

## Farmers, herders, and fishers The ecology of revenge

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### Abstract

Culture of honor (COH) theory [Nisbett, R. E., & Cohen, D. (1996). *Culture of honor: The psychology of violence in the south*. Boulder, CO: Westview Press] predicts that the importance of upholding one's reputation is cross-culturally variable: Revenge should be more prevalent in herding societies than in farming societies, and should be entirely absent in foraging societies. This study was designed to replicate the effects that they found among herding and farming societies and to either support or refute the claim regarding foraging societies. Using a 32-item questionnaire measuring the constructs of Reciprocity and Revenge, this study cross-culturally validates Nisbett and Cohen's COH theory and extends it to fishers, a special kind of forager. Researchers sampled two herding communities (Hermosillo, Sonora, Mexico, and Liberia, Guanacaste, Costa Rica), two farming communities (Mexico City, Mexico, and San Jose, Costa Rica), and two fishing communities (La Paz, Baja California Sur, Mexico, and Puntarenas, Costa Rica.) The differences between the herding and farming samples replicated previous findings in that herders were higher on the Revenge scale than farmers. The fisher samples approximate the herder samples on the Revenge scale more than the farmer samples, but were significantly different from each other. Discrepancies between the fisher samples called for the investigation of alternative theories.

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## 1. Introduction

Whereas the commission of violent acts may serve a variety of functions, often perpetrators' motives are vengeful and/or based on the desire to defend their reputation. According to culture of honor (COH) theory (Nisbett & Cohen, 1996), the relative importance of upholding one's reputation is cross-culturally variable, dependent on the degree of COH in any given society. Nisbett and Cohen (1996) have proposed that violence related to honor and revenge is more prevalent in herding societies than in farming societies. They also claim that hunter–gatherers will not show the characteristics of the COH ideology, but do not offer empirical support for this claim. COH (Nisbett & Cohen, 1996) ideology has not yet been studied in hunter–gatherer societies. The purpose of this research is to test their theory of COH in herding versus farming societies with cross-cultural data and to include an additional form of subsistence economy to the analysis. This paper will also test Nisbett and Cohen's claim that there is an absence of the COH in hunter–gatherer societies by studying a special type of forager, the fisher.

Traditionally, anthropologists have regarded fishers as a specialized type of hunter–gatherer. Some anthropologists (Lenski, Nolan, & Lenski, 1995; Nielson, *in press*) now classify fishers as distinct from classic hunter–gatherers and have documented several substantial differences between fishers and other foragers. Nevertheless, we consider it productive to examine how Nisbett and Cohen's (1996) hypothesis might or might not apply to sedentary fishing communities. We discuss the critical differences between fishing and other modes of foraging in greater detail below.

### 1.1. Previous research

It has been shown that some relatively simple behavioral algorithms can successfully regulate reciprocal social exchange (Axelrod, 1984; Axelrod & Hamilton, 1981). One such social algorithm has been dubbed tit-for-tat (TFT) because all that it requires is the equal payback of any benefits received. TFT requires that individuals be able to reliably recognize each other and accurately remember the value of benefits exchanged with every other individual. Furthermore, it requires that cooperating individuals be able to detect and systematically discriminate against nonreciprocating “cheaters” in repeated social interactions. Otherwise, such cheaters will socially parasitize and ultimately multiply sufficiently to undermine the system. TFT automatically discriminates against cheaters because those who confer no benefits on others eventually receive none in return. However, the only penalty imposed by TFT on cheaters is the withholding of altruistic benefits, and not the infliction of any true punishment. A tantalizing extension of this hypothesis is that the flip side of TFT is the eye-for-eye principle (EFE) immortalized in 1750 BCE by the Babylonian King Hammurabi, which entails repaying harm with harm. However, a problem with this EFE mechanism, called “spite” by Trivers (1971) was that the retaliators bear the exclusive cost of punishing the cheaters, whereas the benefits of penalizing cheating accrue equally to the nonretaliators as well as to the retaliators in the

population. This makes punishing cheaters itself an altruistic act and therefore problematic within the framework of the original theory because it does not include any mechanism for disproportionately rewarding the retaliators. Nevertheless, it is possible that a reputation as a reliable retaliator may confer unique benefits to the punisher within a social context that goes beyond purely dyadic interactions. This effect would be similar to the concept of “indirect reciprocity,” in which one’s reputation as a reliable cooperater is hypothesized to attract other associates (Alexander, 1985).

