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# Why are cultures warlike or peaceful? Test of regality theory on 186 non-industrial societies

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## **Abstract**

Regality theory is a theory saying that people show a preference for strong leadership in times of war or collective danger, but a preference for an egalitarian political system in times of peace and safety. These psychological preferences in individuals are reflected in the political structure and culture of the society. A society in danger will develop strong nationalism, discipline, strict religiosity, strict sexual morals and perfectionist art. A society in peace will develop in the direction of egalitarianism and tolerance.

The article is both theoretical and experimental. Regality theory is explained and the theoretical basis of the theory is extended with contributions from evolutionary game theory, biological life history theory and ecological theory.

The predictions of social-level effects of collective danger are tested by various statistical methods exploring the relationship between intergroup conflict and a number of indicators of social structure and culture in 186 non-industrial societies of the past based on data from Murdock and White's standard cross-cultural sample as well as a subsample based on ethnographic records. It is confirmed that a high level of intergroup conflict is connected with a hierarchical political system, a strict and punitive justice system, a strict religiosity, a high feeling of group identity, strict sexual morals, a higher workload on children, and embellished and perfectionist artistic expressions. Four other predicted effects do not show statistical significance. *Intragroup* conflict influences sexual morals but not the other cultural variables. It is also found that the level of conflict can be predicted from environmental and technological factors.

Regality theory is compared with authoritarianism theory and various cultural theories. While some of these theories appear to describe related or identical phenomena, it is found that regality theory is the theory that best predicts the statistical results. Regality theory has important applications in both the natural and the social sciences, including the study of many psychological, political and cultural phenomena.

**Keywords:** war, intergroup conflict, free rider problem, leadership, psychological flexibility, phenotypic plasticity, social structure adaptation, authoritarian personality, regal versus kungic culture.

## Introduction

It is easy to observe that some cultures are warlike and totalitarian while other cultures are peaceful and tolerant [1]; it is more difficult to explain why. Regality theory is a theory that seeks to explain such cultural differences as adaptations to different levels of intergroup conflict or collective danger that societies are exposed to [2]. According to this theory, there is a psychological mechanism that makes people prefer a strong leader and strict discipline when the probability of war or other collective danger is perceived to be high. In the absence of collective danger, people will prefer an egalitarian society with a more lax discipline. The combined effect of such psychological responses in the individual members of a society has important emergent consequences for the social and cultural structure of the whole society.

### The theory of regal and kungic societies

#### *Evolutionary basis*

It has often been observed that people prefer a strong leader and a strong social group in times of crisis [3], [4], [5] and various scientists have independently suggested that this may be an adaptive response to the need for collective action [3], [6], [7], [8], [9]. However, the discussion of why this would be adaptive has so far been missing. We will propose that a psychological mechanism that makes people prefer a strong leader in times of intergroup conflict could be adaptive because it reduces or eliminates the free-rider problem in collective fighting.

Several mechanisms have been proposed to explain the altruistic behavior of individuals who fight for their social group despite the fitness costs. The most important evolutionary explanations that have previously been proposed are: kin selection, group selection [10], [11], reciprocal selection [12], [13], altruistic punishment, prestige, sexual selection (women are attracted to brave warriors) [14], [15] the opportunity of successful warriors to mate with captured women from the losing group [14], [16], [17], and cultural group selection [18].

It is a common characteristic of these proposed mechanisms that the effects may be weak, and perhaps too weak to compensate for the extremely high fitness costs of fighting [19]. The fitness gain in the form of increased mating opportunities does not necessarily go to the ones that have run the highest risks; and the mechanism of punishing defectors involves the complication that punishing is an altruistic act as well that needs explanation [20].

We are now proposing that the following mechanism may have been important in the evolution of collective fighting. In the event of war, or imminent war, the members of a social group will show a psychological preference for having a strong leader and a social system with strict discipline. If enough members of the group express these preferences then the group will soon develop a hierarchical political structure with a strong and powerful leader who can command

group members to fight, devise a strategy, reward brave warriors and punish defectors.

