frames of Reference for representing spatial relationships. An experimental task called “Animals in a Row” was presented in detail. Shimizu followed by presenting the videographic methodology he developed in researching specific conceptualizations of self in Japan, China, and US. Then, Bennardo took the floor again and summarized two diverging methodological pathways used by a number of researchers in pursuing cultural models. He proposed a blended approach that would capitalize on what he saw as the considerable positive contributions of all the methods adopted by those researchers.

Boster’s contribution followed in which he reported on his broad experience in collecting and analyzing data about cultural models of nature and environmental values in the US. His sampling and systematic interviewing strategies were illuminating. Similarly, the way in which he and his colleagues constructed a survey questionnaire and the types of analyses they conducted on the results were very informative. Then, Gatewood gave a very detailed presentation about his lengthy experience in conducting consensus analyses. His report about specific steps to avoid and others to adopt in conducting this type of analysis were extremely useful for both experienced or novel researchers who want to adopt such a methodology.

Medin’s presentation closed the first part of the day. His experiences as a cross-cultural cognitive scientist (and cognitive psychologist) contributed to widen the methodological landscape so far outlined. His major suggestion regarded eclecticism and creativity in methods to be used (interviews, experimental tasks, and statistical analyses) as well as focused attention to local realities (ethnography).

The discussion following the presentations of this first part of the day was conducive to the suggestion of a core methodological protocol to be used by all researchers in their field sites (see Appendix 1). In addition, a number of methods were also agreed on as potentially useful in a some of those sites. Finally, methods required by local realities were also suggested to be employed in order to satisfy specific ethnographic situations.

1. Space in Culture and Mind.

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Introduction.

Is space, as a fundamental ontological domain, contributing to the generation and construction of other domains of knowledge? Some supporting evidence is found in the literature (Bennardo, 2009; Gattis, 2001; Mandler, 2004, 2008; Mix, Smith, and Gasser, 2010). If so, then, structural preferences found in the spatial module should be found replicated in other modules/domains (see Figure 1). In other words, when a specific preference in the spatial domain is shared by members of a community it can be labeled a *foundational cultural model* because it is also used in the generation of cultural models as molar mental phenomena in a number of domains. This is the main hypothesis of the research project in preparation.

Space and Cultural Models.

Bennardo (2009) proposed that foundational cultural models originating in ontological domains, e.g., space, contribute to the generation of molar cultural models and these latter contribute to action/behavior (see Figure 1).

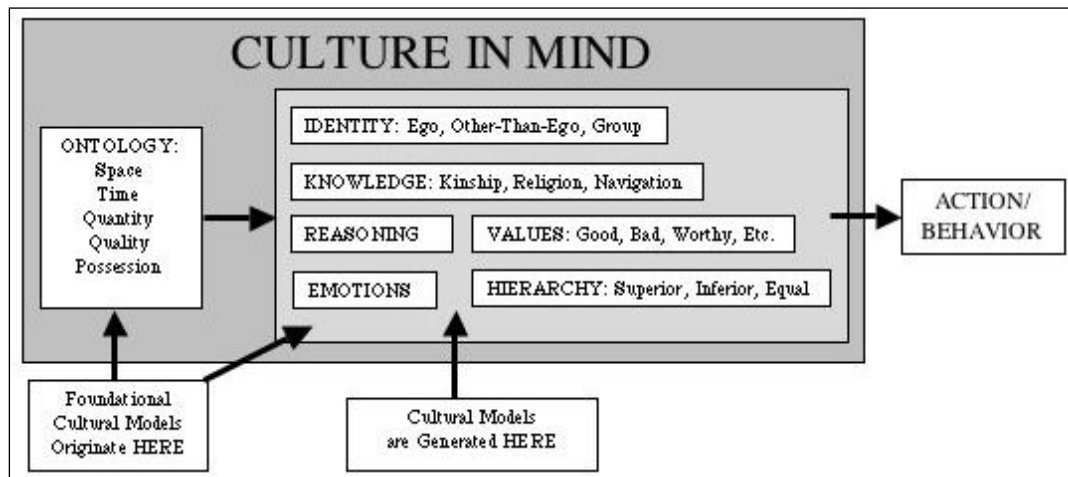


Figure 1: Culture in Mind (Bennardo, 2009: 345)

The project we are putting together is about cultural models of nature and the environment of primary food producers in several cultures over five continents. These models are molar and not foundational, but are possibly generated from foundational ones about space and/or spatial relationships. In this very brief presentation, I propose how to proceed to start collecting data supporting the main hypothesis: preferences about space influence the generation and construction of cultural models.

The 'Animals in a Row' Task.

A frame of reference (FoR) is a set of coordinates (three intersecting axes: vertical, sagittal, and transversal) used to construct an oriented space within which spatial relationships among objects are identified. There are three major types of FoR: relative, intrinsic, and absolute (see Levinson, 2003 for a typology of FoR; and Bennardo, 2009, for a revision of that typology). A relative FoR is centered on a speaker and it remains centered on the speaker when the speaker moves, for example, when one says, “The ball is in front of me.” An intrinsic FoR is centered on an object and it remains centered on the object when the object moves, e.g., “The ball is in front of the car.” An absolute FoR uses fixed points of reference, e.g. north, south, east, west, as in “The town is south of the river.”

Preferences about the mental representations of space, i.e., a foundational cultural model, can be discovered by using a well established methodology (a kit of tasks) prepared in the early 90s by the Cognitive Anthropology Research Group (CARG, 1992) at the Max-Planck Institute for Psycholinguistics in Nijmegen, The Netherlands. The specific task I suggest and have already used is the “Animals in a Row” task. This task can be very easily administered in the field. The results of this task provide clear evidence for a preference for an absolute or a relative FoR in mentally representing spatial relationships.

Subjects who are administered the ‘Animals in a Row’ task are required to stand in front of a table (in some cases, a box, a trunk, or an elevated surface). On the table they are shown a set of three small plastic farm animals, a cow, a pig, and a horse. The objects are shown standing in a row, all facing the same direction, either to the right or the left on the transverse axis in front of the informants. The subjects are then asked to memorize the position of the animals. When the informant declare themselves ready to go to the next step (typically, after a few seconds) the animals are taken away and a minimum of 60 seconds need to elapse in which some conversation takes place between the informant and the researcher and/or assistant.

Then, the subject is directed to another table situated at some distance and right opposite the first one. Here s/he is asked to stand in front of this second table in a position that requires a 180 degrees rotation from the previous one. The researcher then hands the three animals to the subject and the subject has to put them on the new table in the sequence and direction they had seen earlier. This constitutes the end of one trial and careful note needs to be taken of the direction the informant choose to align the three animals. The trial is repeated five times for each subject and each time the sequence and overall direction of the three animals shown changes randomly. A training trial precedes the beginning of the five-part task to make sure that its content is clearly understood.

The way in which the subjects put down the animals provides a very clear cue towards an understanding of which FoR has been used to remember the spatial arrangement observed a few seconds before. In fact, there are only two ways (other solution are considered mistakes) in which the subjects could arrange the overall direction of the three animals (their actual sequence is also registered by the researcher and/or assistant, but has little relevance in the task). If participants use a relative FoR the overall direction of the animals would stay the same as in the way they were seen, that is, either to the subject’s own left or right. If participants use an absolute FoR the direction of the animals would stay the same relative to some landmark or cardinal point, but not to the subject’s left or right.

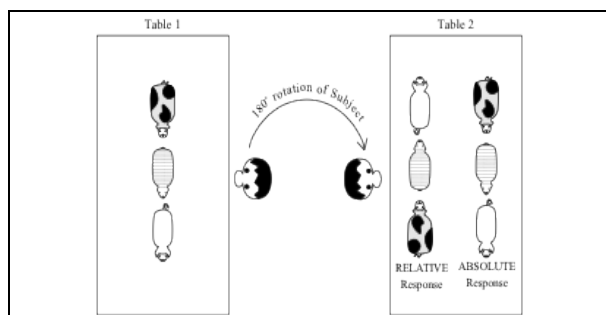


Figure 1: Possible Responses for Animals in a Row Task (from Bennardo, 2009: 91)

The content of Figure 1 shows how the choice of one of the frames of reference, relative or absolute, for coding in memory eventually determines the responses given by the subject.

Beyond the understanding of the instructions in the native language, there is no other role that is overtly assigned to language in the performing of this task. The stimulus involves only visual perception and the response only motor activity. Between the exposure to the stimulus situation and the response some coding of spatial relationships by means of a FoR in non-perceptual memory is involved. The nature of this coding is exactly the target of this task.

The discovery of a preference for the relative or the absolute FoR (a foundational cultural model) is hypothesized to correlate with the structure of molar cultural models, e.g., about self, and about nature and the environment. A great number of variation is expected. However, this variation is hypothesized to coalesce around two major types: either favoring ego as a result of a preference for the relative FoR, or favoring other-than-ego as a result of a preference for the absolute FoR.

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2. Outwardly vs. Inwardly Directed Senses of Self: Reflections on Self and Morality in a Visually-Cued Multivocal Ethnography of Students in a Christian High School in Japan and the United States.

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The following is based on the paper I presented at the 2010 annual meetings of the American Anthropological Association (Shimizu, 2010). It is included here to consider the applicability the two questions that I used in my own cross-cultural study of adolescents' psycho-cultural values in a Christian school in Japan and the United States, to the proposed study on "cultural models of nature and environment." The two questions are: "Describe yourself," and "What's the right way to live?" Giovanni Bennardo and I speculated that the ways in which the students answered these questions, knowing that they would be subject to public judgments (here, by being participants of a short documentary), might have revealed something "foundational" about their cultural cognition: i.e., the "assemblage of knowledge that can generate other more complex models when used to merge a larger number of units of knowledge" (Bennardo, 2009, p. 12).

Specifically, the students' answers showed two distinct style for situating themselves spatially in relation to others and to the outer world: the American students situated themselves within their own ego, whereas the Japanese students situated themselves away from their ego. We reasoned that these were possible manifestation of "foundational cultural models," the basic, generative cultural model used to create other more specific or complex cultural models (Bennardo, 2009). The paper below analyzes how these two basic ego-orientations paradoxically give rise to two distinct and more specific behavioral patterns: outer directed self-expressions originating in the egocentricity (U.S.) and inner-directed self-examinations originating in the non-egocentricity (Japan). Intriguingly, These two behavioral orientations seem to have created two "brands" of Christianity, which usually assert itself as a universal religion.

*At the Workshop, the two questions were presented not as **the** methods to be used for the upcoming project, but suggested as a point of departure for further discussions. The key questions were: "Do these two questions (or their likes) reveal foundational cultural models?" "If so, should these questions (or their derivatives) be applied to the current study?" "If so, how and why?"²⁴*

In videotaped interviews, I asked high school students in a Christian school in Japan and the United States the questions, "Describe yourself," and "What's the right way to live?" The answers were expected to be culturally stereotyped because the students were told that this video would be shown to their parents, teachers and peers, and viewers in Japan and the United States.

The difference between the two groups was quite intriguing. On the one hand, the American students weren't shy about asserting their personal faith. They said, the right way to live, was to: "do God's will and be true to yourself while being conscious of others," "[live] through faith, prayers and reading the Bible." On the other hand, none of Japanese students mentioned God, the

²⁴ As for the Japanese case, there appear to be a close relationship between the culturally shaped (non-egocentric) sense of ego and their sense of nature and environment. See Shimizu (this volume) for detail.

Bible or faith as the basis of their morality. They stated that the right way to live was to live in such a way not to cause other people trouble.

I also found that while Christianity is often presented as a universal religion, students in a “Christian” school in Japan and the United States were complying with divergent sets of moral expectations. In the Japanese school, students were following what I call the norm of Self-Directed, Introspective Morality. Here, students examined critically of themselves for signs of imperfection or selfishness and worked to correct them to be good members of society. In the American school, such rigorous self-examination was rarely practiced. Instead, students were following what I call the norm of Action-Based, Expressive Morality. Here, students went beyond their private selves and world to perform services to others. In other words, the Japanese students’ morality was directed at themselves, and the American students’, to the world.

In addition, these two contrasting moral orientations gave rise to a paradoxical phenomena: contrary to the common view that the collectivistic or the interdependent ethos of Japanese culture inhibits individuals from expressing their autonomy and individuality (Markus and Kitayama, 1991; Nisbet, 2003; Triandis, 1990), when it comes to their *inner* experiences, they seemed to have a *greater* degree of freedom to express their individualized thoughts and feelings than their American counterparts. Conversely, while the individualistic and independent ethos of the American culture gave individuals a greater degree of freedom of choice and initiatives in their external world (Markus and Kitayama, 1991; Nisbet, 2003; Triandis, 1990), when it comes to their inner experiences, individuals seemed to be given comparatively *lesser* degree of freedom for expressing their individualized thoughts and feelings. Below, the evidence for these two sets of findings will be discussed in terms of: 1) students’ everyday environments; 2) ways in which they talked about themselves and the right ways to live; and 3) comments they gave to the videotaped interviews.

Methods.

I used a modified version of Josephs Tobin’s multi-vocal visual ethnography method (Tobin, 1989a, 1989b; Shimizu, 2007). In the first phase of the study, students in two Christian schools, “Seishin High” in Japan and “Martin High” in the United States, were asked to “describe themselves,” and what they considered to be “the right way to live” in videotaped interviews. In the second phase of the study, short videos containing the gist of the videotaped interviews along with snap shots of school-based activities (e.g., homecoming at Martin, and “school festival” at Seishin) and the pictures the students took to describe their lives, were shown to the students who participated in the study, and to their teachers and parents. They took the DVDs home, watched them and took notes of whatever they were intrigued by, and discussed these points in length in subsequent interviews.

School Environment.

Martin High School.

The front entrances of the two schools presented different messages to the outsiders. At Martin, above the main front entrance was a message that read, “Glory to God.” Immediately right of the entrance was a reference to the school’s nickname, “Crusaders,” which read, “Home of the Crusaders.” Interestingly, the display of the word God at the school’s front entrance paralleled the finding that first thing students mentioned when asked about their sense of right and wrong

was their references to God. The image of the Crusaders was also resonant with the school's mission—"touching lives for eternity"—the idea of which was to go beyond one's own private world and produce "fruits" in the lives of others.

Seishin High School.

Upon arriving Seishin High School, one would know that this was a Christian school only because of the chapel steeple. Yet there were no overt signs, as in Martin, proclaiming its Christian affiliation. The only visual marker at its front gate was the family logo of the school's founder, a mere image of a bamboo branch. One intriguing feature of the school buildings was that this front entrance was reserved for teachers and guests, while students entered the school through its "back" entrance. All people took off their outside shoes as they entered the building and put on their inside shoes, giving them a feeling that they had arrived from an outside world to an inside world. That there was a "front" and "back" sides to the school building corresponded symbolically with how Seishin students showed their two-tiered displays of their selfhood, one appropriated for the critical judgment of others, and the other, being kept inside as one's private thoughts and feelings.

Self Descriptions.

Self-Descriptions of Martin Students.

As with the school's architectural design, self-descriptions of student at Martin were focused on actions and interests they pursued in their daily lives. Mark, for example, described himself as, "I'm... artistic ... can draw, athletic like play basketball and soccer. I like to get to... know people ... I like Martial Arts ... like Kung Fu type of stuff, like Bruce Lee and stuff like that, very fun. ..." Similarly, Christy describe herself as, "I have a lot of friends. I think I'm pretty outgoing. I like to get involved in stuff and that's pretty much it. I'm kind of loud. I like to smile a lot." One outstanding feature of the self-descriptions of Martin students was that they were "self-referred," meaning, they defined who they were *by themselves*—like a "sovereign nation"—without considering opinions of others.

Self-Descriptions of Seishin Students.

Nearly all of Seishin students' self-descriptions, however, projected images of themselves as seen in the eyes of others. As Keiko, a senior said, "This is what my parents told me, that my teacher told them that I was a pipeline between the boys and the girls in the classroom, and I improved the overall atmosphere of the class... I guess that is me." There were two other outstanding features of Seishin students' self-descriptions. First, they used comparatively fewer words to describe themselves. One device to do so was to use one all-purpose trait word, *akarui*, which literally means brightly-lit. *Akarui* covers a wide range of pro-social traits such as being sociable, cheerful, polite, courteous, funny, out-going and attentive to the needs of others. One Japanese viewer (a mother) explained that the reason why this expression was used often was that it was a way of saying that there was nothing particularly outstanding about oneself, except that he or she is friendly to others—a trait generally favored by the students for there is a cultural warning against being a "sticking nail" (self-assertive ones) who gets "pounded down" (pressured to submit to the will of the group). The other intriguing finding was that the majority of Seishin students' self-descriptions were self-critical, such as being "immature," "selfish," and "a negative thinker." Contrary to some American viewers' interpretation that these students

lacked self-confidence and self-esteem, the Japanese viewers explained that the self-negation was a way of saying that they were imperfect as everyone else. One teacher said, “It’s a way of saying that you have nothing to worry about me. I am safe person because I don’t think that I am better than anybody else.”

Right Way to Live.

Moral Perspectives of Martin Students.