Such evolved cognitive mechanisms might indeed form the fundamental basis for the human need (or evidently strong desire) for social equity. Our cultural elaborations of the concept of social justice go far beyond such simple behavioral algorithms, but it is quite possible that our untrained moral intuitions continue to follow more primitive principles (Petrinovich, 1995) that serve to guide human societies in developing social systems directed at resolving disputes. Recently, research has been conducted on a theory of a culture of honor (COH), which exists in what were ancestrally herding societies in the Southern United States (Nisbett & Cohen, 1996). The COH theory contends that violence related to honor is more accepted and used in this Southern region historically used for herding. Because of low population density and often lack of unity and inability to enforce state authority, herders rely less on a penal code and more on the honor code. With few neighbors to notice and possessions that are already mobile, it is very easy to rob herders of their herd. To keep this from happening, the herder has to maintain a reputation of being possessive and aggressive to scare potential thieves away before they strike. The COH ideology is a result of the possessive nature of herding peoples and the need to protect and defend one’s self, territory, and property. In contrast, a farming society is more close-knit and its structure allows the farmers to depend more on the law to protect them. Nisbett and Cohen (1996) contrast U.S. Southerners, who were traditionally herders, with U.S. Northerners, who were traditionally farmers. Throughout all of Nisbett and Cohen’s experiments and investigations, they looked at historical, survey, social policy, and experimental data to study the justification of violence for Revenge and Honor. Reflected in what the Southerners reported, the institutional practices of the area, the actions of the Southerners, and their physiological responses to perceived affronts, the herder groups displayed the COH ideology, and the farmers did not.

Nisbett and Cohen’s (1996) interpretation of the North–South differences in U.S. samples as due to differences in ancestral subsistence economies was based primarily on the seminal work of Edgerton (1971), who made systematic comparisons of farming and herding cultures in four East African societies. Although Edgerton had not initially used the expression “culture of honor,” he used a series of projective and open-ended psychological assessments to make systematic comparisons between these societies. Some of the psychological measures used by Edgerton nearly 40 years ago have subsequently come into question (e.g., the use of the Rorschach Inkblot Test), but the overall description of the differences between the psychology of farming and herding societies was synthesized by aggregating the results across a variety of measures and retains a good deal of validity. The most important distinction made by Edgerton between farmers and herders was the predominance of indirect as opposed to direct aggression. We believe that this distinction plays an important role in the

COH ideology because defending one's reputation as a reliable retaliator entails the threat of direct aggression.

### *1.2. Extending the COH to forager economies*

The COH has developed independently in many of the world's societies, and varies in many respects yet keeps one element in common: that individuals are prepared to protect their reputation, home, and property by resorting to violence. These cultures tend to develop where the individual is in a position of economic risk from theft by others in the community, and when there are no strong institutions to prevent or punish theft of property (Nisbett & Cohen, 1996). Nisbett and Cohen (1996) describe hunter–gatherer societies, however, as generally having insufficient surplus of production to make stealing it worth risking one's life. This logic would imply that there should be no COH ideology in these societies. Although this may be true for some hunter–gatherer economies, especially nomadic and transhumant ones, the authors neglect to recognize the complexity of the structure of different hunter–gatherer societies, and they never specify to which type they are referring. High territoriality in certain sedentary hunter–gatherer societies, such as fishing communities, shows that there is a considerable possibility of economic loss due to the actions of conspecifics (other hunter–gatherers who might compete for the same resources). Furthermore, foragers (like herders) tend to live in more unpopulated regions than farmers, for example, so there must be some sort of system that individuals follow to keep from being cheated. According to Paciotti and Richerson's (2002) terminology, self-help institutions (like COH) would be expected to develop where social peacemaking institutions (institutions that implement law) are lacking.

### *1.3. COH study: farmers, herders, and fishers*

The following study is intended to be a cross-cultural validation of the previous studies of COH and differences between the revenge ideology of farmers and herders. It should also be an addition to the current literature because fishers, a special type of forager, will now be included in these comparisons. The key hypothesis of this study is that herders will display a higher COH ideology than farmers, as indicated by higher means on measures of revenge. Another hypothesis of the study is that the fishers will also display higher COH ideology than the farmers. Because of high territoriality and an emphasis on reputation in more sedentary hunter–gatherer societies, the fisher samples were predicted to fall higher on the Revenge scales than the farmer samples but lower than the herder samples. They were not predicted to be as high on the Revenge scale as the herders because their fishing areas are more difficult to control by threat of force than pasture. Nevertheless, fish are as mobile in the water as cattle are on land, and in both cases the areas to be defended are so large that they cannot be easily monitored. In both cases, a reputation as a reliable retaliator can be hypothesized to be valuable in the proactive defense of these resources by serving as a deterrent to poaching.

Finally, although the respondents surveyed were currently urban college undergraduate students, we expect that the cultural inertia of the surrounding community should be

maintained even in modernized subpopulations that currently no longer practice the traditional subsistence economy, as was documented by Nisbett and Cohen (1996) with students at the University of Michigan.