There is an important difference between being willing to fight for one's social group and being willing to support a strong leader. The altruistic individual who volunteers to fight for his group will run a high personal risk while all the non-fighting members of his group will benefit from his bravery. As the cost to the individual warrior is higher than his share of the group-level gain, his behavior will not be promoted by natural selection. But the strategy of supporting a strong leader is different. If only few members of the group desire a strong leader then there will be no strong leader and no collective fighting. If enough group members support a strong leader then this leader will be able to dominate over everybody, including the minority that do not support him, and command them to fight. Thus, it is possible for the group to suppress the fitness advantage of free riding by installing a strong leader. The individual who shows the preference for a strong leader will not only have to carry the costs of fighting, he will also enjoy the benefits of everybody else fighting. Either everybody fights or nobody fights; there is no place for free riders. The group-level benefit of everybody fighting in a coordinated way could very well be sufficiently high to outweigh the individual fitness costs of fighting, even when the benefit is divided between all group members.

The behavior of the leader is easy to explain. The costs to the leader of rewarding and punishing are more than compensated for by the fitness advantage of being a leader or having a high position in the hierarchy of a successful group [21].

We can expect that a system including both reward and punishment will be more efficient than a system based on punishment alone for promoting a complex task such as fighting, where extraordinary above-average skills are particularly valuable. A system based on punishment only would make warriors deliver the minimum performance necessary to avoid punishment; and defectors might even avoid punishment if they could convincingly fake illness. A punishment system could possibly evolve by other mechanisms if the costs of punishing are sufficiently low [20], but rewards are typically more costly to deliver than punishments and require a higher payback to evolve.

There is a tradeoff between the benefit of being part of a strong and powerful political organization and the cost of repression within the organization [21]. This balance is likely to be tipped in a peaceful environment where the need for collective protection is low. The individual would have no reason to submit to a strong leader in this case. On the contrary, the individual would most likely see his own fitness reduced by a despotic male leader who could take advantage of everybody else and even monopolize a large number of women [22]. Therefore, the optimal strategy for the individual must be to have a flexible psychology, showing a preference for strong leadership and strict discipline when intergroup conflicts are frequent or expected, but a preference for an egalitarian social structure when intergroup conflicts are perceived to be unlikely. The group-level effect of this psychological flexibility is that the higher the level of intergroup conflict,

the more the group will invest in a strong organization that strengthens its ability to organize collective fighting.

Such a group with a strong organization and fighting spirit is called *regal*, while we will use the word *kungic* (or *kalyptic*) for a group that has adjusted to peace. The same words are used for the individual psychological preferences that lead to strong or weak group organization, respectively.

Throughout human history, the majority of warriors have been men. Evolutionary explanations for this division of labor have often been discussed; see e.g. [14]. We will assume, nevertheless, that it is advantageous for a woman to support a strong leader in case of collective danger and to prefer an egalitarian social structure in case of peace and safety. Even if a woman is never engaged in direct combat, she still stands the risk of suffering under enemy attack if her group is weak and not organized for fighting.

### ***Cultural effects***

An important finding of regality theory is that the psychological flexibility at the individual level gives rise to an emergent flexibility at the cultural level. The more the social group is affected by intergroup conflicts, the more hierarchical will the social structure be and the stricter the discipline. The social group is likely to increase its fighting power by strengthening its organization, armament, morals, ideology and fighting spirit as a response to escalation in its enemies. The theory does not rule out a certain degree of intelligent decision-making when e.g. a group decides to recruit more soldiers and strengthen their military organization when facing the threat of a bellicose neighbor group or the opportunity for subduing a weak neighbor group [2].

The word *regal* denotes both the psychological preferences for a strong leader and also the resulting social structure, culture and ethos of a social group that is characterized by a high level of intergroup conflict, perceived collective danger or high military strength and discipline. The word *kungic* denotes the opposite.

Not only the morals and discipline are changed by the regal strategy. It appears that also a lot of other cultural expressions, such as religion, art and music, are changed along the regal versus kungic dimension to obtain psychological congruence between the different aspects of the culture. Various forms of art are efficient means for communicating ideological values and cultural unity [23]; and music style, in particular, has been observed to correlate with social structure, lifestyle, personality and political preferences [24], [25], [26], [27] (see, though [28]).

The cultural characteristics that we expect to be typical for regal and kungic societies are listed in table 1. It has been observed that societies can change in these characteristics not only as a response to changing threats of war but also as a response to other dangers that threaten the social group as a whole, such as economic crisis, famine, natural disasters [29], [30], and even imaginary dangers such as witches and devils [31]. It is therefore possible that the observed psychological response is a general mechanism of adaptation to the

level of danger that threatens the social group as a whole, or perhaps even to any problem that requires collective effort to solve [2]. The effects of dangers *to the individual* may be different, as discussed in the section about life history theory below.