As mentioned previously, many of the Martin students talked about their personal faith as the basis of their morality. The reply by Sarah to the question, “What’s the purpose of life,” was exemplary: “I know that my purpose is to spread the word of God and it’s to let everyone know what Jesus has done for us so that everyone can go to heaven.” Yet, more generally, as with their self-descriptions, Martin students’ views on morality were directed *outwardly* to impact others and the world for their benefits. As Eric said “the right way to live” was “to do your best to put more good than evil out in the world. I believe to live a good life you need to love more than just people close to you.”

Moral Perspectives of Seishin Students.

As noted already, not one Seishin student made a reference to Christianity or any other religious teachings as the basis of their morality. One word used nearly by everyone, however, was *hito*, which means people other than oneself. As with the word *akarui*, there was a standard expression which contained this word to describe moral conduct, and that is, *hito mi meiwaku o katenai*, or not causing other people problems. Noticing the lack of connection between religion and morality, I asked Keiko, why this might be the case. Then she answered, “*Hito*, the other people are at the center of our morality. I’d say *hito* is for the Japanese what God is for Americans.”

Reactions To the Video.

Martin students’ comment about the video.

Nearly all Martin students who watched the Japanese video were intrigued by the manner in which their Japanese counterparts openly criticized themselves. As Sarah, a senior, pointed out, “It seemed like the students from Japan were a lot more honest with their comments... I... remember one student saying, ‘I’m lazy’ and ... ‘I get disappointed when I do poorly at work or at school work...’ They seemed ... not trying to... pick out the better points in their life... they are [just] who they are.” Compared with their Japanese peers, Martin students were eager to project positive images to the world. As Kristy, also a senior, noted, “Most people here, if you ask them what they were like would only states the positive things about themselves. Like, if someone asks me what type of a person are you, I probably wouldn’t say I am irresponsible and I am forgetful... I like to focus on the positive things, and I think that for the most part most kids in America are like that.”

Seishin students’ comments about the video

While Martin students were intrigued to observe how their Japanese counterparts were free to reveal their honest, imperfect self, Seishin students were surprised to see how Martin students could talk about themselves so positively without worrying about the opinions of others. As

Kenji, a 16-year-old Japanese boy mentioned, “I was amazed how they were able to express their ideas so clearly and directly. I saw a student who described herself as ‘a leader...’ If you do that [here], people would criticize you by saying, ‘You are expressing yourself [too much].’ So you generally don’t do such a thing.”

External vs. Internal Freedom.

External Freedom in spite of Internal Constraints at Martin.

While Martin students are given more “freedom” to choose and engage in activities that are unavailable to Seishin students, they were pressured to “get involved” for the sake of competition rather than of their own authentic, “internally motivated,” decisions to do so. As Kristy noted, “being involved in all of the things is important.” When asked why it is so important, she explained, “I actually think part of it is kind of making a name for yourself... Getting your name out there... it also helps for the future and I think that’s a big part of it.” The importance of getting involved also applied to aspects of students’ religious life. For example, Kristy explained that Martin students were “really pushed to be involved because we have to do service hours each semester.” which is part of the school’s mission statement, “touching lives for eternity.” More specifically, she explained, “the fact that we are Christians [makes us] supposed to go out and make disciples and help other people... God wants us to go out and make disciples of all nations... not keeping everything within the school... making us the type of people who will in the future go out and make people’s lives better throughout the world.”

Internal Freedom in spite of External Constraints at Seishin.

Being unable to talk freely about themselves for fear of other people’s criticism may constrain the range of choices and self-initiatives for Seishin Students. Nonetheless, that they were not pressed to do so by outside forces seemed to have given them more internal freedom. For example, after viewing both the Seishin and Martin videos, Keiko commented that two groups “believed” in two different things. For her, the Martin students’ belief in God was a devotion to God external to themselves, but for her truth resided within herself as her genuine feelings of appreciation of others. As she noted, “It is often said that Japanese are not religious. But I thought for us, *our faith and beliefs are within ourselves*. It is here [pounding her heart] where you foster your own faith and belief system. To her, such feelings are exclusively her own, and significant in and of themselves. As she noted:

I am not doing this *for* God. But I am doing it because of my *own* desire to reciprocate the kindness of those people who’d had taken care of me. I am not doing it since that’s what God says or said about him, but I just want to express my feelings to others, or let my heart pour out how it feels. That’s my honest opinion. Of course, it’s quite admirable that you put God at the center of your life. It’s one way to live and is a wonderful thing, but that is exactly where the difference between the Japanese [and American students] is.

Summary.

In this paper, I made the following two points. First, the key differences between the two groups of students in a Japanese and an American Christian school were the directions of the students’ psychological attention and the actual manifestation of that attention. In the Japanese view, one

looks *inwardly* to search for aspects of self that are ego-centric, or morally impure, and try to cleanse one's egocentricity either by mental efforts to renounce selfishness or through actions that are other-oriented. In the American view, on the other hand, one looks outwardly to express the inner self that is presumed to be moral, good and capable, and tries to "prove" this supposedly self-evident "fact" through outward performance. Second, in spite of the view that the collectivistic or the interdependent ethos of Japanese culture inhibits individuals from expressing their autonomy and individuality, when it comes to their inner experiences, they seem to have a greater degree of freedom for entertaining their individualized thoughts and feelings than their American counterparts. Conversely, while the individualistic and independent ethos of the American culture gives individuals a greater degree of freedom of choice and action in their external world, when it comes to their inner experiences, individuals appeared to be given lesser degree of freedom for exploring their individualized thoughts and feelings.

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3. Thinking about Methods for Cultural Models.

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When searching for cultural models, the literature provides a number of methodological paths. Some start with semi-structured interviews about something related to the focus of the investigation that requires the activation and use of the mental model searched for, e.g., D'Andrade, 2005. Others start with 'free listing' and 'sorting tasks,' e.g., Ross, 2004; Atran and Medin, 2008. Analyses of the interviews include either looking for key words and metaphors (Strauss and Quinn, 1997; Quinn, 2005), or finding 'gist' and building propositions (D'Andrade, 2005; Kempton, Boster, Hartley, 1995). Frequency, correlation, and MDS analyses, instead, typically follow free listing and sorting.

From the results of the analyses, a Cultural Model (CM) is identified. Once identified, a CM needs to be checked against the available (or new) data. This has been done in a variety of ways: e.g., looking for examples of reasoning, administering questionnaires and/or triadic similarity tasks. Finally, one conducts a consensus analysis trying to ascertain if the CM is shared, how, and by whom.

What methodological pathway can be proposed about this research project? Or better, how can we obtain empirical support for our major hypothesis: preferences about space (foundational cultural model) influence the generation and construction of cultural models, e.g., self? And how can we obtain empirical support for our hypothesized cultural models of nature and the environment in our cultural groups?

This is my proposed pathway:

First Field Visit:

First, we collect data about preferences for mental representations of spatial relationships.

Second, we collect data about the conceptualization of self.

Third, we conduct semistructured interviews about a topic which activate one's cultural model of nature and the environment.

Post-First Field Visit:

Fourth, we conduct linguistic analyses on these interviews, e.g., key words, gist, metaphors, etc.

The results of these analysis should allow the discovery of a cultural model.

Second Field Visit:

Fifth, we construct tasks, e.g., questionnaires, free-listing, sorting, to submit to the same population. These tools should allow us to be able to check the cultural model.

Post-Second Field Visit:

Sixth, we conduct consensus analyses on the results of these tasks and find out about the distribution of the model.

Let's discuss this proposal this afternoon and try to find a 'consensus'!

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4. Ethnographic Methods for Exploring Cultural Models of Nature.

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“Environmental Values in American Culture” (Kempton, Boster & Hartley, 1995) serves as an example of one way of exploring models of nature that can be usefully applied in a number of different settings. I will first describe the methods employed by Kempton et al. (1995) and the results that we obtained with them. I will then critique the strengths, weaknesses, and the limits of those methods.

The goal of our research was to explore how the subject of global environmental change was viewed by different interest groups and to see how environmental issues were contested between these groups. We were interested in the cultural models that individuals used to understand these issues, where we defined a cultural model as “a simplified representation of the world that allows one to interpret observations, generate novel inferences, and solve problems” (Kempton et al., 1995:10). These cultural models were most evident in the ways in which individuals made arguments in favor of their points of view and against those of other groups. These rhetorical devices came in the form of statements or propositions describing relevant facts, beliefs, opinions, and values. As our initial distinct interest groups we chose environmental activists (**EA**), coal miners (**CM**), congressional staffers (**CS**), and auto engineers (**AE**). The goal was to record the points of view of those strongly in favor of defending the environment (**EA**), those resistant to those steps (**CM**), those responsible for crafting public policy (**CS**), and those who in a god-like fashion determine the way in which the rest of us use energy (**AE**). Finally, we interviewed randomly chosen lay people (**LP**) to establish a baseline.

The interviews were semi-structured and began with grand-tour questions, followed by a short presentation on the current scientific consensus on global climate change, and ending with a series of questions to draw out individuals responses to these questions. After each of the questions was posed, there followed an open-ended conversation in which we, the interviewers, attempted to coax the interviewee to elaborate their points while we contributed as little as possible to the content of what was said. The 43 semi-structured interviews lasted from a half an hour to an hour and a half, with an average of about an hour. They took place in the years 1990 to 1992. These interviews produced 530 transcript pages.

In the next step, Kempton and I independently scanned the transcripts for *key ideas*: brief statements of the core arguments stated by the individuals in the interviews. This winnowing process resulted in 165 pages, reducing the text to about a third of the original transcript. We were struck by how similar were the sets of key ideas that we had independently identified in the transcripts. These ideas were the basis for describing the cultural models used for understanding these issues: models of the causes of climate change, of nature, and of environmental values. They were also used to craft a systematic survey that was administered to other groups of respondents. To produce the survey, the core ideas were culled more savagely to yield 142 propositions. An additional seven propositions were added from another study in order to calibrate our results with theirs.

Cultural Models of Causes of Climate Change.

One of the principal ways in which our interviewees understood global climate change was as a form of pollution. The cultural model we inferred includes these propositions:

1. Pollution consists of artificial chemicals, not natural substances.
2. These chemicals are toxic to humans and other life, although health effects may not be observed until much later.
3. Sources of these artificial chemicals are predominantly industrial and automotive.
4. Pollution is fixed by installing additional filtering equipment.

While pervasive, this model does not fit the principal cause of climate change according to climate scientists. They attribute the cause of global warming to the release of CO₂ and other greenhouse gases through the use of fossil fuels for energy. The CO₂ released is identical to that produced by living beings and cannot be considered an artificial chemical like the chlorofluorocarbons which cause the depletion of atmospheric ozone. It is not toxic to humans nor are its sources limited to industry and the use of automobiles. Finally, the release of CO₂ cannot simply be filtered out of emissions the way that particulates can be. There is a similar misunderstanding of the role of forests in the carbon cycle; few realize that a mature forest is neutral with respect to CO₂ such that as much CO₂ is released to the atmosphere through decay and other processes as is fixed by photosynthesis.

Cultural Models of Nature and of Environmental Values.

Kempton and I began this research believing that our topic was global climate change. However, the interviewees transformed our topic by responding with descriptions of their views of nature and of the reasons for preserving it. In their views of nature, there was strong agreement on the following propositions:

1. Humans depend on nature
2. Natural resources are limited
3. Natural systems are interdependent, balanced, and unpredictable
4. Things are changing for the worse
5. Someone else is to blame

The values they offered for protecting the environment fell into four general classes: spiritual, anthropocentric, biocentric, and utilitarian. These values were expressed by individuals across the groups seemingly irrespective of their own interests; agnostics would find themselves describing the sacredness of nature and the childless would find themselves describing the importance of passing on a healthy planet to our children and our children's children.

We found the amount of consensus on environmental values surprising, especially as we had expected this topic to generate considerable controversy. However, the major areas of disagreement concerned 1) the policy implications (what to do about climate change and at what cost) and 2) cases in which alternate values were in conflict (e.g., between spiritual and utilitarian values).

Our tool for exploring the pattern of agreement and disagreement on these issues was the systematic survey. The survey asked respondents to evaluate 149 propositions on a six point Likert scale from strongly agree to strongly disagree. The respondents were chosen from groups anticipated to span the range of opinion on these issues. At the environmentalist end were members of Earth First! and the Sierra Club; representing the other pole were dry cleaners in Southern California (whose businesses are adversely affected by environmental regulations) and sawmill workers in Oregon who had lost their jobs in part because of the protections of the endangered spotted owl. The original informants were expected to span the entire range of opinion while lay people were expected to fall in the middle. These expectations were born out with the most extreme contrast being that between members of Earth First! and the laid-off sawmill workers.

The general pattern is that there is substantial agreement of all groups with propositions that state environmental values in isolation (Tables 1a and 1b), substantial disagreement of all groups with propositions that reject those values (Table 2), but substantial disagreement between groups on propositions that pose values in conflict with each other (Table 3).

Another way of illustrating the pattern of agreement among respondents is through a minimum residual factoring of the inter-respondent correlation matrix (Romney, Weller, and Batchelder, 1986). In general, the first factor reflects the degree to which respondents agree on common cultural beliefs while the second and subsequent factors reflect the major dimensions of disagreement. The first factor score measures the degree to which each respondent shares the common beliefs while the second factor score places the respondent on the major axis of differentiation. In this case the major dimension of differentiation of respondents reflects the degree to which the respondent embraces environmental values – individuals low on this dimension have stronger commitments to environmental protection than those high on this dimensions. Figures 1 through 7 show the positions of members of the various groups on these two factors.

It can be seen that positions on the two dimensions are related; those at the extreme environmentalist pole (low on factor two) show the highest agreement with the set of common beliefs (high on factor one) while those stressing the importance of conflicting values (high on factor two) show lower agreement with the set of common beliefs (low on factor one). In other words, the so-called radical environmental activists are closer to the consensus of all groups taken together than members of any other group.

I expect that this result would not be replicated were our research to be done in the present. I expect that now there are groups (such as members of the tea party) embrace a much stronger and more coherent anti-environmentalism. Indeed, climate science skepticism has joined rejection of the theory of evolution, rejection of efforts to develop alternative energy sources, as part of a thorough-going rejection of positions attributed to intellectual and scientific elites.

All groups substantially agree with the following propositions:
Table 1a.

Earth First!	Sawmill workers	Survey statements
93	74	1 The weather has been more variable and unpredictable recently around here.
68	74	2 We are not going to be able to totally prevent global climate change, so adaptation has to be part of the solution.
100	70	5 Change of a few degrees in average temperature can make a huge difference in whether things can grow or not; global climate change would mean there would be enormous disruptions of agriculture.
94	100	7 People have a right to clean air and clean water.
77	93	22 In World War II, people gladly rationed for the war effort. People would willingly do it again to save the environment if the need were great enough.
100	74	24 We have to protect the environment for our children, and for our grandchildren, even if it means reducing our standard of living today.
100	96	27 We have a moral duty to leave the earth in as good or better shape than we found it.
93	85	31 Preventing global climate change is better than waiting to see what happens. It's more costly to fix problems than it is to prevent them in the first place.
83	89	34 They could easily design a much more fuel efficient car, but the big automobile companies conspire with the big oil companies to keep that from happening.
86	67	48 We don't have the right to play God by manipulating nature.
97	82	51 Our obligation to preserve nature isn't just a responsibility to other people but to the environment itself.
97	85	55 The reason politicians break their promises to the people to clean up our environment is the power of industry lobbies.

All groups substantially agree with the following propositions:
Table 1b.

Earth First!	Sawmill workers	Survey statements
100	82	57 Global climate change would disturb the whole chain of life.
76	78	58 Because God created the natural world, it is wrong to abuse it.
100	78	65 We spend billions of dollars trying to find the cure for cancer and yet we're not doing enough to clean up the environment which causes the cancer.
97	78	89 Unfortunately a lot of companies wouldn't do anything to protect the environment unless they were forced to by law.
84	93	108 If global climate change would cause things like a million people drowning in Bangladesh, we can't let that happen. Even if it doesn't affect us here, that would be totally immoral.
94	85	109 Nature may be resilient, but it can only absorb so much damage.
97	85	111 Working to try to prevent environmental damage for the future is really part of being a good parent.
94	67	126 Global climate change would be bad even if it didn't cause humans any harm, because it is not a natural change.
100	70	141 We should return to more traditional values and a less materialistic way of life to help the environment.
90	67	144 Government restrictions on the use of private property are necessary in order to insure that the land will not be permanently harmed.
90	67	147 Americans are going to have to drastically reduce their level of consumption over the next few years.

All groups substantially disagree with the following propositions:
Table 2.