## 2. Methods

### 2.1. Participants

The study participants were 317 undergraduates from the University of Arizona, Tucson; 138 undergraduates from the Universidad Complutense de Madrid (UCM), Madrid, Spain; 251 undergraduates from the Universidad Nacional Autónoma de México (UNAM), Mexico City, Distrito Federal; 257 undergraduates from the Universidad de Sonora (UNISON), Hermosillo, Sonora; 165 undergraduates from the Universidad Autónoma de Baja California (UABCS), La Paz, Baja California Sur; 220 undergraduates from the Universidad de Costa Rica (UCR-SJ), San José, Costa Rica; 119 undergraduates from the Universidad de Costa Rica (UCR-LG), Liberia, Guanacaste; and 135 undergraduates from the Universidad de Costa Rica Sede Pacífico (UCR-SP), Puntarenas, Costa Rica. All the samples were drawn from public universities, and thus the student samples were reasonably comparable. There were differences in the relative sizes of these public educational institutions, but those were unavoidable consequences of the relatively higher population densities supported by the different subsistence technologies (e.g., farming supports higher populations and therefore larger universities in traditionally farming areas.)

Pilot samples were collected in Tucson, AZ, and Madrid, Spain, primarily to perform the initial assessment of the psychometrics of the measures and to validate the translations of the items from English into Spanish. Neither the Tucson nor Madrid pilot samples were collected to test differences between farmers, herders, and fishers.

The Latin American samples, however, were all collected systematically to test the predicted differences between populations that have traditionally been predominantly either farmers, herders, or fishers. Both the Mexico City and the San José samples represented data from the capital cities of central highland valley regions that have been dominated by farming economies for several thousand years and have drawn most of their current population from the surrounding agricultural regions (Fonseca, 1997; Guillén, 1989; Weaver, 1993). Conversely, the Sonora and Guanacaste samples represented data from regions that have been dominated by herding economies for the past few centuries (Fonseca, 1997; Guillén, 1989; Villa, 1951, Villalpando, 1985) and should indeed reflect the influence of a strong COH ideology. The current populations of both Hermosillo, Sonora, and Liberia, Guanacaste, are also drawn principally from their surrounding regions. Finally, the La Paz and Puntarenas samples represented data from coastal regions that have been used for thousands of years by local communities for fishing, even before Spanish colonization (Fonseca, 1997; Gonzales-Cruz, 2002; Guillén, 1989). In all samples, we determined that the majority of respondents had indeed been born and raised in the general area in which they were tested. Thus, we were able to contrast the effects of differing social

ecologies with those of similar ethnic phylogenies and provide a cross-cultural test for the ecological COH hypothesis.

## 2.2. Procedures

All data were collected as voluntary classroom exercises in the various institutions listed above. Groups were composed of anywhere from 5 to 50 students depending on the size of each class. The participants were told by their instructors that they were attending a workshop being conducted by visiting researchers from the University of Arizona. After all the students had entered the classroom, the researchers told them that they were trying out a new questionnaire, and that it would be appreciated if they would fill it out as best they could. They were told that there would be a brief discussion about the questionnaire when they were finished, and that they should pay special attention to what they thought about the questionnaire itself. The students then completed the questionnaire, which usually took about 30 minutes. When the questionnaires were completed, they were collected and the discussions were begun. This qualitative part of the procedure was not to be reported as separate data, but was to be used to help interpret the quantitative results. After the discussion, the experimenter gave a brief presentation on past research that had been done and how these results might be applied and extended to their local culture.

## 2.3. Scale development and construction

To adequately test COH theory, it was necessary to operationalize and psychometrically validate the COH construct as an individual difference variable. Fortunately, Nisbett and Cohen (1996) had identified an entire battery of critical issues on which the ideology of honor could be reliably discriminated and multiply operationalized. A series of psychometric studies (Figueredo & McNeill, 1988; McNeill & Figueredo, 1996, 1997) were designed and performed to evaluate the convergent and discriminant validities of the hypothetical constructs of reciprocity and revenge, as proposed by both evolutionary and social psychologists. These data suggested that two scales measuring Reciprocity and Revenge were relatively independent of each other.

In the present study, respondents from various international sites completed either parallel English or Spanish translations of an abbreviated 32-item questionnaire constructed to provide a more stringent test of the validities of the constructs previously identified (Figueredo & McNeill, 1998). Items were generated systematically in an orthogonal factorial design based on three theoretical dichotomies: (a) reciprocity versus revenge, (b) justice versus honor, (c) individual versus group. The items consisted of brief, third-person vignettes describing various responses to social exchange situations of a hypothetical male or female protagonist (“John”/“Juan” or “Mary”/“María”). In each item, an individual or group confers either a benefit or a cost to the hypothetical protagonist (directly or indirectly, publicly or privately), who then either reciprocates or retaliates in kind. The respondent is then asked to rate on a 6-point scale to what degree the protagonist

did anywhere from “much less” to “much more” than what the respondent “should have done” in response. (See Appendix A for a full listing of these items.)