**Table 1. Regal and kungic cultural indicators.**

<b>Regal societies</b>	<b>Kungic societies</b>
A hierarchical political system with a strong leader	A flat and egalitarian political system
Strong feeling of national or tribal identity	High individualism
Strict discipline and punishment of deviants	Lax discipline and high tolerance of deviants
Xenophobia	Tolerance of foreigners
Belief that individuals exist for the benefit of society	Belief that society exists for the benefit of individuals
Strict religion	Religion has little or no disciplining power
Strict sexual morals	High sexual freedom
High birthrate	Low birthrate
Low parental investment, i.e. short childhood and low education	Long childhood and education
Low marrying age	High marrying age
Low suicide rate (except for culturally prescribed reasons)	High rate of anomic suicide
Art and music is perfectionist, highly embellished and follows specific schemes	Art and music express individual fantasy with appreciation of individuality and innovativeness

### *Contributions from ecological theory*

In ecology and niche theory, the *competitive exclusion principle* says that complete competitors cannot coexist indefinitely [32]. While this principle has been applied mostly to the areas of ecology and economics, other aspects of niche theory have been successfully applied to eco-cultural specialization [33], [34]. If we apply the competitive exclusion principle to human societies, then we cannot expect two social groups in close proximity to live in peace if they are adapted to the same environment and depend on the same resources. The two competing groups may merge, separate, differentiate, or fight. But they may not coexist indefinitely unless something prevents them from fighting, such as geographic barriers, technical difficulties, or third party intervention.

There is archaeological evidence of at least some degree of human fighting in prehistory [35], [36], but the evidence also shows that violence was more common in some areas than in others, apparently due to settlement patterns and environmental factors such as the concentration and defendability of resources [37], [38], [39]. Mass killings did not occur everywhere. They took place mainly in sedentary cultures and most markedly in connection with agriculture or otherwise

defendable resources [37], [38]. Nomadic hunter-gatherers would flee more often than fight and thus rarely die in a battlefield, but more likely die from malnutrition and diseases after fleeing to an inferior territory.

It may be possible to roughly predict the degree of intergroup conflict for a particular culture if we consider the ecology, mode of subsistence, available technology and geography. Conflicts are unlikely for a social group that has adapted to its own specialized niche, but likely for a group that depends on the same niche as a close-by neighbor group. Conflicts can be impeded if traveling is difficult because of geographic barriers or if it is technically difficult to collect and transport sufficient food and water for supporting a troop of warriors.

If food is sparse, and consequently the population density is low, then it will be difficult to assemble a sufficiently large group of warriors for attacking the enemy; the warriors will have a long way to travel; and it will be difficult to supply enough food for the warriors. Some people find it counterintuitive that low food supply should lead to peace. However, we have to distinguish between a low but stable food supply, and a fluctuating food supply. If the food supply is permanently sparse, but stable, then the population density will necessarily be low. Imagine a landscape where food is sparsely distributed and people live in small villages or camps far distanced from each other. How would it be possible to assemble enough warriors from allied neighbor groups to attack an enemy, travel together to the distant enemy territory, and provide and transport enough food and other necessities for the traveling troops? The logistic problems simply make large-scale war impossible in the absence of technological means for food preservation and transport here. However, if food is plentiful then the population density will soon become high, geographical distances between enemy groups is likely to be shorter, and it will be easier to organize larger political groups. If, furthermore, the food supply is fluctuating and unpredictable, then there will be occasional periods of famine where people will fight over the insufficient supply of food.

In conclusion, we will predict that the level of intergroup conflict will be low in areas where food is sparse or where mountains, dense vegetation, aridity, or other environmental factors make traveling difficult. On the other hand, we can expect frequent wars where food production is efficient and defendable and there are efficient means of traveling and food preservation. The predictability of the food supply is also important. Unpredictable famine and natural disasters are factors known to cause war [29], [38].