Earth First!	Sawmill workers	Survey statements
7	15	11 Because global climate change is a world issue and not an individual one, it's the government's responsibility to do something about it, not mine.
0	33	29 The environment may have been abused, but it has tremendous recuperative powers. The radical measures being taken to protect the environment are not necessary and will cause too much economic harm.
29	19	68 The public doesn't need to know all the details on policies to deal with global climate change, Congress just needs to pass the right laws.
14	26	74 The environment probably doesn't need as much protection as we imagine.
0	11	75 People's only responsibility to nature is to make it serve their own best interests.
0	31	80 Plants and animals are there to serve humans. They don't have any rights in themselves.
0	22	90 Scientists are just speculating about global climate change. We shouldn't take action until they have proof.
3	26	128 Nuclear power doesn't pollute as much as other power sources. We should expand our use of it for the sake of the environment.
32	30	129 We should not force the auto companies to make cars with higher gas mileage. Instead we should discourage people's excessive use of their cars.
0	30	130 We shouldn't take action on global climate change based just on computer models and scientist's predictions. We should wait until we can measure an actual temperature change and know it's real.
0	0	131 Humans can't live without creating waste. We should use the old-fashioned methods—find some place out in the woods where it doesn't bother anybody, and just dump it.
0	15	132 We shouldn't be too worried about environmental damage. Technology is developing so fast that, in the future, people will be able to repair most of the environmental damage that has been done.

Members of Earth First and sawmill workers substantially disagree on the following propositions:

Table 3.

Earth First!	Sawmill workers	Survey statements
100	30	42 Energy conservation will work better if we price energy correctly through higher fuel taxes to make efficient energy use in people's own interest.
73	22	127 We shouldn't resort to nuclear power, even if the industry can make it completely safe, take care of wastes, and prevent it from going into bombs.
13	70	63 My first duty is to feed my family. The environment and anything else has to come after that.
80	7	78 If any species has to become extinct as a result of human activities, it should be the human species.
90	22	84 I would rather see a few humans suffer or even be killed than to see human environmental damage cause an entire species to go extinct.
23	67	37 We don't have to reduce our standard of living to solve global climate change or other environmental problems.
13	67	125 If we had the technology to change climate for the better, to improve the human condition, we should do so.
90	22	99 We should become vegetarians to reduce our environmental impact.
24	74	45 I don't believe in preservation of species in the way some environmentalists do. In nature, evolution includes extinction.
21	67	116 Reducing pollution is a more effective way to prevent global climate change than energy conservation.
17	81	92 A fuel tax would be an unfair way to reduce fuel consumption because some people are forced to use more fuel than others by their business or personal needs.
77	33	121 Nature is inherently beautiful. When we see ugliness in the environment, it's caused by humans.
25	70	96 Some of the people who are the most passionate about global climate change are pretty naive about the facts. The ones who know what they're talking about tend to be cautious about making predictions.
23	78	123 Environmentalists would not be so gung-ho if it was their jobs that were threatened.

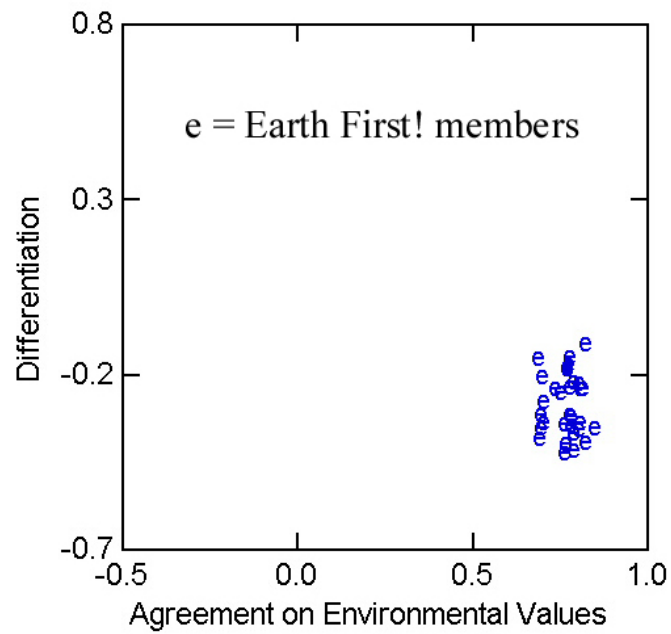


Figure 1. Agreement on Environmental Values

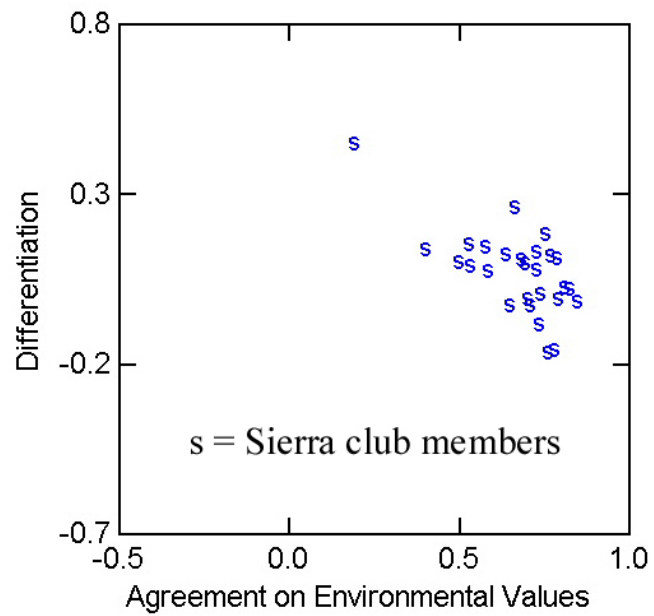


Figure 2. Agreement on Environmemtal Values (Sierra Club Members)

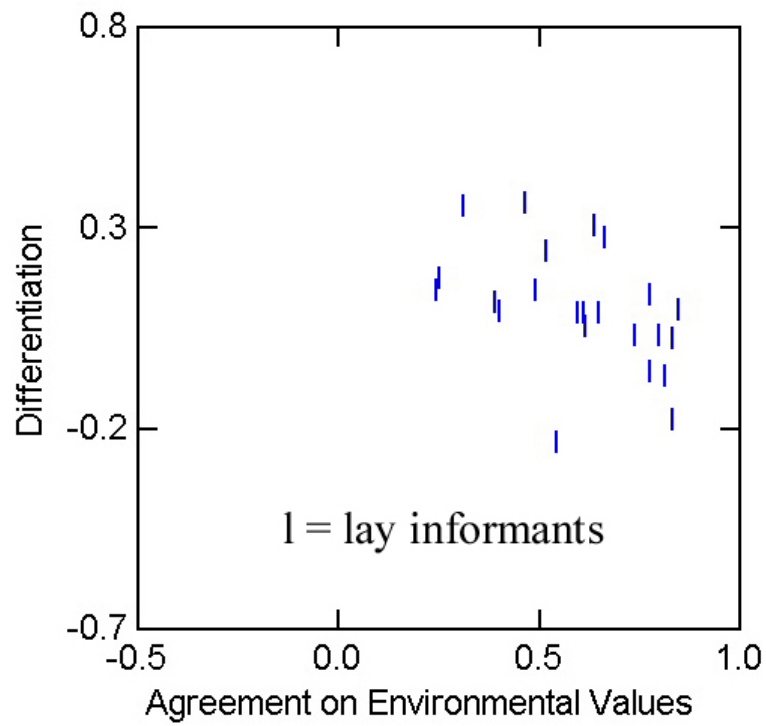


Figure 3. Agreement on Environmental Values (Lay Informants)

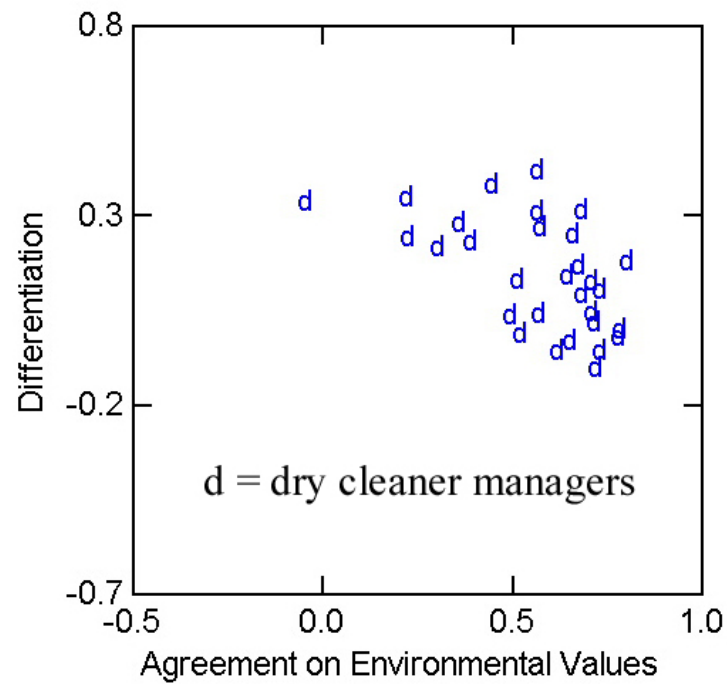


Figure 4. Agreement on Environmental Values (Dry Cleaner Managers)

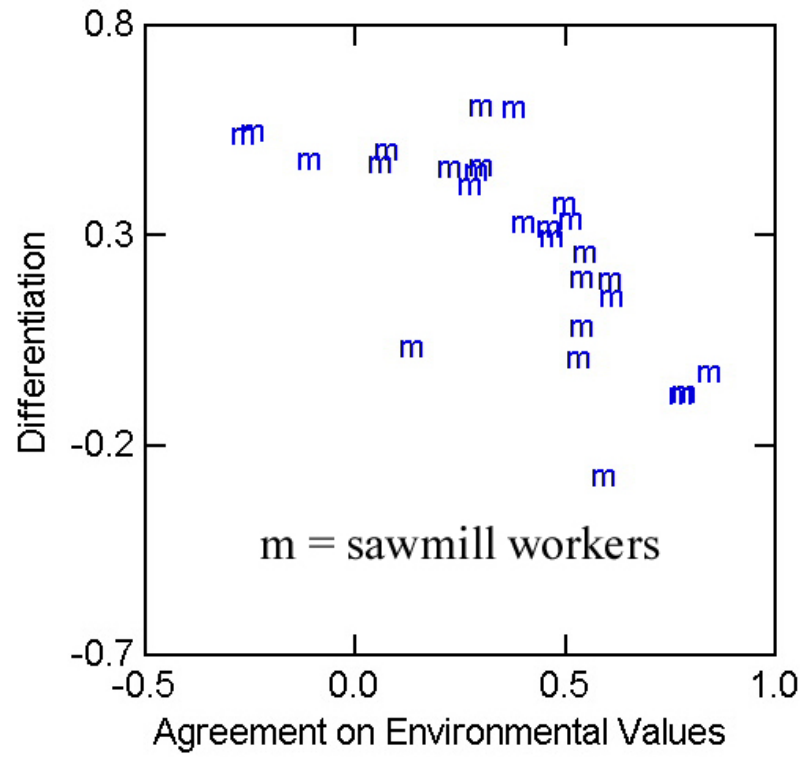


Figure 5. Agreement on Environmental Values (Sawmill Workers)

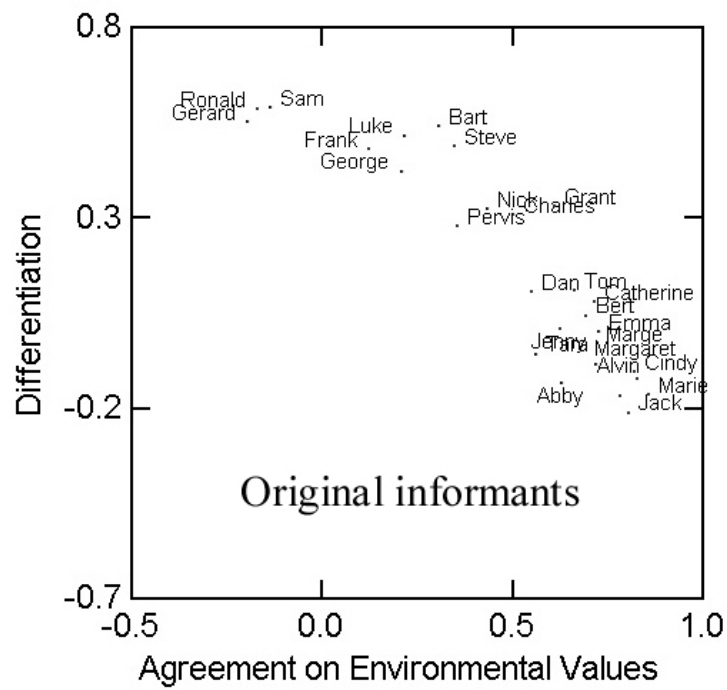


Figure 6. Agreement on Environmental Values (Original Informants)

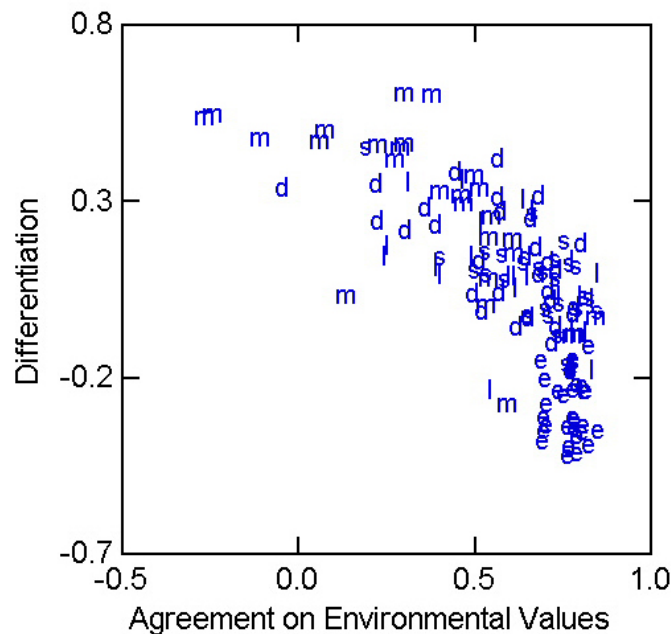


Figure 7. Agreement on Environmental Values (All Respondents)

Methodological Strengths and Weaknesses.

The principal strength of the methods used in this research is that they adhere to the value of deriving descriptions of culture from the native point of view. This value is shared broadly among ethnographers irrespective of their choice of either quantitative or qualitative methods. (This research, of course, combined qualitative and quantitative methods.) The descriptions of the cultural models of the causes of climate change, nature, and environmental values are inferred directly from the statements of the interviewees; the propositions in the survey are directly derived from the same statements. We trust and verify; trust our intuitions as ethnographers to accurately infer cultural models but verify them using more systematic methods.

The principal weakness is linked to this strength; one loses a certain degree of control of the ethnographic outcome. By being bound to the statements of the interviewees, one cannot make use of more powerful systematic methods such as ranking, rating, item by attribute matrices, propositional scaling, similarity judgment, and so on. One is pretty much limited to assessing the degree to which individuals agree or disagree on the propositions.

A second weakness affects almost all systematic ethnographic methods—they are very difficult to use with non-literate or unschooled populations. Schooling and the acquisition of literacy gives students ample practice at articulating the abstract. Most of the people we interviewed had never tried to formulate their environmental values explicitly before; it is as though many of them discovered their own understandings in the process of describing them. But they had had plenty of practice at articulating abstractions through their schooling so that their difficulties were not impossible ones. I have worked with many very intelligent humans in the tropical forests of Peru and Ecuador. For the most part, their keen intelligence was directed to solving concrete problems not to describing abstractions; they shared the empirical bias

described by Scribner (1977). I am skeptical about the degree to which the methods described here can be easily applied in non-literate populations.

I am similarly skeptical about the possibility of creating a cross-cultural survey to allow us to compare models of nature and environmental values across different ethnographic contexts. One would have to identify propositions about nature and values that could be true and relevant everywhere. I believe that this would be possible but that the propositions identified would lack any local ethnographic detail and be so general as to be vacuous. D'Andrade (1995) has a similar critique of the results of Kluckhohn's ambitious cross-cultural values study.

In short, our common project is likely to stimulate a great deal of methodological creativity both as individual researchers craft methods that can be applied to their own ethnographic context and as a team of researchers negotiating methods that will allow meaningful comparisons of cultural models of nature.

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- D'Andrade, R. (1995). *The Development of Cognitive Anthropology*. Cambridge: Cambridge University Press.
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5. Conjoining Cultural Models and Consensus Analysis: Two Examples and Some Nuts-n-Bolts Advice.