Because the hypothesized distinctions contrasting justice with honor and individual with group effects were not supported by the data, all items originally designed to measure different levels of the justice/honor and the individual/group dimensions were aggregated within the two principal scales, Reciprocity and Revenge. These two scales were therefore composed of items sampled broadly from their domain of generality. The two scales were also composed of items designed to measure different levels of “difficulty” to be able to discriminate different degrees of adherence to either the Reciprocity or Revenge ideologies. Thus, some items were designed to require only relatively low levels of Revenge ideology to answer affirmatively, whereas others required extremely high levels of Revenge to endorse. Furthermore, some items in both the Reciprocity and Revenge scales were reverse-coded, meaning that either high Reciprocity or Revenge would lead one to answer the items negatively or fail to endorse them. This was done to counter possible “response bias,” or the inclination of some respondents to either systematically agree or disagree with each item regardless of substantive content. Of course, these reversed items were scored negatively in computing the overall scales. Thus, both scales were constructed in a psychometrically sound manner.

The final psychometric properties of these two scales were evaluated by the use of Cronbach’s alpha, which is a measure of the internal consistency or “interitem” reliability of multi-item scales, related to the intraclass correlation coefficient. Cronbach’s alpha is positively influenced by (1) the average correlation between the items and (2) the number of correlated items in the scale, which increase the scale reliability by the psychometric principle of aggregation (Nunnally, 1978). Like the correlation coefficient, Cronbach’s alpha ranges between zero and one, with a value of 1.0 representing perfect internal consistency and any value less than .6 being generally deemed psychometrically unacceptable.

### 3. Results

#### 3.1. *Reciprocity and Revenge*

COH theory (Nisbett & Cohen 1996) does not make any specific prediction regarding any systematic differences in levels of Reciprocity between different societies based on their subsistence economies. As mentioned above, the Reciprocity scale was only included in this study as a test of discriminant validity for the Revenge scale. Consistent with this hypothesis, the Reciprocity and Revenge scales correlated with each other only .26 (when aggregated across all six Latin American cross-cultural samples) and were thus confirmed to be statistically discriminable from each other, suggesting the independent operation of at least two distinct psychological mechanisms for positive and negative social exchange.

Table 1 displays the internal consistencies (as indicated by Cronbach’s alpha) of both the Reciprocity and the Revenge scales for all eight study sites sampled. The internal consistencies were generally unacceptable for the Reciprocity scales but were generally

Table 1

Internal consistencies (Cronbach's alphas) of Reciprocity and Revenge scales in eight cross-cultural samples using the COH questionnaire (see Appendix A)

	City	Reciprocity	Revenge
USA	Tucson ( $n = 317$ )	.55	.87
Spain	Madrid ( $n = 138$ )	.44	.88
Mexico	Mexico City ( $n = 251$ )	.33	.87
	Hermosillo ( $n = 257$ )	.29	.81
	La Paz ( $n = 165$ )	.23	.79
Costa Rica	San Jose ( $n = 220$ )	.17	.82
	Liberia ( $n = 119$ )	.29	.86
	Puntarenas ( $n = 135$ )	-.01	.76

highly acceptable for the Revenge scales. Because the internal consistencies of the Reciprocity scales were generally unacceptable, all subsequent statistical analyses were performed exclusively on the Revenge scales. The internal consistencies of the Revenge scales, on the other hand, were comparable in magnitude across all study sites. It was also determined that the internal consistency of neither scale was substantially improved by the elimination of any particular item or subset of items.

### 3.2. Pilot tests for functional equivalence of translations

A preliminary general linear model was tested comparing the mean Revenge scores in the two pilot samples collected in Tucson, AZ, and in Madrid, Spain. Because these two pilot samples were not expected to differ systematically on the Revenge scale, this initial comparison was performed not merely to compare scale scores across the two study sites, per se, but, more importantly, to compare scale scores across the two languages into which the measure was translated and, all else being equal, validate the translation of the measure from English into Spanish. There was no significant difference between mean Revenge scale scores in these two pilot samples [ $F(1,453) = 0.24, p = .63$ ]. The statistical equivalence of both the Cronbach's alphas and the Revenge scale means for these two pilot samples supports the functional equivalence of the English and Spanish translations.

### 3.3. Cross-cultural comparisons

The six Latin American sites in Mexico and Costa Rica, which were specifically selected for traditional farming, herding, and fishing subsistence economies, were used for all subsequent predictive models. A hierarchical general linear model was tested in which five planned orthogonal contrasts were used to compare and contrast the mean scale scores among the six different Latin American study sites. (Again, because only the Revenge scale had an acceptable internal consistency, the results of the general linear model for the Reciprocity scale are not reported.) As a whole, the predictive model for Revenge was statistically significant [ $F(5,1065) = 6.68, p < .0001$ ].