### *Contributions from life history theory*

The regal versus kungic culture dimension has an interesting connection with the *fast versus slow life history* strategy dimension in evolutionary ecology. A *fast* life history strategy, or *r*-strategy, means that individuals start early to reproduce, have many children and care little for each child. A *slow* strategy, or *K*-strategy, means a high age at first reproduction, few children, and a high investment in the care and upbringing of each child. Humans have a relatively slow life history

strategy compared with most animals [40]. This strategy is not completely fixed. Recent research has shown that there is some room for individual differences and adjustment to the environment. Several studies have found that humans are choosing a faster life history strategy when they live in an environment where the mortality and morbidity of adults is high. A slower life history strategy is chosen where the mortality is low, where resources are predictable and defensible, and where the population density is near the carrying capacity of the environment [41], [42], [43], [44]. Economic factors and education also influence the strategy [45].

While the fast versus slow life history theory sees reproductive strategy from the point of view of the individual, the regal versus kungic culture theory is also concerned with a social-level perspective. The optimal strategy from the perspective of the social group in times of war is to produce many children and to raise them as quickly as possible to become fierce warriors. In times of peace, the optimal strategy from the group's perspective is to produce few children in order to avoid overexploitation of the environment and ecological collapse. Group selection theory has not provided a satisfactory explanation of why reproduction is limited, but life history theory seems to provide at least part of the explanation.

In times of war, the mortality is high and individuals will choose a fast life history strategy. In times of peace and stability, we can expect the population density to match the carrying capacity of the environment and we can expect to see a slow life history strategy. The interesting observation is that there is a fairly good agreement between the interests of the group according to regality theory and the interests of the individual according to life history theory. There is some degree of synergy between the two mechanisms and we will expect a positive correlation between regality and fast life history strategy.

However, there is one important difference between the predictions of the two theories. Regality theory predicts that fertility will go up as a response to collective danger that requires collective action, while the fast versus slow life history theory predicts that fertility will go up as a response to *any* danger, including dangers that affect only the individual.

## **Testing the theory on ethnographic data**

The following predictions can be made from the theories outlined above:

1. People will show a preference for a strong leader and a social structure with strict discipline in cases of a high level of intergroup conflict or other collective danger. They will show a preference for an egalitarian social structure in the absence of collective danger.



2. These individual preferences will influence the social and cultural structure in the directions called *regal* and *kungic*, respectively, as reflected in the indicators listed in table 1.
3. A society with a high level of intergroup conflict will use both reward and punishment of its members to enhance its military strength.
4. Individual danger and *intragroup* conflict will not have the same effect on social structure as collective danger and *intergroup* conflict have. But both kinds of danger will have the same effect on fertility.
5. The level of intergroup conflict will depend on the geographic and technological environment. Efficient food production and efficient means of transportation will increase the occurrence and intensity of intergroup conflict, while sparseness of food and water, geographic and other barriers to travel, and specialization to a unique niche are factors that will decrease the level of intergroup conflict.

No other known theory generates the same set of predictions. We can therefore compare our theory with alternative theories by testing these predictions. A discussion of alternative theories is provided on page 27 after the experimental section.

The predictions of social-level effects should preferably be tested on distinct sociocultural groups. We prefer to compare different societies that have as little connection with each other as possible in order to avoid spurious correlations due to cultural diffusion or common descent. Since almost all contemporary cultures are heavily influenced by modern western culture, we have chosen to rely on ethnographic data from non-industrial cultures of the past. The available archaeological data are insufficient for statistical testing, so we will use data mainly from ethnographic studies of non-industrial cultures. We will use these data to test the predictions listed above. The predictions of regality theory have not previously been subjected to cross-cultural statistical testing.

## **Data and methods**

We are presenting two statistical studies here. Study one is based on the database known as Murdock and White's standard cross-cultural sample, while study two is based mainly on data extracted directly from the original ethnographic literature.

### ***Study one***

Murdock and White's standard cross-cultural sample (SCCS) is a database covering more than a thousand variables recorded for 186 non-industrial societies around the world [46]. These societies are intended to form a representative sample of world cultures studied at a time when cultural independence was higher than today. The data are

based on ethnographic records, many of which were collected by early explorers in the 19th and early 20th century.

The variables include information about subsistence ecology, intergroup relations, political organization, culture, beliefs and child rearing practices [47], [48]. Relevant variables from the SCCS were used in study one. All statistical calculations were done in the R programming language [49].