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Outline

- Overview
 - cultural model approach & cultural consensus analysis
 - reciprocal strengths and weaknesses → do both
- Cultural Models as Analytical Constructs
 - based on qualitative interviews
 - described in terms of propositions (simple lists or interrelated)
 - ‘composite’ model to accommodate individual differences
 - validating proposed model with additional data
- Credit Unions – A Tale of Two Studies
 - Pilot Study (Gatewood & Lowe 2006)
 - Follow-up Study (Gatewood & Lowe 2008)
- More about Questionnaire Items
 - re-polarizing items after the fact
 - why counter-balancing makes a difference
 - how to shorten a l-o-n-g questionnaire

Overview

Cultural Model Approach

STRENGTHS:

- Fine-grain focus on “what people know”
- Recognizes knowledge is integrated and generative
- Building composite models from diverse informants is something non-social scientists just don’t think of doing
- Produces insightful findings
- Has intuitive appeal to potential end-users of the information
- But ...
 - Credibility of the model? – replicability, validity, completeness, etc.
 - Degree of sharing? – expertise gradient or subcultural diversity, competing viewpoints or cognitive plurality, etc.
 - Generalizability of findings? – because usually based on convenience sampling

Cultural Consensus Analysis

STRENGTHS:

- Focus on “how knowledge is distributed in a population”
- Addresses the fact of intra-cultural diversity
- Explicit methodology (clear what has been done)
- Easily coupled with standard survey research; hence, data lend themselves to standard hypothesis testing, too
- But ...
 - Particulate view of knowledge isn’t plausible
 - How to decide on the questions?
 - Devil is in the details – e.g., must counter-balance questions if using rating data; how many questions needed to establish accurate respondent-profiles; etc.

Conjoining via Two-stage Research Design

- **PHASE 1: personal interviews → formulate Cultural Model**
 - Purposive sampling ... to get range of variation
 - Extract propositional content from interviews, then winnow and sort into coherent organization
- **PHASE 2: questionnaire-survey with items based on propositional content of Cultural Model → then Consensus Analysis**
 - Probability sampling ... necessary for generalizing from sample to a population
 - Univariate analyses of questionnaire items provides “validity check” on components of proposed model
 - Consensus analysis reveals degree to which model is shared and provides information on the distributional pattern

- Conjoining cultural models and consensus analysis this way, cognitive anthropology can contribute to a better understanding of the **social organization of knowledge** (a.k.a., socially distributed cognition).

Cultural Models as Analytical Constructs

Little Theories

- The cognitive perspective postulates that people have knowledge, which they use to do stuff.
- Our descriptions of what people know are also supposed to do something, i.e., explain a range of ethnographic facts in terms of (posited) underlying knowledge structures.
- In this sense, cultural models are little scientific theories.
- QUESTION: How do we know if a given cultural model is a “good” theory?

Discovery vs. Verification

- Discovery procedures ... (who knows where ideas come from?)
- Verification procedures are much clearer ...
A verified theory is our current best understanding ... meaning that:
 - It has withstood repeated efforts to falsify it, and
 - Its alternative theories have been eliminated.
 (“Validity checks” are a first step in the verification process.)

Awareness Gradient

- An individual’s awareness of his/her socially transmitted knowledge forms a gradient:

EXPLICIT, readily articulated knowledge	(What are the days of the week?) (Where can you buy a hammer?)
IMPLICIT, tacit knowledge	(What are your political values?) (How do you ride a bicycle?)
UNCONSCIOUS knowledge	(What are the phenomena in your language?)

- Validity checks for analytical construct X depend on the extent to which informants are aware that they know (have learned) X.
 - If EXPLICIT, then asking people if they know X makes sense (keeping in mind social norms may lead to denials)
 - If UNCONSCIOUS, then it makes no sense to ask people if they know X
 - If IMPLICIT ... well, I’ll get to that shortly

Implicit to Explicit ...

- Much of the knowledge individuals have learned lies beneath conscious awareness (...iceberg metaphor).
- Early efforts to “reveal” such implicit or unconscious knowledge were generally done intuitively by the ethnographer.

Example 1: Summary of Navaho Philosophy (Kluckhohn 1949)

1. The universe is orderly; all events are caused and interrelated.
 - a. Knowledge is power.
 - b. The quest is for harmony.
 - c. Harmony can be restored by orderly procedures.
 - d. One price of disorder, in human terms, is illness.
2. The universe tends to be personalized.
3. The universe is full of dangers.
4. Evil and good are complementary, and both are ever present.
5. Morality is conceived in traditionalistic and situational terms rather than in terms of abstract absolutes.
6. Human relations are premised upon familistic individualism.

Example 2: Basic Postulates of Cheyenne (Hoebel 1978 [revision of 1954])

1. The world (universe) is fundamentally a mechanical system with a limited energy quotient which progressively diminishes as it is expended.
2. The energy quotient of the world is rechargeable through compulsive mimetic acts of sympathetic ritual.
3. Human beings are subordinate to supernatural forces and spirit beings. These forces and beings have superior knowledge concerning the operation of the universe and are benevolently inclined toward mankind.
4. The social order is fragile and threatened by aggressive tendencies in Cheyenne character.
5. The authority of the tribal council is derived from the supernaturals and is supreme over all other elements in the society.
6. The killing of a Cheyenne by a fellow Cheyenne pollutes the tribal fetishes and also the murderer.
7. Sex interests generate jealousy and hostility; they must be held to a minimum.
8. Sex relations are necessary for procreation and regenerative ritual.
9. War is necessary to defend and advance the interests of the tribe.
10. War is necessary to permit individual self-expression and personality development of the male.
11. The virility of men, like the energy of the world, is limited.
12. Men are more important than women.
13. Children (excluding infants) have the same qualities as adults; they lack only in experience.
14. All land, and the tribal fetishes, are public property.
15. All other material goods are private property, but they should be generously shared with others.
16. The individual is personality is important.

Cultural Models

- **LIKE** Kluckhohn and Hoebel, contemporary research using the cultural model concept is concerned with **revealing “underlying” knowledge**.
- **UNLIKE** Kluckhohn and Hoebel, cultural models are grounded in **fine-grained analyses of the ways people talk** ... including metaphors and unsaid premises (Quinn, ed. 2005).
- Nonetheless, the final description of cultural models is often in the form of **lists of propositions**.

Example: American Model of Society (D’Andrade 2005)

1. There are different levels of American society based on wealth and social status.
2. In America people move up (and down) these levels.
3. Success means either moving up (getting ahead) or staying at the top levels.
4. Money and social status motivate people to try to succeed.
5. People can succeed if they have opportunities, work hard, and have talent.
6. In America, people have more opportunity than in other countries.
7. Although people in America have equal rights, they do not have equal opportunities.
8. People have more opportunity to succeed if they come from families with money, or have special connections, or if they have good luck.
9. People who have worked to reach high levels deserve their wealth and superior position.
10. Everyone wants to be treated as an equal because it is painful to be treated as inferior.
11. People feel more comfortable with others who are similar to them with respect to wealth and social status because they feel equal to each other.
12. Differences in drive, talent, and opportunity produce differences in wealth and position.
13. Differences in wealth result in inequality of opportunity because the rich and well placed can give special advantages to their children with respect to education, social skills, and connections.
14. No group should be given special opportunities or privileges.
15. Prejudice is morally wrong.
16. Prejudice prevents people from receiving equal opportunities they should have and withholds proper rewards for achievement.

BUT... Individuals Can and Do Differ

- Individuals’ understandings often differ in terms of:
 - degree of elaboration or completeness
 - degree of emotional investment or motivational force
 - familiarity with competing models for same topic (e.g., Democrat vs. Republican views on debt-reduction)

- Thus, analyst's "cultural model" is usually a COMPOSITE pieced together from several informants
- Furthermore, qualitative interviewing (by itself) cannot address:
 - degree to which the analyst's model is ethnographically valid
 - degree to which the analyst's model is shared
- Only subsequent systematic data collections can determine:
 - (1) ethnographic validity of components in the composite model
 - (2) degree of sharedness (and distributional pattern)

Credit Unions – A Tale of Two Studies

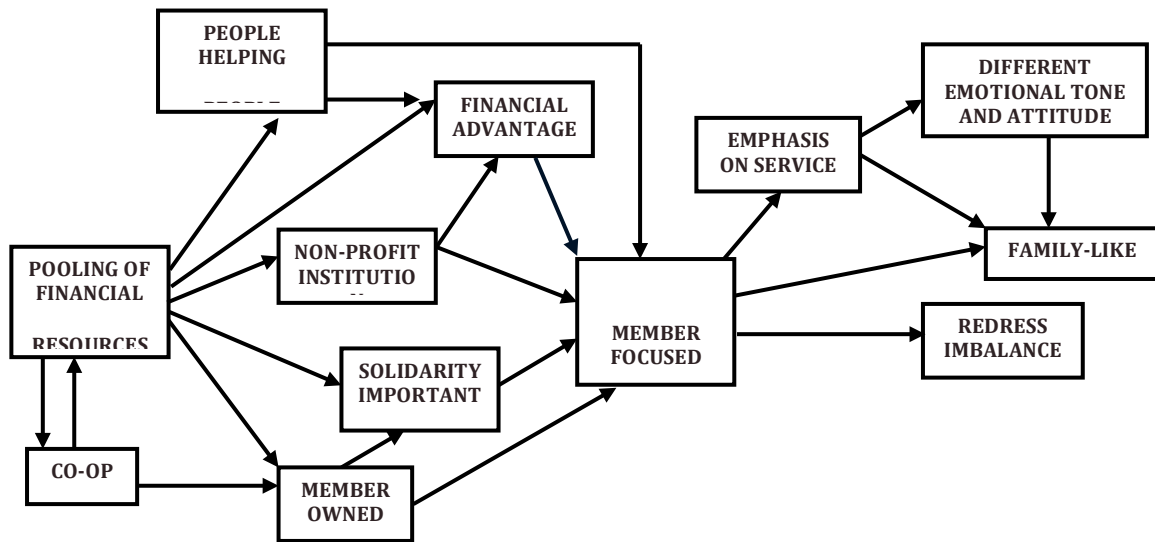
1. PILOT STUDY (Gatewood & Lowe 2006)

Pilot Study: Overview

- Purpose: pilot study to demonstrate that anthropological research can produce results relevant to mission of the Filene Institute
- Focus: meaning of "credit union" among employees of such institutions
- Sample: 30 employees (CEO to teller) in two New Jersey credit unions.
- Method: two phases – interviews, then survey

Cultural Model of Credit Unions

- During the open-ended interviews, the 30 employees made 1,000+ propositions concerning characteristics of credit unions.
- But ... no one could articulate a coherent "explanation" of what a credit union is and how it differs from a bank. Indeed, we were struck by the diversity of views expressed during the interviews.
- Reviewing our notes, we slowly realized that different things people told us could be pieced together into a logically coherent model.
- So, WE put together an analytical composite.
- To reiterate:
 - No one person could tell us the "whole story."
 - Still, the composite we assembled is firmly grounded in what different informants did tell us, and each element was corroborated by at least two informants.
- Schematically, our cultural model of credit unions is as follows ...

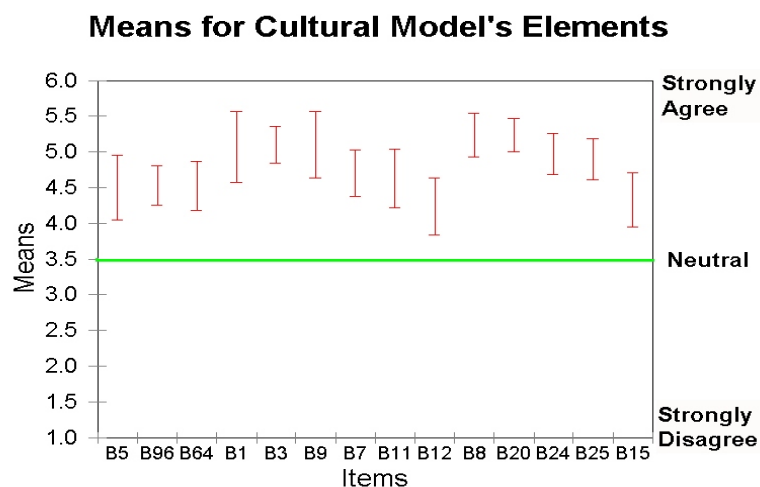


Root characteristics <-----> Surface manifestations

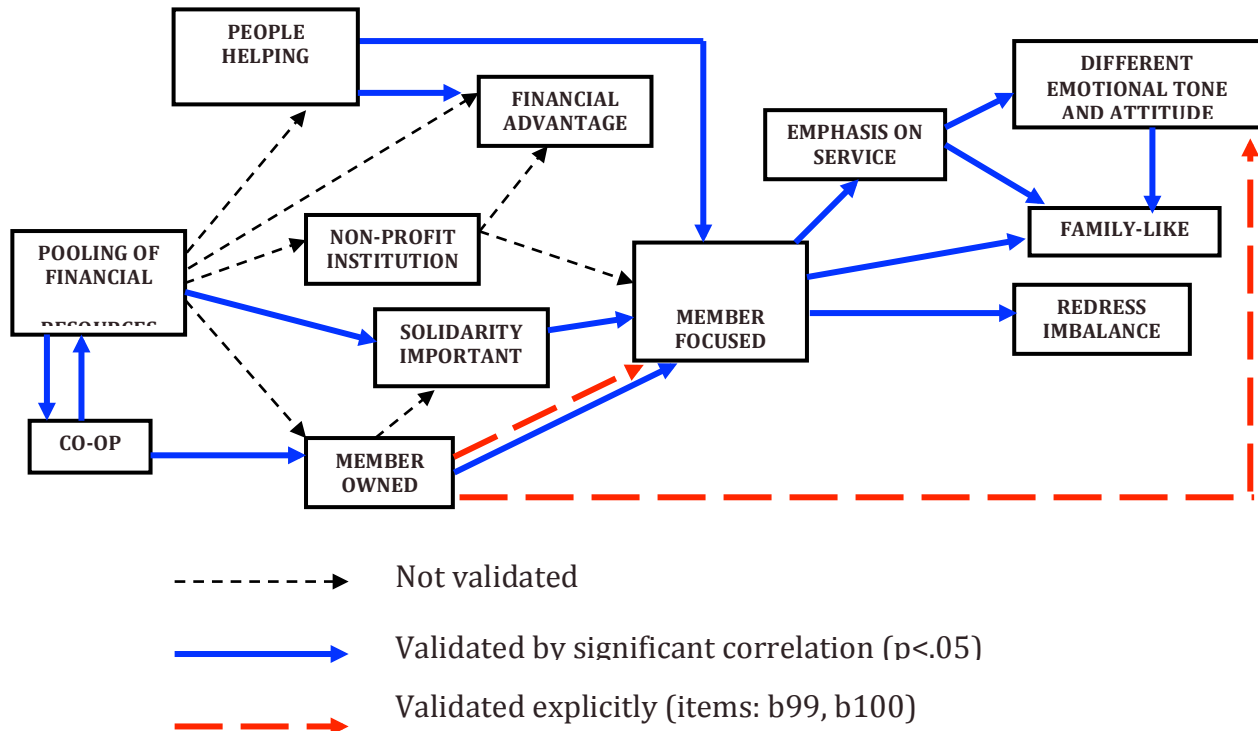
Ex Post Facto Validity Check

- Given that the model consists of propositions and chains of reasoning connecting them, employees can be asked directly whether they agree or disagree with these (now-articulated) statements.
- Validating elements of the model is a matter of examining the mean values of questionnaire items best corresponding to them.
- Validating linkages between elements can be done two ways:
 - Explicitly through awkwardly-worded items
e.g., “Because credit unions are member-owned collectives, they exist only to serve members.”
 - Implicitly through correlations

Elements – All Validated



Linkages – Mostly Validated



Conclusion concerning Validity of Model

- Survey findings validated all the propositional elements in our Pilot Study model and most of the linkages.
- YET ... Validation does not guarantee completeness ... we may have missed other, equally-valid components.
Nor do the univariate validations address the issue of “sharedness,” which is done through Consensus Analysis.

Consensus Analysis ... very puzzling results !

- **IF** the data are analyzed as ratings using the “informal method” of consensus analysis – i.e., Pearson r is the measure of similarity between respondents, and the correlation matrix (unadjusted for guessing) is the input to the minimum residual factor analysis – **then NO consensus:**
ratio of 1st to 2nd eigenvalues is only 1.278
mean 1st factor loading is only .343
20% of the sample have negative 1st factor loadings).
- **IF** the ratings are dichotomized and then analyzed using the “formal method” of consensus analysis – i.e., proportion of exact matches is the measure of similarity between respondents, and the agreement matrix is corrected for guessing before being input to the minimum residual factor analysis – **then STRONG consensus:**
ratio of 1st to 2nd eigenvalues is 10.030

mean 1st factor loading is .804
only 3% (one person) of sample has negative 1st factor loading.

PILOT STUDY (N = 30) 14 “positively-phrased” items					
RATING DATA 1-to-6 scale			DICHOTOMIZED DATA agree / disagree		
Factor	Eigenvalue	Ratio	Factor	Eigenvalue	Ratio
1:	6.017	1.278	1:	21.206	10.030
2:	4.708	1.409	2:	2.114	1.535
3:	3.341		3:	1.377	
Mean 1st factor = .343 with 6 negative, or 20.0% of sample			Mean 1st factor = .804 with 1 negative, or 3.3% of sample		
NO consensus			STRONG consensus		

Summary of Pilot Study

- Whereas “cultural models” refer to (mostly) implicit knowledge shared among members of a human group, the models described by researchers are themselves explicit analytical constructions.
- A proposed model’s constituent propositions (and their logical implications) can and should be checked for ethnographic validity through subsequent systematic data collections.