Table 2

Revenge means  $\pm$  SDs and sample sizes (in parentheses) for all Latin American sites

Subsistence economies	Mexico	Costa Rica
Farmers	$-1.05 \pm 0.85$ (251)	$-1.12 \pm 0.99$ (220)
Herders	$-0.90 \pm 1.00$ (257)	$-0.80 \pm 1.14$ (119)
Fishers	$-0.69 \pm 1.00$ (165)	$-0.94 \pm 0.87$ (135)

Higher values on a 6-point scale from  $-3$  to  $+3$  indicate endorsement of revenge.

The first contrast, comparing the mean of the combined Mexican samples to that of the combined Costa Rican samples was not statistically significant [ $F(1,1065) = 2.13, p = .1445$ ]. The second contrast, comparing the mean of all farmer samples to that of all nonfarmer samples (i.e., the combined set of all herder and fisher samples) was statistically significant [ $F(1,1065) = 18.63, p < .0001$ ]. The third contrast, which was the interaction of the first and second contrasts, was not statistically significant [ $F(1,1065) = 0.01, p = .9328$ ], indicating that the systematic difference between farmers and non-farmers (combined herders and fishers) was the same between the two countries (Mexico and Costa Rica). The fourth contrast, comparing the mean of the herder samples to that of the fisher samples was also nonsignificant [ $F(1,1065) = 2.52, p = .1125$ ]. The fifth contrast, which was the interaction of the first contrast with the fourth contrast, however, was statistically significant [ $F(1,1065) = 10.11, p = .0015$ ], indicating that the difference between herders and fishers was unequal between the two countries (Mexico and Costa Rica). This was because the means for herders and fishers were statistically equivalent in Costa Rica, but not in Mexico.

Most subjects in all samples generally tended to disapprove of Revenge, although to significantly different degrees, and thus the means of the Revenge scale scores were all negative numbers. The results of all of the Latin American cross-cultural COH studies done thus far may be seen in Table 2. We can see from this table that herders and fishers were generally less disapproving of revenge than farmers. We can also see that farmer Revenge scores were similar to each other across both countries. Furthermore, we see that although herder Revenge scores were also similar to each other across the two countries, in contrast, fisher Revenge scores were somewhat discrepant from each other, with La Paz exceeding Puntarenas in mean Revenge scale scores.

#### 4. Discussion

This study adds to the ecological relevance of the COH theory. First, an instrument was developed and psychometrically validated for measuring COH with a minimal number of items that sampled all of the substantive domains of interest. Second, a Spanish translation was developed and tested that functioned equally well as the English version in native Spanish-speaking populations in both Spain and Latin America. Third, this instrument was applied in six different Latin American samples within two different countries (Mexico and Costa Rica) and selected for three different subsistence economies (farming, herding, and fishing). Fourth, these six samples were compared to test Nisbett and Cohen's (1996)

hypotheses regarding the different levels of COH expected to be prevalent in farming, herding, and foraging societies. Nisbett and Cohen's hypothesis that herders were generally higher than farmers in COH was supported by these results; Nisbett and Cohen's hypothesis that COH would be entirely absent in foraging societies was disconfirmed. Furthermore, these tests were conducted in societies other than the Anglo-American samples that Nisbett and Cohen had relied exclusively upon.

Although the Revenge scale proved to be psychometrically adequate, the Reciprocity scale yielded unacceptable results due to low internal consistency of measurement for all societies sampled. Frankly, we do not understand why we obtained such different psychometric results from the Reciprocity and Revenge scales that we created. The items were virtually identical in structure except for the critical difference in content, which was socially exchanging benefit for benefit instead of harm for harm. We therefore cannot attribute these results to any plausible artifact of item construction and must interpret them as real phenomena. One post hoc interpretation is that Reciprocity might be a more complex mechanism that is more dependent on context than Revenge and therefore does not generalize across the specific situations represented in the vignettes. Nevertheless, because Reciprocity is an important characteristic in hunter–gatherer societies, future research should be designed to evaluate scales that have been used in the past. For example, Constantino and Todd (2000) have devised a Social Reciprocity scale that they are using to examine the genetic structure of deficits in reciprocal social behavior in twins. Using this scale, they have found correlations of .73 between monozygotic twins and .37 between dizygotic twins.

In addition, this study would appear to disconfirm Nisbett and Cohen's (1996) prediction that the COH should not exist in hunter–gatherer societies, because the La Paz and Puntarenas results clearly reflect the COH ideology. However, whether this constitutes a true disconfirmation is conditional upon precisely what is meant by “hunter–gatherers.”