**Data quality.** The quality of the data in the SCCS is far from perfect, but it is the best available. The data have been collected from the original ethnographic literature and coded into a database. This process involves many potential sources of error, despite elaborate precautions. The native informants that have been interviewed; the anthropologists or explorers conducting the field studies; the coders who interpreted the original literature and coded it into predefined categories for the database; and the database designers who defined the variables and categories to include in the database - all of these persons may have influenced the data by their own agendas, predilections, selectivity, taboos and language problems. Most of the field studies were conducted many years ago, and often by persons without adequate scientific training, such as explorers and missionaries (see appendix 1).

Re-reading some of the original ethnographic literature revealed several flaws in the database, mainly due to imprecise definitions of the categories in soft areas such as religion, morals and psychology. The data in the SCCS appear to be poor in the area of religion and quite uncertain in other areas of the soft sciences, and particularly in taboo-ridden areas such as sexual behavior [50].

Many data values are coded as missing, and it was suspected that data might be missing for nonrandom reasons. For some variables, more than half of the data values were missing. We suspect that the coders have tended to err on the side of caution and entered the code for "data not available" rather than "trait absent" when a particular trait is not mentioned in the ethnographic literature for a particular society. This leads to a systematic bias when data are more likely to be coded as missing when a trait is absent than when it is present. This suspicion was tested statistically by correlating missingness for each of the variables against the factors that emerge from a factor analysis as described below. This correlation was highly significant ( $p < 0.001$ ) for several relevant variables. It is quite understandable, for example, that the value for "Leadership during battle" is coded as "data not available" if there is no battle, but the statistical model does not work correctly if data are missing for nonrandom reasons. Hence, it is better to replace "data not available" with "no leadership during battle" here. Similar replacements were made for the variables "Despotic bias in conflict resolution", and "Interpersonal violence".

**Exploratory factor analysis.** A factor analysis was performed on the standard cross-cultural sample in order to test whether conflict and danger would form a single factor or split into two factors: one for

external conflict and collective danger, and one for local conflict and individual danger. Furthermore, we wanted to see whether cultural indicators of regality such as hierarchy and discipline have loadings on these factors.

The database includes more than a thousand variables for each society, but not all variables were relevant for the present study. Factor analysis requires that the number of variables must be less than the number of societies in order to avoid that the covariance matrix becomes singular. It was therefore necessary to exclude most variables and retain only those considered most relevant. Variables that had little or no relevance to the purpose of the current analysis, such as language and geographic region, were excluded. Excluded were also: categorical variables that could not be made ordinal, variables where more than half the values were missing, and variables with low variance or high uniqueness. Unfortunately, many of the variables that are relevant to regality theory had to be excluded from the factor analysis because they had too many missing values, especially psychological variables and variables relating to childrearing, etc.

Where a group of variables all relate to the same subject area, the redundant variables were either excluded, or closely related variables were combined into one. After this reduction, 91 variables remained for the factor analysis. These variables were normalized to unit variance.

Missing data was a big problem because the factor analysis model has no standard way of dealing with missing data. Missing values were replaced with appropriate values for three of the variables in the manner explained above. The factor analysis was performed twice on the same data set, using two different methods for dealing with the remaining missing data: (1) replacement with the mean, (2) multiple imputation by the hot deck method with population density as auxiliary variable [51]. The second method typically gives higher variance and poorer correlation on variables with many missing values than the first method.

The number of factors was chosen to be eight based on a Scree plot. Oblique rotation (Promax) was used in order to allow factors to be correlated.

**Structural equation modeling.** In addition, study one comprised a structural equation model constructed with data from the standard cross-cultural sample. Several indicators related to intergroup war were combined into a war factor. The regality dimension was inserted as a latent variable based on the war factor and a number of cultural indicators according to the theory. The fast versus slow life history strategy dimension was also inserted as a latent variable based on internal and external war as well as other dangers and cultural indicators of life history strategy. Sexual moral was included as another latent variable because sexual behavior could not be directly observed. The influences of cultural regality and life history "fastness" on sexual morals are included in the model.

Missing values were replaced with appropriate values for those variables where missingness correlated significantly with the factors in

the exploratory factor analysis and where the reason for data missing was clear, in the same way as for the factor analysis. Missing values were replaced by the mean for the remaining variables.