KEY FINDINGS:

- (1) Pilot Study’s cultural model was validated, but
- (2) results of consensus analysis were puzzling:
 - Data analyzed as 1-to-6 ratings → NO consensus
 - Dichotomized data (agree/disagree) → STRONG consensus

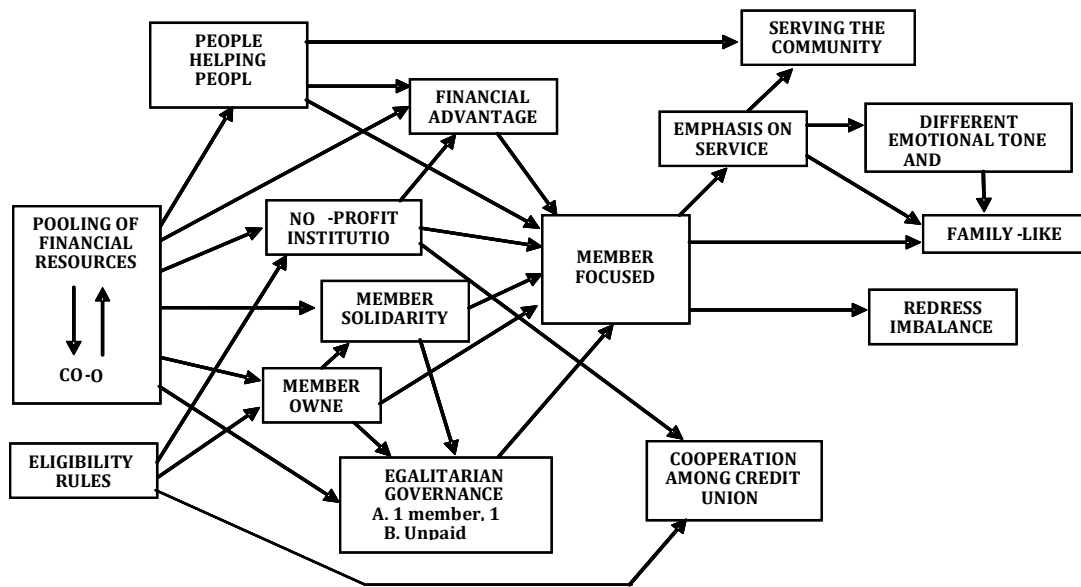
2. FOLLOW-UP STUDY (Gatewood & Lowe 2008)

Follow-up Study: Overview

- Purpose: build upon the Pilot Study, but produce more credible results by refining questionnaire and better sampling
- Focus: meaning of “credit union” among employees
- Sampling:
 - 10 credit unions (2 East Coast, 4 Midwest, 4 West Coast)
 - 93 personal interviews (CEOs to tellers)
 - 343 randomly-selected employees completed “Form A” questionnaire
 - 115 randomly-selected employees completed “Form B” questionnaire

- Method: two phases – interviews, then survey

Revised (expanded) Cultural Model



Root characteristics <—————> Surface manifestations

“New, Improved” Battery of Survey Items

- With the Cultural Model formulated IN ADVANCE, we increased the number of survey items “testing” the Model (50 rather than 14) AND used “paired-opposites” format for these questions, as illustrated in the following table:

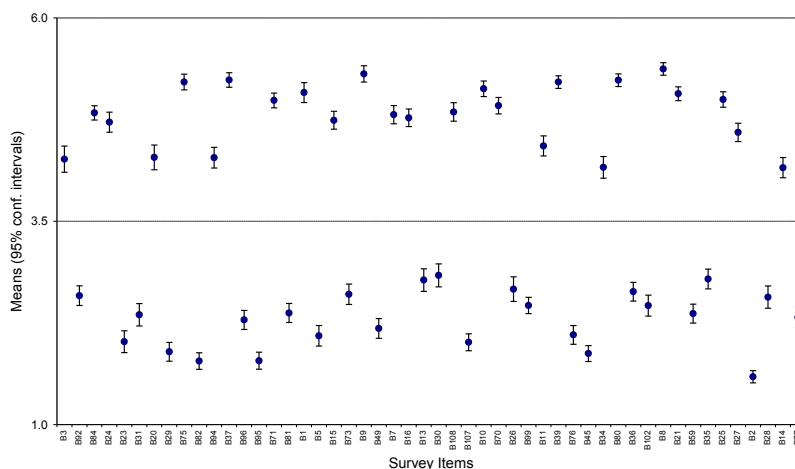
Cultural Model Items		← Disagree	Agree →	Mean
CO-OP				
3.	Basically, a credit union is a co-op.	12 48 28	44 123 60	4.26
92.	It's just wrong to think of a credit union as some sort of financial cooperative.	43 141 84	39 18 5	2.58
POOLING OF FINANCIAL RESOURCES				
84.	Fundamentally, a credit union is a pooling of the members' financial resources for the members' benefit.	0 6 13	66 188 55	4.83
24.	Whereas a bank can issue stock to raise capital, the money available to a credit union comes almost entirely from its members' depository accounts.	8 14 12	62 157 69	4.72
23.	Credit unions, like banks, can issue stock to raise capital.	133 103 34	23 13 5	2.02
31.	There is no pooling of resources in a credit union. The money a credit union loans to people comes from the institution's capital reserves, not from other members' deposits.	72 140 48	19 22 7	2.35

ELIGIBILITY CRITERIA								
20.	Unlike banks, all credit unions have restrictions on who is eligible to become a member.	20	35	26	59	142	55	4.28
29.	Anybody can become a member of any credit union they want. There are no restrictions on membership.	147	135	33	10	14	4	1.90

- And, to see whether having a “neutral” response made a difference, we used TWO FORMS of the questionnaire:
 - **Form A** (N=343) ... 1-to-6 response scale (strongly disagree to strongly agree)
 - 1-to-6 responses can be dichotomized to simply “disagree/agree” → can compare results of Interval vs. Nominal methods of Consensus Analysis
 - **Form B** (N=115) ... 1-to-5 response scale (strongly disagree to strongly agree)

Elements – All Validated

Survey's Measures of Model's Elements



Consensus Analyses: Pilot vs. Follow-up

- Analysis of the Follow-up Study’s improved battery of questions shows an even stronger cultural consensus among employees than did analysis of the dichotomized data from the Pilot Study:
 - ratio of 1st to 2nd eigenvalue is 15.027
 - mean 1st factor loading is .782
 - only 1.2% of sample (4 people) had negative 1st factor loadings

PILOT STUDY (N = 30) 14 “positive” items		FOLLOW-UP STUDY (N = 343) 50 “counter-balanced” items
RATING DATA 1-to-6 scale	DICHOTOMIZED DATA agree / disagree	RATING DATA 1-to-6 scale
Fac. Eigenvalue Ratio	Fac. Eigenvalue Ratio	Fac. EigenvalueRatio
1: 6.017 1.278	1: 21.206 10.030	1: 222.3 15.027
2: 4.708 1.409	2: 2.114 1.535	2: 14.8 2.157
3: 3.341	3: 1.377	3: 6.9
Mean 1st factor = .343 with 6 negative, or 20.0% of sample	Mean 1st factor = .804 with 1 negative, or 3.3% of sample	Mean 1st factor = .782 with 4 negative, or 1.2% of sample
NO consensus	STRONG consensus	STRONG consensus

Consensus Analyses: “Informal” vs “Formal” Method of Consensus Analysis

- Furthermore, when we dichotomize the Follow-up Study’s ratings and analyze those using the “formal method,” the indicators of cultural consensus are very comparable as those obtained when using the “informal method” (see table below).
- Counter-balancing the 1-to-6 rating questions, done via paired-opposite phrasings, resolved the discrepancy observed in the Pilot Study (in which the two methods of assessing respondent-by-respondent similarities produced opposite conclusions).

FOLLOW-UP STUDY – Form A (N=343) 50 “counter-balanced” items					
RATING DATA 1-to-6 scale			DICHOTOMIZED DATA agree / disagree		
Factor	Eigenvalue	Ratio	Factor	Eigenvalue	Ratio
1:	222.3	15.027	1:	215.2	16.797
2:	14.8	2.157	2:	12.8	1.723
3:	6.9		3:	7.4	
Mean 1st factor = .782 with 4 negative, or 1.2% of sample			Mean 1st factor = .761 with 7 negative, or 2.0% of sample		
STRONG consensus			STRONG consensus		

Consensus Analysis: Form A vs Form B

- Finally, whether the response scale was 1-to-5 or 1-to-6 made virtually no difference with respect to the indicators of cultural consensus, i.e., the ratio of eigenvalues, mean 1st factor loadings, and percentage with negative 1st factor loadings are very similar between the sample of 343 respondents given Form A (1-to-6 scale) and the sample of 115 respondents given Form B (1-to-5 scale):

FORM A (N=343) 50 “counter-balanced” items			FORM B (N=115) 50 “counter-balanced” items		
RATING DATA 1-to-6 response scale			RATING DATA 1-to-5 response scale		
Factor	Eigenvalue	Ratio	Factor	Eigenvalue	Ratio
1:	222.3	15.027	1:	74.373	16.242
2:	14.8	2.157	2:	4.579	1.961
3:	6.9		3:	2.335	
Mean 1st factor = .782 with 4 negative, or 1.2% of sample			Mean 1st factor = .785 with 0 negative, or 0.0% of sample		
STRONG consensus			STRONG consensus		

Lessons from the Credit Union Studies

1. formulate Cultural Model, **then** design questionnaire
2. for Consensus Analyses, **more questions** are better than fewer
3. when items involve ratings, must **counter-balance** the set of items (“paired-opposites” format ensures this)
... because IF items are counter-balanced, THEN both methods of Consensus Analysis produce very similar results.
4. **two-stage research design** is necessary to:
 - (a) validate a proposed Cultural Model, and
 - (b) assess degree to which the Model is shared

In short, CONJOINING the cultural model and consensus approaches is the way to go.

More about Questionnaire Items

Credit Union studies showed importance of counter-balancing questionnaire items. This leads to three related nuts-n-bolts points:

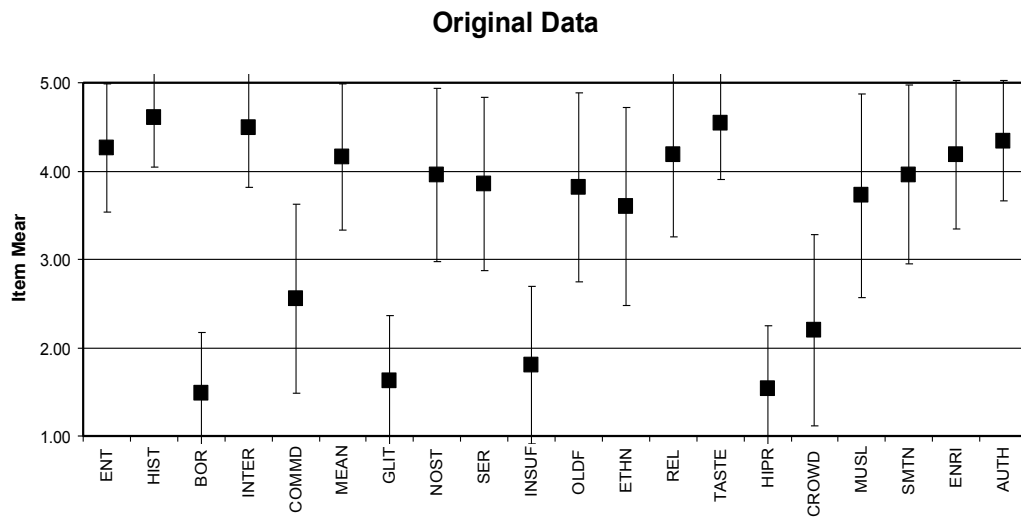
1. “re-polarizing” items (after the fact) as alternative to formulating paired-opposite questions
2. why counter-balancing items makes a difference
3. how to shorten a very l-o-n-g questionnaire

Point #1: The Christmas Program in Bethlehem, PA (1-to-5 ratings for 20 adjectives)
“How well does each of the following words describe Bethlehem’s Christmas Program?”

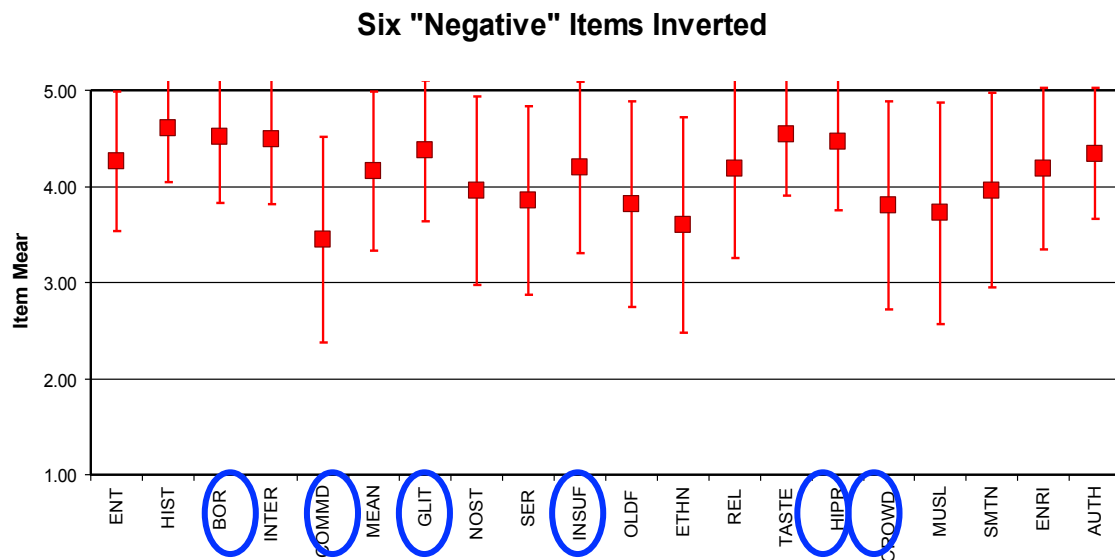
(where RED items with asterisks = “negative” connotations)

Entertaining	Old fashioned
Historic	Ethnic
*Boring	Religious
Interesting	Tasteful
*Commercialized	*High pressured
Meaningful	*Crowded
*Glitzy	Musical
Nostalgic	Small townish
Serene	Enriching
*Insufficient	Authentic

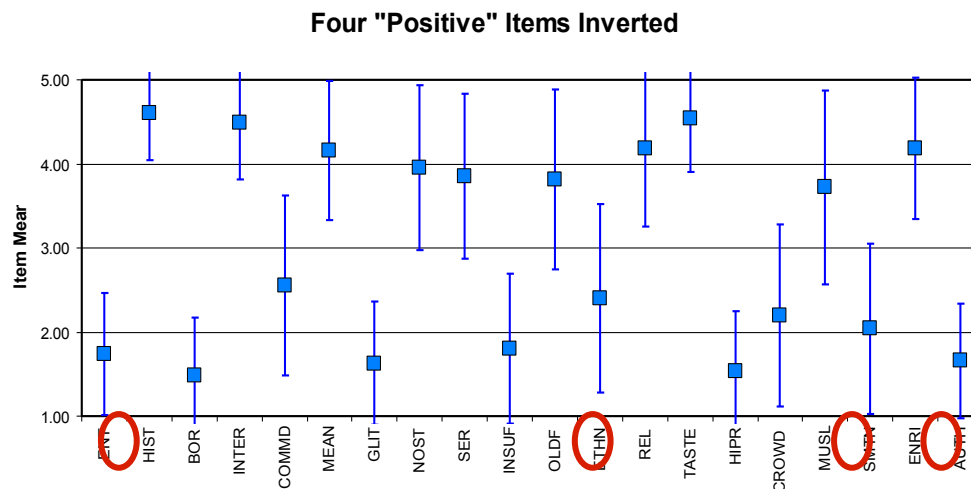
Original 'Christmas Program' data ... (item means and standard deviations)



Same data with "negative" items inverted



Evenly counter-balanced data (4 positive items inverted)



Different consensus findings !

ORIGINAL DATA (N = 112) 14 "positive" items 6 "negative" items	NEGATIVES INVERTED (N = 112) 20 "positive" items 0 "negative" items	COUNTER- BALANCED (N = 112) 10 "positive" items 10 "negative" items
Fac. Eigenvalue Ratio	Fac. Eigenvalue Ratio	Fac. EigenvalueRatio
1: 77.184 16.230	1: 24.284 1.860	1: 79.805 18.508
2: 4.756 1.262	2: 13.055 1.237	2: 4.312 1.063
3: 3.767	3: 10.554	3: 4.058
Mean 1st factor = .813 with 1 negative, or 0.9% of sample	Mean 1st factor = .403 with 7 negative, or 6.3% of sample	Mean 1st factor = .824 with 1 negative, or 0.9% of sample

LESSONS:

Point #1: Counter-balance

If one's data collection strategy is to use Likert-format questions (e.g., 1-to-6, disagree-to-agree response scales) and then analyze these using the "informal method" of cultural consensus analysis, then it is imperative that the items be counter-balanced, with roughly half the items having mean values above the midpoint of the response-scale and half below the midpoint. This can be done when crafting the data collection instrument (by

asking each question twice with opposite phrasings) or ex post facto (by randomly re-polarizing items). But, failure to counter-balance the battery of items will, all by itself, result in underestimating the degree of cultural consensus.