#### *4.1. Nomadic or transhumant versus sedentary foragers*

Nisbett and Cohen's (1996) use of the term hunter–gatherers appears to refer to nomadic or transhumant foragers, which represent the classical type of hunter–gatherers. This type of foraging economy would not be expected to foster a COH, unlike the more sedentary foragers, such as many fishing societies. Fishing communities are examples of foraging economies still common today. Because they are often more sedentary, they are typically more accessible to researchers. This sedentary lifestyle of many fishing communities is favored by certain specific ecological conditions:

Several species of migratory mammals, birds, and fish appear in places closely adjacent to one another—but at different times of the year. The resources may then be exploited from a single home base, a variety of briefly occupied special-purpose camps also being used (Rowley-Conway, 1983, p. 112).

Hunter–gatherers that are either nomadic or transhumant rapidly deplete local resources and either move on or follow resources that move seasonally for ecological reasons.

However, when richer and more stable resources are reliably available, even foragers have a tendency to become more sedentary. The higher density and stability of such resources makes a certain degree of territoriality economically feasible. Paradoxically, the higher carrying capacity of the environment produces rising population pressure and a higher demand for the resources. We believe this escalated intraspecific competition of a difficult-to-defend resource will give rise to the COH in high-density sedentary hunter–gatherers.

The Northwest Coast Indians are the best-documented example of a society with these characteristics (Rowley-Conway, 1983). Sedentary villages' overall population density is high, unlike nomadic or transhumant societies whose populations are usually not larger than the hunting band. Mechanisms for storing food and amassing wealth in trade items and other commodities, in conjunction with territoriality, allow ranking among group members. By virtue of their hereditary, ranked aristocracy, the Northwest Coast Indians exemplify the more complex social structures associated with complex societies. This characteristic contrasts with the simpler nomadic or transhumant societies, in which there are no mechanisms to store wealth of excess resources, which increases sharing among groups (Cartwright, 2000). Some groups, such as certain Turkish fishers, may even maintain rights to specific resources (Berkes, 1986).

This type of territoriality may foster a COH ideology in which the need to defend one's territory, possessions, and reputation as a reliable retaliator may be violently done. In Alaskan Eskimo groups, specifically the Akulmiuts, territoriality is very high, especially between neighboring villages (Andrews, 1994). Territoriality is expected where there are dense food resources that are predictable across time and location. To mark their territories, the Akulmiuts use warfare and fighting, but also rely on symbolic ceremonies, such as naming conventions, kinships, and marriages, to “intimidate” neighbors. Territoriality is prominent between groups rather than within groups. Within the groups, there are strong kinship alliances and reciprocal altruism.

To live in a group there must be norms people follow that keep the group together. In the Qiqqtamiut society, life is “dependent on an everyday-life world of ongoing relations rather than on any sense of how things ought to be in a highly structured universe of abstract social rules” (Guemple, 1998, p. 149). There is a sense of what is right and wrong and how to treat others, but there is no state institution to enforce it. The COH can be a self-help institution (Paciotti & Richerson 2002) that provides the inherent rules that these people follow.

Lobster fishermen in Maine provide a classic example of how group cohesion, territoriality, and property rights can contribute to a thriving fishing economy without state influence or control. Although a fishing license is easy to come by in this area, unless independent newcomers find out which areas are territories of the various “harbor gangs,” they can expect to have their traps cut. The Maine lobster fishermen have, until recently, managed to work together to maintain a functional system without individual ownership or regulation by the state (Acheson, 1987). This is a typical example of a self-help institution.

These examples illustrate how territoriality may play a major role in the economies and social structures of many sedentary fishing communities. A high density of stable but difficult

to defend resources may therefore predict COH in foraging societies as well as herding societies. Fishing communities, such as those found in La Paz and Puntarenas, are examples of foraging societies that depend on stable, high-density, but difficult to defend resources and would thus be expected have evolved a COH.

#### 4.2. *Discrepancies among fisher samples*

Our results indicate that these two fishing communities may be somewhat different from each other. The La Paz sample approves of violence in response to an insult considerably more than the Puntarenas sample, displaying a higher COH. The Puntarenas sample mean of the Revenge scale falls somewhere in between the means of the herders and the farmers, although it more closely approximates those of the herders, but the La Paz sample mean seems to be substantially higher than that of the herders. Thus, Nisbett and Cohen's (1996) COH theory alone does not explain the differences between the La Paz and Puntarenas sample.

The best theory to explain these discrepancies might be cultural evolution theory (CET; Boyd & Richerson, 1985; Paciotti & Richerson, 2002). Unlike CET, COH theory is an example of an ecological theory that claims that humans have sophisticated mechanisms to optimize goals within ecological constraints. Another example of an ecological theory is Cosmides and Tooby's (1992) theory of evoked culture, which states that cultural variation is due to environmental triggers on universal psychological modules adapted to have several mechanisms to solve adaptive problems. Thus, herders use revenge to deal with their particular environmental challenges, whereas farmers do not because they face different challenges.

In contrast, according to CET, humans' flexible cognitive processes allow people to learn adaptive behavior through culturally transmitted information. In this view, the social environment is a mediator between behavior and the environment. More specifically, Paciotti and Richerson (2002) explain that self-help institutions are the ancestral state and peace-making institutions are the derived state, requiring the development of centralized control. These ideas encompass the COH theory, but also leave room for a time lag. Although the perspective is different, CET still maintains that there will be a COH in herding regions because, for the same reasons mentioned by Nisbett and Cohen (1996), peacemaking institutions are not practical.

Consistent with this argument, CET might explain why there may be a difference between Puntarenas and La Paz. Although both are fishing communities and port towns, the historical importance of Puntarenas as a commercial port is much greater than that of La Paz, indicating that Puntarenas is farther along the way into evolving from a purely fishing economy to a maritime economy (Delfin-Quezada & Breton, 1986; Nielsen, 2003; Nolan & Lenski, 1999.) It is therefore likely that peacemaking institutions were imposed on Puntarenas by the Spanish conquest less recently than on La Paz. CET therefore might explain the differential time lags in the development of peace-making institutions between Puntarenas and La Paz. La Paz also had a greater history of resistance to Spanish colonial domination, which may have even further inhibited or delayed the imposition of state authority (Gonzales-Cruz, 2002) Another alternative hypothesis would be that there are cultural differences between Mexican

fishermen and Costa Rican fisherman; the nonsignificant difference between Mexican and Costa Rican farmers or herders, however, makes this hypothesis highly improbable.

One final alternative explanation may be that the recent resource depletion in the Sea of Cortez creates a different ecological situation in La Paz than in Puntarenas, where this is currently not as pressing a problem. Whereas La Paz was traditionally known for rich beds of pearl-bearing oysters, a combination of overexploitation and disease wiped out most of these oyster beds by the middle of the 20th century (Gonzales-Cruz, 2002). It is possible that La Paz fishers are now more territorial than previously because of this recent experience of resource devastation in combination with more current problems of overexploitation of other marine species.

Proponents of communal control argue that local people are better at managing the resources in which they have personal stakes and that everyone would benefit by the government taking a hands-off approach with these types of communities (Ruttan, 1998). Communal management is an example of a self-help institution and a COH may be expected among the people of these communities. Although it is apparently the case that La Paz has been and still is relatively isolated from the central government system of Mexico, whereas Puntarenas is both geographically and economically more closely integrated to the central government of Costa Rica, further investigation of the history of the imposition of state authority on these sites is necessary to explore this hypothesis.

#### 4.3. *Limitations of the study*

There were two major limitations of this study: (1) that the samples were exclusively composed of college students and (2) that the studies were completely based on self-reported attitudes rather than actual behavior. The first limitation is perhaps less serious because we were only interested in identifying mean differences between societies, not estimating the parameters for the entire populations. We believe that we can safely assume that observed differences between the college student samples are indicative of the general cultural differences between the societies as a whole. We can think of no plausible alternative hypotheses why the college samples might differ systematically in ways substantially different from those of their host societies. In general, since college students are likely to be less traditional than their non-college counterparts from the same population, and perhaps even more similar to each other, our use of college samples might have biased against our finding the differences that we reported.

The second limitation is a more serious one, but one that we hope to address in ongoing research. An earlier version of the COH measure that we used in this study was already tested on a non-college student population and related to behavior in a previous study (Figueredo et al., 2001). In this previous study, the Revenge scale was tested as part of a four-way interaction that significantly predicted both male perpetration of and female victimization by spousal abuse. This study was done in Hermosillo, Sonora, which was one of the six Latin American study sites reported in the present paper. The general content and the psychometric characteristics of that earlier version of the measure were comparable to those of the present revised measure, although some of the individual items were different. Furthermore,

replications of that domestic violence study are currently underway in both México City, Mexico, and San José, Costa Rica, using the current version of the measure. Thus, we should soon have predictive validation of the COH construct in at least three out of the six sites reported on within the present study, using domestic violence as the criterial outcome.

A third potential limitation is that a recent study (D'Andrade, 2002) has suggested that the COH may not be the reason that US Southerners tend to react violently in response to insults. That study was quite comprehensive in getting to the root of how the participants would rationalize their own responses to an insult in hypothetical situations. However, the act of thinking out a response ignores the fact that there is not that much time to think in a similar situation in real life. One is much less likely to overreact (a defensive characteristic of the COH) when there is time to think out the problem. In addition, the other studies cited in the D'Andrade (2002) article may have elicited a social desirability response from the respondents because they were asked to pass judgment and give advice to the confederates. Our method of measuring COH was unique in that it places no responsibility on the respondents, yet it allows them to put themselves in the place of the character in the hypothetical situation to answer the question. This allows a more honest, realistic response and supports Nisbett and Cohen's previous findings.