Point #2: WHY counter-balancing makes a difference

The informal method of consensus analysis uses Pearson r as the measure of similarity between respondents' "response profiles" – their pattern of answers across a battery of similarly-formatted questions. Thus, respondents with similar patterns of up's-and-down's will have higher correlations than respondents with dissimilar patterns. But, since the Pearson r statistic assesses the degree of co-variation (see formulas below), there must be some variation in each respondent's response profile – correlation between two constants is simply undefined (would result in division by zero).

IF responses are expressed as z-scores:
$$z = (X - m) / s$$

- m = respondent's mean across items
- s = respondent's st. dev. across items

THEN the Pearson correlation coefficient is:
$$r = \sum (z_i z_j) / N$$

(between respondents i and j)

COUNTER-BALANCING ITEMS ...

1. **increases within-respondent variances** ... more "undulations" in each person's response profile
 - hence, counter-balancing makes higher correlations among respondents mathematically possible (although not necessary)
2. **induces respondents to use more of the response-scale**
→ finer gradations of responses, more "interval-like" data

Point #3: Shortening a L-O-N-G questionnaire, but ensuring it will be counter-balanced

Example drawn from Gatewood & Cameron (2009) ... residents' ("Belongers") understandings of tourism and its impacts in the Turks and Caicos Islands

- After developing our composite Cultural Model, we formulated "paired-opposite" questions for each component idea.
- BUT ... we had way too many questions (162 of them).
- So, using data from the Follow-up Credit Union study, I split those 50 cultural model questions into two sets of 25 items each:
 - The first "positive" question was put in Set A and first "negative" in Set B, then reversed the assignments for the second pair of questions, and so on, such that
 - Set A had 13 "positive" and 12 "negative" items
 - Set B had 12 "positive" and 13 "negative" items
- Consensus analyses of these two subsets of items were virtually identical

- LESSON: don't need positively- and negatively-phrased questions for every single idea
- Thus, our Turks and Caicos study ended up using the following procedure to reduce the number of items in the survey form:
 - Cate and I went through the list of paired-questions (independently of one another) and decided whether we had a prediction about how a "knowledgeable" Belonger would answer each question
 - IF we couldn't make a prediction, then BOTH phrasings about that topic were included in the survey
 - IF either of us had a prediction about responses to a topic, then we included ONLY ONE of the paired phrasings in the survey
 - And, when choosing which phrasing to include for these "singleton" items, we made sure we had an equal number of negatively- and positively-phrased questions
- RESULT: 162 paired-opposite questions were shortened to 119 Cultural Model items

Conclusion

The cultural model and cultural consensus approaches have almost reciprocal strengths and weaknesses. Fortunately, there is a rather straightforward research strategy whereby the two approaches can be conjoined. The strategy involves two phases of data collections: first qualitative, then quantitative. By conjoining cultural models and consensus analysis this way, cognitive anthropology can contribute to a better understanding of the social organization of knowledge (a.k.a., socially distributed cognition).

With respect to the process of developing cultural models, it is important to recognize that individuals' understandings of a cultural domain both can and do differ. People cannot share understandings, metaphors such as "shared culture" or "culture sharing" notwithstanding. (When we say "culture is shared," what we really mean is that individuals are similar to some degree.) For some domains – e.g., the days of the week – the degree of similarity among normally functioning school age children through senior citizens is very, very high. But for many other domains, the degree of sharing is highly variable. And, especially when studying more complicated cultural domains – e.g., credit unions, effects of tourism, etc. – the analyst's "cultural model" is usually a composite pieced together from several informants. In these circumstances, individual differences with respect to cultural models can take several forms, such as degree of elaboration or completeness, degree of emotional investment or motivational force, and familiarity with competing models for same topic. Lastly, qualitative interviewing (by itself) cannot address the degree to which the analyst's model is ethnographically valid or the degree to which the analyst's model is shared. Only subsequent systematic data collections can determine both the ethnographic validity of components in the composite model and the degree to which the model is shared (its distributional pattern).

With respect to cultural consensus analysis, there are a couple of methodological points to bear in mind. Firstly, once a cultural model has been distilled to a list of constituent propositions, it is very easy to construct a battery of standardized questions to test the ethnographic validity of

those propositions. Typically, Likert-format rating questions are used, i.e., respondents are asked to rate how much they agree or disagree with each statement using a response-scale with a fixed number of increments (e.g., 1=“strongly disagree” to 6=“strongly agree”). And, importantly, the degree of “culture sharing” with respect to these questions can be determined through consensus analysis. Secondly, whenever using the “informal method” of consensus analysis on rating data (e.g., in Anthropac’s consensus routine, “Type of Analysis: Interval”), one must make sure that the battery of items is counter-balanced, with roughly half the items having mean values above the midpoint of the response scale and half below that midpoint. This can be done in advance of data collection by asking pairs of oppositely-phrased questions for every idea or, ex post facto, by re-polarizing a subset of questionnaire items. But, the informal method of consensus analysis, if don on non-counter-balanced rating data, will give false and misleading results, i.e., it will underestimate the true degree of “culture sharing.”

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6. Cultural Models of Nature: Native-American versus European-American.

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This report will be brief because several of the ideas presented at the NIU workshop overlap with the methodological papers of Ross and Medin (2011) and Medin et al (2010). Our general research strategy has been to draw on a wide range of converging measures to identify the most robust features of cognitive models for understanding nature (see also Bang, Medin and Atran, 2007). Many of our contrasts involve Native-American and European-American hunters and fishermen. In part because they appear to have distinctly different cultural models.

Here is a sampling of the procedures we have used and the dependent measures we have analyzed: 1. Open-ended descriptions of hunting and fishing experiences; 2. Gesture during story telling; 3. Open-ended spontaneous sorting of biological kinds; 4. Direct probes of different kinds of ecological relations; 5. Discourse about goals for children's learning; 6. Reasoning about disruptions to ecosystems; 7. Ratings of species importance to ecosystems and corresponding justification for judgments; 8. Spontaneous (biological) name generation; 9. Surveys of outdoor practices; and 10. Illustrations and text in children's books. For each of these measures we find large and reliable cultural differences.

The cultural differences we observe are partially captured by the notion of psychological distance (Trope and Liberman, 2003). For the Native-American samples we have studied (the Menominee tribe of Wisconsin and an inter-tribal urban sample from the American Indian center of Chicago), nature appears to be psychologically closer than for rural European-Americans (Bang, et al, 2007). According to the Trope and Liberman (2003) construal level theory, there should be distinct cognitive consequences associated with distance. Specifically, closeness should be associated with greater sensitivity to context and increased perspective taking abilities. And indeed we find that our Native-American samples show reliably greater sensitivity to context (e.g. Winkler-Rhoads et al, 2010) and relationships (ecological relations in particular; see Medin et al 2006) as well as increased perspective taking (this is even reflected in perspective taking devices incorporated into illustrations done by Native-Americans). These differences in turn appear to be linked to inter-group conflict over natural resources (Medin, et al, 2007; Ross, et al, 2007).

But psychological distance, by itself, is not sufficient to fully capture cultural differences in cognitive models of nature. For example, anthropomorphism may be seen as involving closeness (to animals) but anthropocentrism is a distinct cultural model (Hermann et al, 2010) that is not observed among our Native-American samples. Instead we observe a focus on relationships and systems level thinking where everything is seen as having a role to play (e.g. Ross et al, 2007) and therefore having worth and being worthy of attention (Medin et al, 2007). We are currently conducting follow up studies of system level thinking because we think it is central to understanding environmental challenges such as global climate change and associated environmental decision making.

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APPENDIX 1:

Field Manual

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The discussion about methodology that characterized the second day of the workshop, especially the afternoon open discussion, generated a list of possible activities to be conducted in the field. The activities were divided into two groups: core and optional. The core group includes activities that were regarded as essential to the acquisition of adequate data to reach the goal of the research project. The optional group includes activities that were regarded as desirable but not essential to reach that same goal. A further sorting of the activities was also proposed and implemented: first field visit and second field visit activities, data acquisition and data analysis activities. Thus, I am first introducing what were regarded as core activities for the first field visit and the second field visit, both followed by suggested data analysis activities. Then, I introduce optional data acquisition and optional data analysis activities.

1. Core Activities for First Field Visit.

Most of the activities included in this appendix have been extensively described in Bernard, R. (2008) *Research Methods in Anthropology: Qualitative and Quantitative Approaches*. New York: Altamira Press, in Quinn, N. (2005) *Finding Culture in Talk: A Collections of Methods*. New York: Palgrave Macmillan., and in Ross, N. (2004) *Culture and Cognition: Implications for Theory and Method*. London: Sage Publications.

Participant Observation (in local language).

All the researchers in this project have extensive field experience in the cultures under investigation. For some researchers though the community chosen may not be the one they have already investigated. It is deemed necessary then that some brief but intensive time is spent with the population chosen so that specific local features may be highlighted as well as commonalities with other similar communities already investigated.

Because of the already established familiarity with the overall culture, this period of exclusive participant observation will not be long. In addition, the whole period spent in the field (4-8 weeks) can be looked at in this terms. That is, the whole period will see the researcher actively participating in the daily and not so life of the community. Thus, a first in-depth understanding of the local knowledge and dynamics could be obtained.

Unstructured Interviews (in local language).

While residing within the community of choice, researchers will conduct casual but intentionally focused conversation and interviews. Ideas, beliefs, and knowledge about nature and the environment will thus be collected. Though preliminary and anecdotal, such a knowledge will be of extreme importance in informing the conduction of the semi-structure (S-S) interviews. This knowledge will be similarly relevant in the forthcoming interpretative stage of the texts collected during the S-S interviews.

Nature Walks (in local language).

This methodology was used by Stross (1973) and Boster (1985) while investigating the folk-biological knowledge of the population under study. It consists of what is clearly stated in the name: the researcher engages in ‘walks’ in nature, i.e., cultivated fields, forests, desert, reefs, ocean, with one or more informants. During these carefully planned experiences, the researcher engages in conversation about plants, animals, weather patterns, and anything else deemed relevant by the informants about the cultivars, animals, and/or physical features encountered.

Semi-Structured (S-S) Interviews (in local language).

The S-S interviews are the activity in this first period of field work that are regarded as the most data loaded toward obtaining insights into the CMN held by the community under investigation. All these interviews will be conducted using the same protocol in all the various field sites. Questions will be asked about daily subsistence (or other) activities and about climate change. These two topics were chosen because it was thought that in order to answer these questions the CMN held by the interviewees would be necessarily activated/used. This ‘indirect’ strategy to collect data about CM was first suggested by D’Andrade (2005).

All the interviews will be taped and if possible videotaped. The sample of interviewees will be arrived at by including parameters such as gender, age, economic and social status, and/or any other feature of the local population considered salient to obtain an adequate representation of that same community. Typically, it is recommended to conduct a minimum of 20 interviews and possibly go up to 30 or more. The length of the interview can vary and each researcher will have to make it as long as ecologically appropriate. I would suggest a minimum length of an hour or more and foresee that at times it might be necessary to conduct a second (or more) interview with some informants.

All interviews will have to be transcribed so that analyses on their texts can be later conducted. I recommend transcriptions to be done in the field. Personally, I have found these transcriptions sessions an extremely rich and enriching experience both about the content of the interviews and about their socio-cultural contexts.

Below, I introduce a list of suggested questions to be used during these S-S interviews. The list was agreed on during the workshop. All questions need to be translated in the local language and possibly pre-tested for linguistic and cultural appropriateness.

About Daily Activities

Describe your work/job (which relates to primary food production).

What is your typical work/work-day?

What is the rhythm of work in this area... Or actual activities?

What are some of the essential knowledge, skills, experience you need to be a successful food producer?

What are considered ‘productive activities’?

Which fields/sea areas/etc. are productive?

What effects productivity? What forces have an influence on production success?

What is meant by growth, why do plants grow?

What are the key decisions __x__ must make to be successful?

What information do you need to make decisions?

How do you choose what crops to grow, what to hunt, what to go after?

What are some of the constraints/problems you face as a food producer?

Who effects your environment (fields, forest, sea, etc) the most?

Agency (human, animal, plants, ancestors, spirits)—what/who makes things happen?

Government/NGO agency?

What is worst/best thing humans can do in fishing/farming/etc.?

What do you like/not like about what you're doing (satisfaction)?
Are there things you have to do that are destructive but you'd prefer not to do?
Effect of weather, government, wars, people, terrorists?
What are the livelihood alternatives?

About Climate Change

What changes have occurred in your work/environment?
Why are there these changes/variations?
Weather change, how?
What can humans do about it?
Can humans/human activity effect nature/weather/wind/currents
Species X changes in presence of Y?

Space Task.

Data will be collected about a possible preference in representing mentally spatial relationships. The task used is called 'animals in a row' and was developed by the Cognitive Anthropology Group at the Max-Planck Institute, Nijmegen, The Netherlands, and used by many scholars including Levinson (2003), Bennardo (2009), and Dasen and Mishra (2010). Informants who are administered the 'animals in a row' task are required to stand in front of a table (in some cases, a box, a trunk, or an elevated surface). On the table they are shown a set of three small plastic farm animals, a cow, a pig, and a horse—if these animals are ecologically inappropriate, animals salient to the local environment can be used. The objects are shown standing in a row, all facing the same direction, either to the right or the left on the transverse axis in front of the informants. The informants are then asked to memorize the position of the animals. When the informant declare themselves ready to go to the next step (typically, after a few seconds) the animals are taken away and a minimum of 60-90 seconds (in order to engage long-term memory) need to elapse in which some conversation takes place between the informant and the researcher and/or assistant.

Thereafter, the informant is directed to another table situated at some distance and right opposite the first one. Here s/he is asked to stand in front of this second table in a position that requires a 180° degrees rotation from the previous one. The researcher then hands the three animals to the informant and the informant is asked to place them on the new table in the sequence and direction s/he had seen earlier. This constitutes the end of one trial and careful note needs to be taken of the direction the informant choose to align the three animals. The trial is repeated five times for each informant and each time the sequence and overall direction of the three animals shown changes randomly. A training trial precedes the beginning of the five-part task to make sure that its content is clearly understood (a slight variation of this task was introduced in Levinson, 2003, and used by Dasen and Mishra, 2010).

The way in which the informants put down the animals provides a very clear cue towards an understanding of which FoR has been used to remember the spatial arrangement observed a few seconds before. In fact, there are only two ways (other solution are considered mistakes) in which the informants could arrange the overall direction of the three animals (their actual sequence is also registered by the researcher and/or assistant, but has little relevance in the task). If participants use a relative FoR, the overall direction of the animals would stay the same as in the way they were seen, that is, either to the informant's own left or right. If participants used an absolute FoR, the direction of the animals would stay the same relative to some landmark or cardinal point, but not to the informant's left or right.

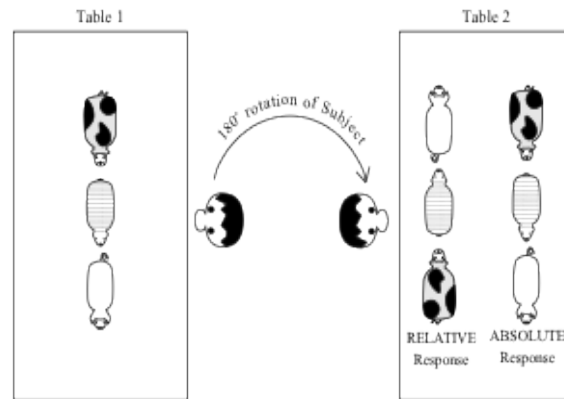


Figure 1: Possible Responses for Animals in a Row Task (from Levinson, 2003: 156)

The content of Figure 1 shows how the choice of one of the frames of reference, relative or absolute, for coding in memory eventually determines the responses given by the informant.

Beyond the understanding of the instructions in the native language, there is no other role that is overtly assigned to language in the performing of this task. The stimulus involves only visual perception and the response only motor activity. Between the exposure to the stimulus situation and the response some coding of spatial relationships by means of a FoR in non-perceptual memory is involved. The nature of this coding is exactly the target of this task.

Free Listing (in local language).

It was agreed that there are six domains that can be part of one's CMN: supernatural, humans, animals, plants, physical environment, and weather. Knowing the lexical extension of these domains can provide insights into the cognitive organization of these domains as well as of the overall CMN. Consequently, six 'free listing' activities are suggested to be conducted about these six domains with a 'sample' of the population under investigation. The sample could consist of the same individuals who were administered the S-S interviews or of different individuals selected with the same criteria.

A 'free listing' activity consists of asking an individual to provide out of memory as many terms as possible about a specific domain. The labels for the domains may not be present in the local language, thus other strategies that can obtain the same list need to be used, e.g., using question of this type after showing (or pointing to) X: "do you know of anything/anyone that is like X?"