#### *4.4. Conclusions*

In conclusion, although there remain minor anomalies such as the differences in COH between the fishers in La Paz and Puntarenas, these results are generally supportive of the idea that variation in COH represents to some degree a local adaptation to different subsistence economies. Furthermore, these results show that more sedentary foraging societies, such as fishers, may have COH characteristics approaching those of herding societies. Finally, these results show that these variations in COH can be adequately assessed by psychometric methods.

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### **Appendix A. Culture of honor questionnaire (English language version)**

Imagine that a person named John or Mary finds himself or herself in each of the following situations. Please tell us if this person:

- +3 = Did much less than he/she should have done
- +2 = Did less than he/she should have done
- +1 = Did slightly less than he/she should have done
- 1 = Did slightly more than he/she should have done
- 2 = Did more than he/she should have done
- 3 = Did much more than he/she should have done

Please consider each situation separately. There is no relationship between John's or Mary's action in one situation and what they might have done in any other situation.

#### RECIPROCITY ITEMS:

1. Mary went shopping for a present for a female friend who bought her a present last year. Mary chose to buy a more expensive present than her friend had given her. (REVERSED)
3. John's male friend had once saved John's life. John later offered a high-paying job to his friend's son.
5. John's country was invaded by another nation. John voluntarily enlisted in the army and asked to be sent to the front.
7. A man from a distinguished family of good reputation asked John for a job. John agreed to hire the man, even though John didn't know anything about the man's accomplishments.
9. A man from a distinguished family of good reputation let Mary know that he was romantically interested in her. Mary agreed to have dinner with the man before she knew anything else about him.
11. A contagious epidemic once affected Mary's community. Mary volunteered to serve as a nurse at a local hospital.
13. Mary's lifelong female friend had just died. Mary adopted her friend's young child.
15. John did not have enough money to buy his male friend a gift this year. When John's friend tried to give him a gift, John refused to accept it.
17. John had paid for his male friend's dinner at a restaurant. The next time they were at a restaurant, John expected his friend to pay for their dinner.
19. Mary's 10-year-old brother-in-law was trapped in a burning building. Mary risked her life to save her husband's younger brother.

21. Mary was offered a high-paying job in the city. Mary decided to turn down that job and stay in her rural community to teach underprivileged children.
23. A man has two uncles who were convicted criminals. John was willing to befriend this man because he had heard nothing bad about his character. (REVERSED)
25. A girl's three sisters were notorious delinquents. Mary allowed the girl to baby-sit her children because the girl herself was not known to have done anything wrong. (REVERSED)
27. Mary's local church collected used clothing for the poor. Mary chose not to donate her used clothes and threw them away. (REVERSED)
29. While traveling abroad, John meets a man from his own hometown. Even though John did not know him personally, John lent the man some money for plane fare to get home.
31. John was working in a group. Every day, John kept track of how much work he was doing in comparison to everyone else and would work less if he noticed he was doing more work than the others.

REVENGE ITEMS:

2. Mary's male neighbor once threw trash in Mary's back yard. Mary later threw her own trash into her neighbor's yard.
4. A drunken man bumped into John's wife on the street. John hit the drunk.
6. While at work, a fellow female employee called Mary a liar and a cheat. Mary then publicly accused the fellow employee of dishonesty.
8. An acquaintance of John looked over John's girlfriend and started talking to her in an offensive way. John then started a fight with his acquaintance.
10. A male stranger deeply insulted Mary's sister in public. Mary then slapped the stranger.
12. During an argument, John's male friend called him a liar and a coward to his face. John then started a fist fight with his friend.
14. A man sexually assaulted Mary's sister. Mary then shot the man who did it.
16. A female stranger tried to steal John's baseball cap on the bus. John took back his cap and then pushed the stranger off the bus.
18. Mary's male friend had borrowed money from Mary to buy a vase and refused to pay Mary back. While at her friend's house, Mary intentionally broke the vase.
20. A man seduced John's 16-year-old daughter. To get even, John then seduced that man's teenage daughter.
22. A man looked over John's girlfriend and talked to her in a suggestive way. Although John's girlfriend was not offended, John hit the man.
24. A male acquaintance insults John's wife. John simply ignores it. (REVERSED)
26. A female acquaintance insulted Mary's mother. Mary slapped the acquaintance in the face.
28. Mary's female friend had offended her. Mary then revealed her friend's secrets to their common acquaintances.
30. An adult male stranger had beaten up John's mother. John stabbed the stranger.

32. Mary's female neighbor always steals tomatoes from Mary's garden. Even though Mary works hard in her garden, she always forgives her neighbor. (REVERSED)

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