The activity needs to be taped or video taped and then transcribed to obtain for each domain a list of the terms in order of appearance, i.e., first remembered, second remembered, etc. One important assumption for the free listing activity is that first remembered terms are more salient. Consequently, caution needs to be exercised during the activity not to allow other individuals interfere with one's memory process (co-presence of other individuals is common in the field sites of the researchers in this project).

1a. Analyses to Be Conducted on First Set of Collected Data.

The data collected requires the implementation of a number of analytic procedures in order to allow the discovery of the CMN an individual holds and one's community may share. The procedures can be divided in two groups: discourse analyses and frequency analyses.

Discourse Analysis:

A number of analyses can be conducted on the texts obtained after transcribing the S-S interviews.

Key Words Analysis. The texts can be scanned and a number of key words topically linked to nature can be found. This type of analysis needs to be as large as possible. That is, if the researcher is not clear about what type of words refer to nature, as many words as possible needs to be listed. This will allow the mere high frequency of some words to become key one. For an example of this type of analysis, one can consult Appendix 2 of this work.

Gist Analysis. One analysis suggested and used by D'Andrade (2005) in order to arrive at cultural models held by the interviewees is that of reducing the texts of the interviews to gist sentences. This procedure yields good indications about the cultural model/s that the population in focus holds about a specific domain of knowledge. The success of this procedure in other research projects convinced us to propose this type of analysis. Consequently, the texts of the interviews need to be analyzed and reduced to a number of gist sentences. This gist sentences needs to be generated by staying as close as possible to the wording and phrasing used by the interviewees. Then, after a careful reading of these results, the various gist sentences can be thematically grouped. A narrative can be constructed by using the gist sentences that can come very close to the CMN held by the community.

Metaphor Analysis. Extensively used by Quinn (see Strauss and Quinn, 1997; and Quinn, 2005), a metaphor analysis can provide clear insights into one's and one's community cultural models. A good typology of metaphors can be found in Lakoff and Johnson (1980). The metaphors more likely to be found are ontological, personification, and orientational. The source domain/s of the metaphors used is another insightful type of information that this analysis makes available (see as an example Bennardo, 2009:263ff).

Reasoning Analysis. Fragments as well as full-fleshed reasoning examples also provide additional clarification toward the CMN targeted. It is suggested though, to conduct such an analysis after a provisional model of the CMN has already been sketched out from the previous analyses. Thus, the reasoning fragments will stand out against the background of the discovered, locally given for granted CMN.

Causal Relationship Analysis. It is expected that a good part of the reasoning conducted with and within the CMN could be of a casual nature. Then, it is relevant to be able to capture examples of causality thinking in the texts under analysis. For an example of language related to causality, I recommend reading a chapter entitled "Locating Causal Structure in Language" in Sloman (2005). This chapter is about English, but it can provide some guidelines when looking at the local language.

Frequency Analysis.

The quantitative data obtained by the administration of the space task, the free listing tasks, and the conducting of the key words and metaphor analyses can all be analyzed statistically. For the space task it can be determined for each subject if his/her responses are more frequently of the absolute FoR type or relative FoR type—the task was administered five times to each subject. Similarly, this computation can be applied to the whole sample, thus, determining the ‘absolute’ or ‘relative’ preference for representing spatial relationship mentally in the whole community (see Appendix 2 for an example and Levinson, 2003:177).

Regarding the free listing lists obtained, each item in a list needs to be ranked and a value for each item remembered can be calculated using the following formula:

$$\# \text{ of items remembered} - \text{memory rank} + 1 / \# \text{ of items remembered}$$

This formula produces standardized values from .01 to 1.00 for all items ranked. Aggregate numbers (sum of all values) for each item can be calculated and a final rank is determined using the following formula:

$$\text{aggregate} / \text{total} \# \text{ of items in study}$$

Then, a lower rank means ‘less remembered’ (less salient) and a higher rank means ‘better remembered’ (more salient).

The key words frequency of occurrence can be easily determined by counting the times each key word appears in each text. Similar counting can be conducted on the metaphors and their source domains found after the metaphor analysis. Grouping of items, either key words, metaphors, or source domains, can appear after this simple quantification. More sophisticated procedures, such as a cluster analysis, can also be used to reach the same goal, i.e., groups/clusters. The groups obtained should provide insights into the content and structure of the local CMN.

2. Core Activities for Second Field Visit.

The results of the analyses conducted on the data collected during the first field visit provide the guidelines for the construction of the methodological tools to be used for the collection of the data during the second field visit.

Sorting Task (in local language).

The free listing activities supplied a lexical and possibly conceptual border for the various domains that are part of the CMN. In order to further understand the internal organization of these domains a sorting task can be administered. The aggregated list of items obtained for the domains are shown to a subject (the researcher may curtail the list, if deemed appropriate from the results). The items can be photos, drawings, or simply names, each on a piece/strip of paper. Then, the subject is asked to group the items as s/he thinks it fits. After the first sorting, requests for further possible sorting follow. When the subject refuses to go any further in sorting, then, the researcher asks for explanations about the reasons for the kind of sorting that has resulted from the activity so far. The whole activity can be video taped and the sorted groups recorded manually on paper or on the video, i.e., by showing their contents to the camera.

Intra and Inter-Species Relations/Interactions (in local language).

Another way to arrive at insights into the way intra and inter-domain relations are organized within the CMN is to administer the following tasks (see Atran and Medin, 2008). Choose the top 12 major species of animals listed in the free listing activity and ask subjects to answer the following questions about each of them: Does species X harm or help species Y? Similarly, choose the top 12 species of plants listed and ask: does plant X harm or help animal Y? And vice versa?

In a second type of activity, one asks: Do humans harm or help plant X? And vice versa? Do humans harm or help animal Y? And vice versa? A third activity can follow in which one asks about the top 12 features of the environment obtained: Do humans harm or help physical feature X of the environment? And vice versa? Then, one can ask about the weather and supernatural items: How does weather feature X relate to supernatural Y? And also: How do humans affect/are affected by weather feature X and/or supernatural Y?

The content and format of the questions will depend on the results of the free listing activities. In addition, each researcher will knowledgeably choose the kind of questions about the specific relations, e.g., intra and/or inter-species, weather, supernatural, that are deemed salient and possibly revealing about the nature of the CMN held within the local population.

Problem-Solving (in local language).

Researchers formulate scenarios within which problems need to be solved involving destructive actions toward humans, animals, plants, or physical features of the environment. Then, they ask for possible solutions to the problem and for an explanation of the favored solution. One needs to tape or videotape the activity, then, transcribe texts. The activity must be administered to a sample of the population.

Questionnaire (in local language).

The content of the CMN arrived at so far can be transformed into a number of statements to insert in a questionnaire. The number of items to include depends on how detailed the CMN obtained is. Subjects are asked to agree/disagree about these statements on a 1-5 scale. The results of this activity provide insight into the distribution—consensus—of the CMN within the population. The sample chosen needs to be constructed with the same criteria of the other samples already described.

Social Networks.

Knowledge about the composition of local social networks can highly enhance the construction of samples as well as greatly help the interpretation of consensus analysis results. In order to obtain minimal data about social network, one can formulate a question about who can help you or who would you help in case of a local natural disaster and administer it to the whole community (see Bennardo, 2009:309ff) or to a sample of it.

2a. Analyses to Be Conducted on Second Set of Collected Data.

The second set of data collected requires a number of statistical analyses to deliver its potential weight toward a possible definition, content, and distribution of the CMN. Often, these procedures will have to be conducted at the same time or in a close sequence.

For example, the results of the sorting activity can be analyzed by looking at how many times a specific type of group is used (**frequency analysis**), or by looking at how one individual's groupings correlate to those of other individuals (**correlation analysis**). In addition, MultiDimensional Scaling (**MDS analysis**) analyses can provide insights into which dimensions may form meaningful clusters (**cluster analysis** can also be conducted). All three analyses contribute in clarifying further the content of the CMN in the local population.

What has just been said about the results of the sorting activities can also be said of the results of the intra and inter-species relationships activities. The same analyses can be conducted on these data. The problem-solving activity should instead provide more qualitative data, even though if appropriately rendered the results of this activity can also be quantified. The results of the questionnaire can be used to run a **consensus analysis**. Consult Borgatti and Halgin (2011) for details about the rationale of this procedure and Gatewood's contribution to this work in the Section entitled 'Second Day: Toward a Common Methodology.'

Regarding the data collected about social networks, I recommend the use of *Ucinet 6*, a **social network analysis** application (Borgatti, Everett, and Freeman, 2002). A fundamental procedure is that of establishing centrality of individuals in the network by combining the measures of outdegree (and indegree), outcloseness, and betweenness for each member. *Outdegree* represents the number of people each ego mentioned as someone they would be able to relate directly (*indegree* represents the opposite measure, that is, the number of people that nominate ego as someone they could relate directly). *Outcloseness* takes into account the ability of ego to extend relations throughout the network and measures how close or proximate that extended sphere of relationships is (Wasserman and Faust, 1994:183-118). A higher number indicates that more people can be reached in fewer steps. This is a measure of the extent of the relationship across the entire network, through intermediary links as well as direct links. *Betweenness* is a measure of the network's dependence on the ability of an individual to link other people in the network (Wasserman & Faust, 1994:188-192). Betweenness measures of centrality thus describe the degree to which the network is characterized by how much the connections between people are dependent upon a link to a third party. This can be thought of as a form of brokerage relationship.

3. Optional activities.

A number of other activities were suggested as potentially useful in the field to collect data about the local CMN. One of these activities we named the '**self-task**' (to be conducted in the local language). This activity was suggested and used by Shimizu in his research (see Section entitled 'Second Day: Toward a Common Methodology'). He used a modified version of Josephs Tobin's multi-vocal visual ethnography method (Tobin, 1989a, 1989b). In his study, subjects were asked to "describe themselves," and what they considered to be "the right way to live" in videotaped interviews. The texts of the interviews were later analyzed and it was determined if a focus/preference on/for ego or other-than-ego was present. This activity would dovetail greatly with the 'animals in a row task' and if the results of both are congruent, e.g., use of relative FoR and focus on ego, they would substantiate each other's validity.

Another set of suggested activities comprises: **story-telling**, **photo elicitation**, **drawing task**, and **time allocation**. By asking subjects to *tell stories*, either personal or community wide, a significant quantity of information can be collected about specific ways of conceiving of and relating to nature, including all six domains already mentioned. The use of *photos* as stimuli can

contribute to generate a variety of activities such as showing specific environmental degradation and eliciting reactions; showing human activity as detrimental to animals, plants, and physical features of the environment and eliciting reactions; and/or showing extreme weather related consequences on humans, animals, plants, and physical features and again eliciting reactions.

Asking subjects to *draw* their environment or parts of it can be conducive to great insights about the way in which that environment is conceptualized (see Bennardo, 2009:117ff). The appearance of specific features, animals, and plants is telling of their cultural saliency. Similarly relative size of items that appear in the drawing is revealing of their cognitive status. And so is their spatial organization, e.g., closer, far away, concentric, and so on. Of parallel value is the collection of data about the way in which activities are allocated *time*, either during a day, week, or year.

Conclusion.

In conclusion, this field manual provides a referent point for all the researchers engaged in data collection for the wider project with the goal of discovering and describing cultural models of nature in primary food producers across the world. The manual makes available a common protocol while at the same allowing enough flexibility and options for each researcher to be able to adjust his/her methodology to the specificity of the community under investigation. It is the sufficiently enough common protocol that would allow later the use of all the findings for a significant test of the major hypothesis: the cultural preference in the spatial domain within a community being replicated in the content and structure of the cultural model of nature held by that same community.

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APPENDIX 2:

An American Cultural Model of Nature: A Pilot Study in Northern Illinois.

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Introduction,²⁵

In order to test some of the theories, hypotheses, and methodologies related to the research project about cultural models of nature discussed during the Workshop, a pilot study in Northern Illinois was conducted.

The first stage of the study was to determine a specific preference for one of the Frames of Reference (FoR) when representing mentally spatial relationships. Consequently, the Animals in a Row Task (see Carg, 1992) was administered to 18 subjects all residing in NorthEastern Illinois, including DeKalb County and the metropolitan area of Chicago. The subjects were 9 women and 9 men, ranging in age from 21 to 56 (av. 36.5). The second stage was to conduct a number of semi-structured interviews with the same subjects. The topic of the interviews was climate change and a keen attention was devoted to causal explanation and ideas about constitutive characteristics of nature. All the interviews were later transcribed.

The third stage was that of analyzing the texts obtained from the transcriptions of the interviews. A key word analysis was conducted followed by a further analysis in which the most frequent key word found, i.e., human/s, was checked as appearing in the agent or patient position in the utterance. Finally, a gist and a metaphor analysis were conducted. The results of all the analyses confirm major characteristics of the American cultural model of nature as outlined in Kempton, Boster and Hartley (1995: Chapter 3). However, important nuanced differences emerged that made the whole process worthwhile. In addition, the protocol implemented found supporting evidence towards its validity.

Preference about Space: ‘Animals in a Row’ Task.

Informants who are administered the ‘Animals in a Row’ task are required to stand in front of a table (in some cases, a box, a trunk, or an elevated surface). On the table they are shown a set of three small plastic farm animals, a cow, a pig, and a horse. The objects are shown standing in a row, all facing the same direction, either to the right or the left on the transverse axis in front of the informants. The informants are then asked to memorize the position of the animals. When the informant declare themselves ready to go to the next step (typically, after a few seconds) the animals are taken away and a minimum of 60 seconds need to elapse in which some conversation takes place between the informant and the researcher and/or assistant.

Thereafter, the informant is directed to another table situated at some distance and right opposite the first one. Here s/he is asked to stand in front of this second table in a position that requires a 180 degrees rotation from the previous one. The researcher hands the three animals to the informant and the informant is asked to place them on the new table in the sequence and direction s/he had seen them earlier. This constitutes the end of one trial and careful note needs

²⁵ Without the help of three Undergraduate Research Apprentice Program (URAP) students, Maria Rangel, Curtis Valasek, and JoAnn LoSavio (co-authors) this project could not have been conducted.

to be taken of the direction the informant chooses to align the three animals. The trial is repeated five times for each informant and each time the sequence and overall direction of the three animals shown changes randomly. A training trial precedes the beginning of the five-part task to make sure that its content is clearly understood.

The way in which the informants put down the animals provides a very clear cue towards an understanding of which FoR has been used to remember the spatial arrangement observed a few seconds before. In fact, there are only two ways (other solutions are considered mistakes) in which the informants could arrange the overall direction of the three animals (their actual sequence is also registered by the researcher and/or assistant, but has little relevance in the task). If participants use a relative FoR the overall direction of the animals would stay the same as in the way they were seen, that is, either to the informant's own left or right. If participants used an absolute FoR the direction of the animals would stay the same relative to some landmark or cardinal point, but not to the informant's left or right.

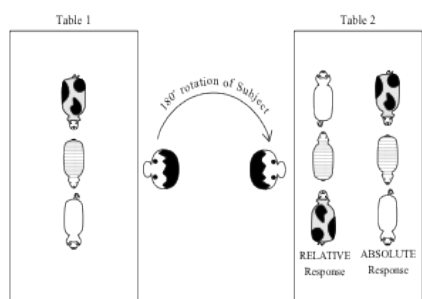


Figure 1: Possible Responses for Animals in a Row Task (from Levinson, 2003: 156)

The content of Figure 1 shows how the choice of one of the frames of reference, relative or absolute, for coding in memory eventually determines the responses given by the informant.

Beyond the understanding of the instructions in the native language, there is no other role that is overtly assigned to language in the performing of this task. The stimulus involves only visual perception and the response only motor activity. Between the exposure to the stimulus situation and the response some coding of spatial relationships by means of a FoR in non-perceptual memory is involved. The nature of this coding is exactly the target of this task.

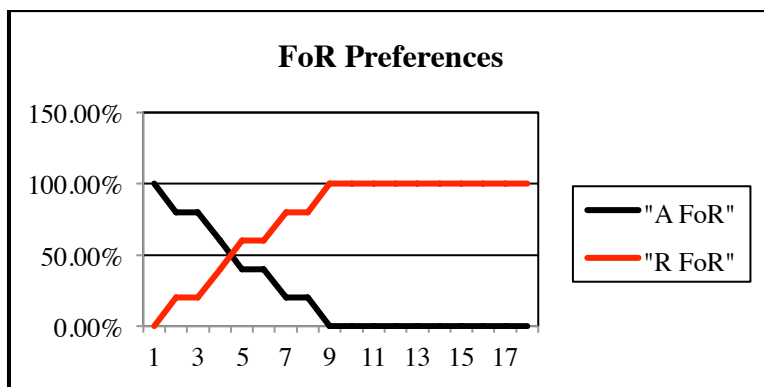


Figure 2: Results of 'Animals in a Row' Task.

The results, shown in Figure 2, indicate that there is a clear preference for the relative FoR among the subjects (67% preference for relative). This finding allows one to hypothesize that the cultural model of nature that this population would share will have within its internal structure a focus on ego as separate from nature (a dualistic approach) and not on nature as an encompassing entity, including ego (a holistic approach).

In Search of a Cultural Model of Nature: Interviews about Climate Change.

15 of the same subjects (3 became unavailable) that were administered the ‘animal in a row’ task were also interviewed about climate change. These semi-structured interviews were about climate change because the subjects would be using their knowledge of what they thought nature is in order to answer the questions. The topic of the interviews was constructed in this way following D’Andrade’s (2005) suggestion. All the interviews were digitally recorded and later transferred to a computer. The transcriptions of the interviews followed, thus, making their content available for analysis.

Key Words Analysis.

The first analysis conducted on the texts of the interviews was a key word analysis. All the words used regarding climate change and nature were counted. The top 20 key words appear in Figure 3. After a close look at the list obtained, we decided to look at the top 5 key words in more detail. In fact, there appear to be a clear break in the frequency of these top 5 key words as compared to the frequencies of the following words.

First and foremost, ‘humans’ is the word most frequently mentioned (98 times). At some distance, ‘earth’ follows as second (74), then ‘natural’ (72), ‘causal’ relationships (see the frequency of ‘effect/affect’) between humans and ‘earth/nature’ (67), and finally ‘climate change’ (50) which was the actual topic of the interview, thus expected to be highly frequent—notice, however, how the topic of the interview appears almost half as frequent as ‘humans’ in the texts.

While it is still difficult to construct a narrative about a cultural model of nature out of the sheer frequency of these few key words, it is clear that ‘humans’ stand out as the dominant agent (mentioned more often) in the interactions with ‘earth/nature.’ In addition, these relationships are conceived as ‘causal’ in either direction, humans to earth/nature or earth/nature to humans.

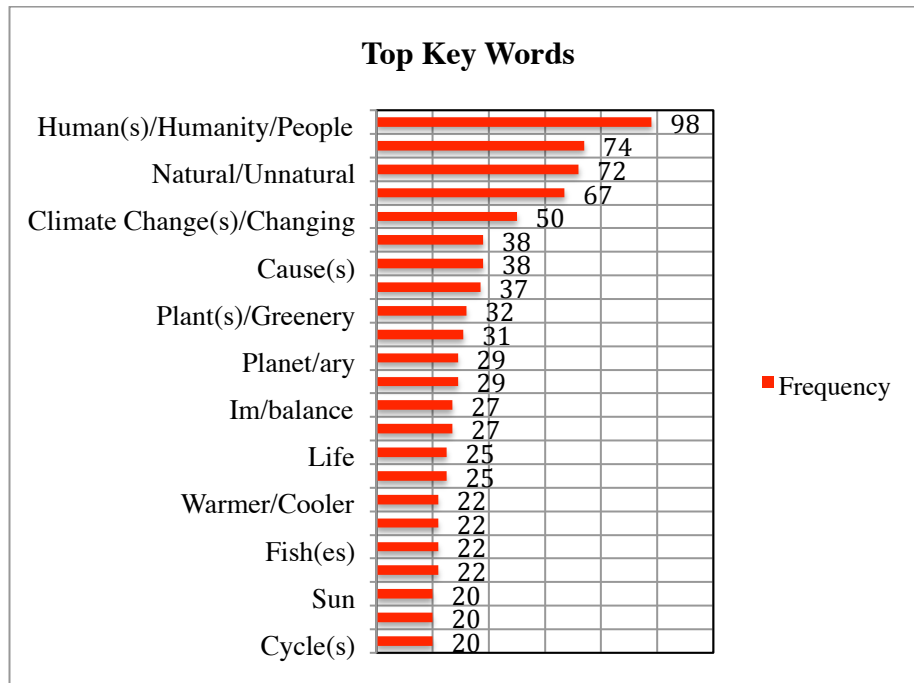


Figure 3: Frequency of Top 20 'Key Words.'

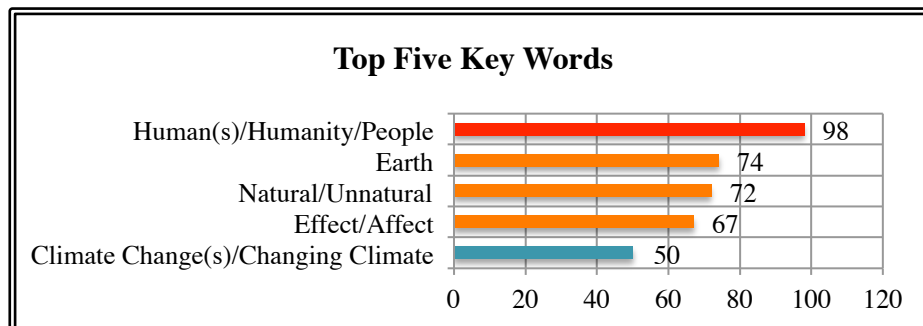


Figure 4: Frequency of Top 5 'Key Words.'

Agent vs. Patient Analysis.

The high frequency of the key word 'humans' cued us toward an investigation of its semantic role in the utterances in which it appeared. That is, while it is already important to know that humans is the most frequent word, it is also relevant to know if it is being used as agent or patient in the events described. The answer to this question can also clarify the directionality of the causality relationship between humans and earth/nature.

The results of the analysis presented in Figure 5 clearly indicate that 'humans' occur predominantly as 'agent' (83.80%) in the utterances in which it is used. Humans are then conceived—and linguistically encoded as such—as the primary agent in the relationship between them and nature. It can also be deduced that causal relationships are originated in humans and directed at nature. This focus on humans when talking about climate change and consequently

about nature correlates well with the focus on ego as instantiated in the preference for the relative FoR obtained by the administration of the ‘animals in a row’ task (see Figure 2).

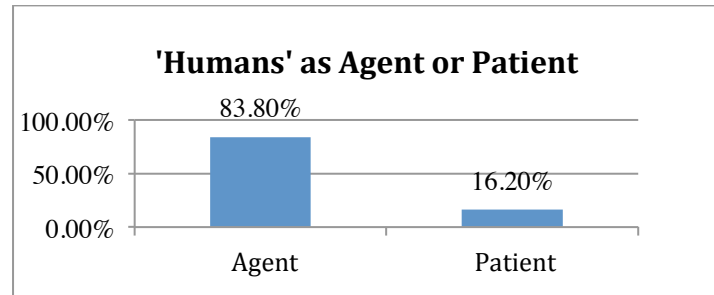


Figure 5: Frequency of ‘Humans’ as Agent or Patient.

Gist analysis.

One analysis suggested and used by D’Andrade (2005) in order to arrive at cultural models held by the interviewees is that of reducing the texts of the interviews into gist sentences. This procedure yields good indication about the cultural model/s that the population in focus holds about a specific domain of knowledge. The success of this procedure in other research projects convinced us to conduct this type of analysis. Consequently, the texts of the interviews were analyzed a second time and reduced to a number of gist sentences. A number of types of gist sentences were found and we recorded their frequency.

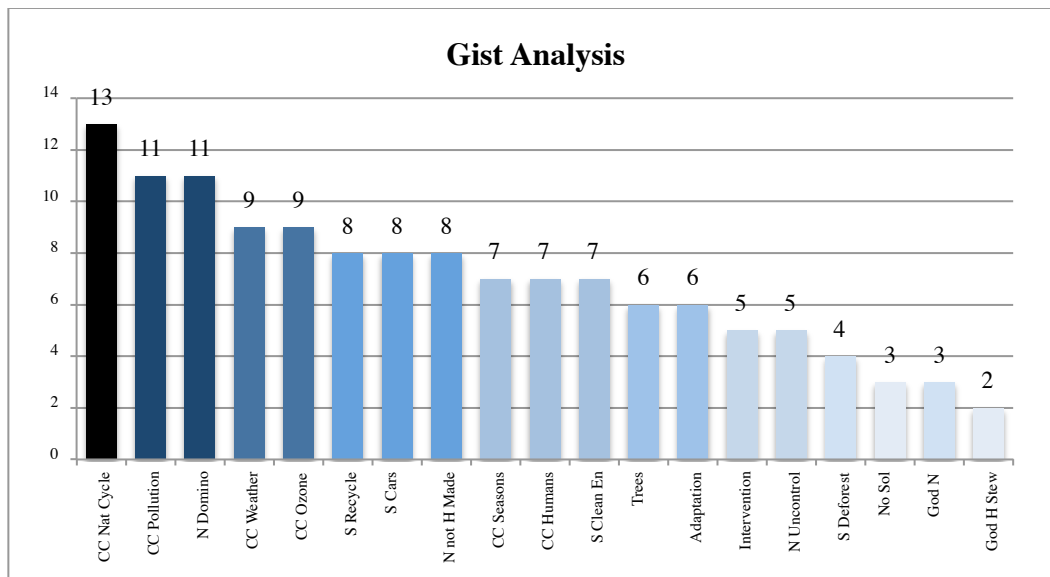


Figure 6: Gist Analysis.

In Figure 6, we present the first results of this analysis. The gist sentences span a number of themes, from statements about climate change, e.g., climate change is caused by pollution; climate change is fluctuating seasonal changes, to what could be done about it, e.g., more clean energy; stop deforestation, and to what are the constitutive characteristics of nature, e.g.,

domino-effect, uncontrollable. Then, after a careful reading of these results, we decided to divide the various gist sentences into three thematically arranged groups: one about the causes of climate change, one about suggestions towards a resolution of problems caused by climate change, and one about the nature of nature.

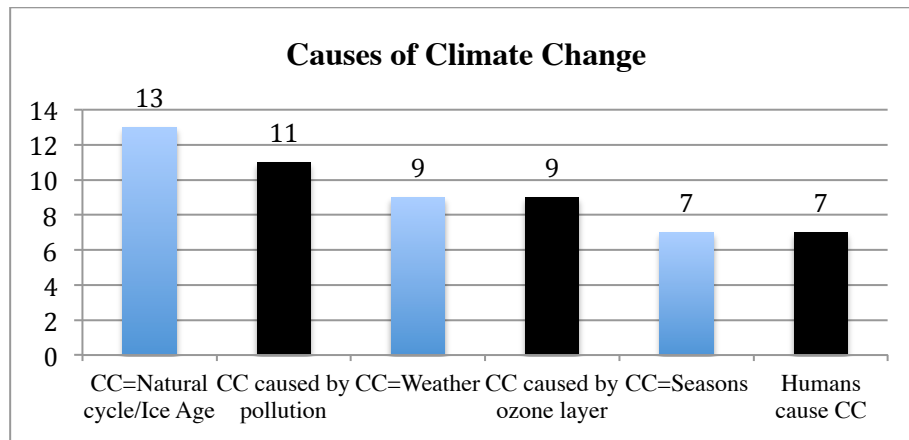


Figure 7: Causes of Climate Change.

In Figure 7, we present the results about the suggested causes of climate change. The majority of explanations (29/56) attribute climate change to ‘natural’ causes, e.g., weather, seasons, ice ages. The remaining explanations attribute climate change to pollution, the ozone layer, and finally and explicitly to human actions. The same lack of understanding of climate change and erroneous attribution of the processes that causes it were found almost twenty years ago in a study conducted by Kempton, Boster, and Hartley (1995) in a stratified sample of the American population.

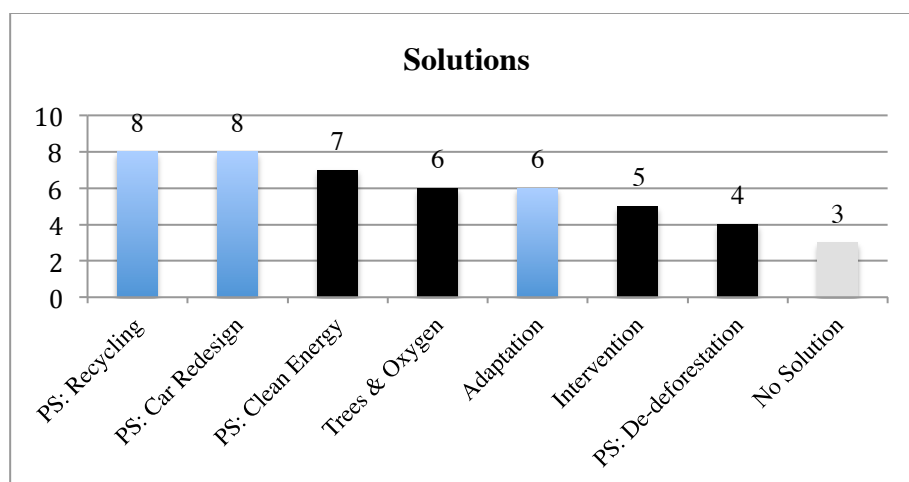


Figure 8: Solutions to Climate Change.

The types of solutions suggested in Figure 8 reflect the explicitly mentioned or implicitly assumed causes of climate change. The suggestions are evenly divided between measures

advocating intervention, e.g., the investing in clean energy, and measures advocating adaptation, e.g., the redesigning of cars.

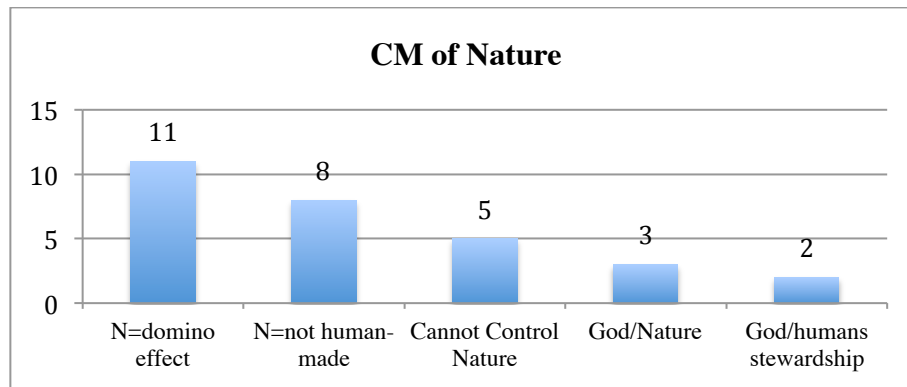


Figure 9: Components of the Cultural Model of Nature.

As shown in Figure 9, the cultural model of nature that the subjects seem to entertain while thinking about climate change is made of five major elements:

- the consitutive parts of nature are all strictly correlated such that if you change one part, a domino effect ensues that changes many other parts (11/29);
- nature was not made by humans (8/29);
- nature cannot be controlled by humans, it is unpredictable (5/29);
- nature was made by God (3/29);
- God created nature for humans and they can use it as they please but also must take care of it (2/29).

None of these characteristics of nature lead to a consideration of humans and nature as being one, i.e., a holistic approach. They all presuppose a strict division between humans and nature while at the same time considering nature's fundamental features as highly unknowable and basically of divine origin. Here again, the suggested model of nature found in Kempton, Boster, and Hartley (1995) as held by many Americans is replicated in large strokes.

Discussion and Conclusion.

The results of this pilot study in Northern Illinois fundamentally confirmed the more than one decade old findings of the research project conducted by Kempton, Boster, and Hartley (1995) in a much larger section of the American population. Fundamental features of the cultural model of nature held by Americans were all found again in the sample of the smaller Northern Illinois population. Humans are the focus of most thinking and reasoning about nature. This latter is divine in nature and with uncontrollable characteristics many of which are still unknown and maybe unknowable to humans.

We don't want to speculate about the reasons that are contributing to the major finding of this pilot study, i.e., lack of change in knowledge about its causes, lack of knowledge about the impact of climate change, heavy participation of the divine in the conceptualization of nature. We want to point out though how the overall results of the pilot study add an important new possibility to the understanding of the American mind.

The preference shown in mentally representing spatial relationships by using the relative FoR correlate well with fundamental aspects of the cultural model of nature held in the same population. The former FoR preference realizes a focus on ego and the latter cultural model of nature realizes a deeply felt division between humans and not-humans (a.k.a. nature) followed by a focus on humans. Both seem to us are the result of a congruent way of organizing knowledge mentally, with a focus of ego/humans and with a clear separation from whatever is other than ego/humans.

In addition, in contrast to Kempton, Boster, and Hartley (1995), the methodology used so far in the study has focused mainly on linguistic analyses, e.g., key words and gist. While other analyses will soon be added, we want to stress how very similar findings have already been obtained regarding the cultural model of nature in our sample.

This Pilot Study has not been completed yet, a metaphor and a reasoning analysis on the texts of the interviews is still in progress. Once completed, a more detailed cultural model of nature can be obtained. Then, the reconstructed cultural model will be used to prepare a questionnaire containing statements extracted from it and about which interviewees will have to agree on a 1-5 scale. The questionnaire will be administered to a sample of the Northern Illinois population and the results will be used to conduct a consensus analysis. Variables like age, gender, years of schooling, profession, living conditions (country, city) may be conducive to clusters of responses that can represent slightly different models held by these subgroups of the population.

In conclusion, the methodology implemented in this study so far has successfully been tested. The results have been highly comparable to another longer and more ambitious study. In addition, the linguistic analyses we used were not as extensively pursued in the previous study. Thus, we can confidently state that while in search of cultural models the semi-structured interviews stage followed by in-depth linguistic analyses already provide valuable insights. We expect the consensus analysis stage to refine and clarify some of these insights.

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