Relevant variables according to the theory were inserted, but variables that failed to reach significance at the 0.05 level were removed. Unfortunately, most of the variables used by Quinlan [52] as indicators of parental investment failed to reach significance in the present model. A few variables that relate to parental investment remained as significant, while only one variable related to art and three variables related to religion remained as significant. The model was analyzed with the R package named *lavaan* [53], and additional correlations were calculated.

**Multiple correlation analysis.** Also in study one, a simultaneous multiple correlation analysis was made for several variables according to the linear model

$$v = k_0 + k_1 f_1 + k_2 f_2 + k_3 f_3 + \varepsilon$$

where  $v$  is any of the variables in the SCCS.  $f_1$  represents cultural regality and  $f_2$  represents fastness of life history strategy, both obtained from the structural equation model.  $f_3$  is the population density, which was included in the model because it is a very likely confounding factor, according to the results of the factor analysis.  $k_0$ ,  $k_1$ ,  $k_2$  and  $k_3$  are coefficients, and  $\varepsilon$  is the residue of unexplained variance. The levels of significance for  $k_1$ ,  $k_2$ ,  $k_3 \neq 0$  were calculated.

## *Study two*

A subsample of fourteen of the cultures represented in the SCCS was selected for further study, and the desired data were extracted from the original ethnographic literature rather than from the SCCS database. This method was intended to reduce the problems with data quality and to obtain information that was not available in the SCCS. The extraction of data is further explained in the results section below.

The literature listed as sources for the SCCS [54] was supplemented by any additional literature published later. All coding of data was done by the author. Every conscious effort was made to avoid expectation bias. No funding was available for hiring extra raters and test inter-rater reliability. A brief description of each society, an explanation of how it is evaluated, and the literature used, is provided in appendix1.

Study two tests the prediction that certain environmental factors influence the level of intergroup conflict which in turn influences the social and cultural indicators that we associate with regal or kungic cultures.

The statistical test uses a rank correlation. This is a non-parametric test that makes no assumption about linear relationships or normal distribution, unlike the previous tests. Kendall's tau,  $\tau$ , was calculated and the level of significance,  $p(\tau)$ , was calculated for the one-tailed tests. The subsample was not big enough to control for confounding factors.

## Results

### *Exploratory factor analysis (study one)*

Regality theory predicts that the level of external conflicts and other collective dangers will influence a number of political, cultural and psychological variables. The fast versus slow life history theory predicts that both internal and external conflicts influence fertility and parental investment. We expect these two dimensions to be visible in a factor analysis because they have many cultural correlates. The factor analysis is carried out twice, using two different methods for handling missing data, as explained above. The results are given in table 2 and 3, respectively. Detailed factor loadings are given in appendix 2, page 64.

**Table 2. Factor analysis of sociocultural variables in 186 societies.**

<b>Factor interpretation</b>	<b>% variance explained</b>
Political complexity and population density	7.9
War	5.2
Other conflict and violence	4.9
Agriculture	4.1
Urbanization	2.7
Animal husbandry	2.6
Fishing	2.1
Gathering	1.9
Missing data values are replaced by the mean	

**Table 3. Factor analysis of sociocultural variables in 186 societies.**

<b>Factor interpretation</b>	<b>Occurrences in 25 runs</b>	<b>% variance explained</b>	<b>Std. dev. between runs</b>
Political complexity and population density	25	9.8	0.9
Climate	25	5.1	0.3
War, conflict and violence	25	4.9	0.3
Animal husbandry	25	3.3	0.7
Gathering	24	2.0	0.3
Fishing	23	2.8	0.9
Urbanization	21	2.8	0.1
Hunting	19	2.9	1.2
Agriculture	11	3.6	0.8
Uninterpreted	2	3.3	0.0
Factor analysis on the same data as in table 2, but missing data values are replaced by multiple imputation in 25 runs.			

The first factor analysis (table 2) shows that political complexity is highly correlated with population density, and these variables combine to form the strongest factor. The second factor represents intergroup conflict as well as its correlates. This factor has high loadings on variables related to war, army and bellicosity. The third

factor has high loadings on both internal and external conflicts as well as individual violence. In other words, we have two factors that relate to conflict. These two conflict factors are both positively related to polygamy. Other indicators of life history strategy show only weak and inconsistent correlations with the two conflict factors.

The two conflict factors merge into one in the second factor analysis (table 3). The difference between the results of the two factor analysis methods is a mathematical artifact. The method used in the second factor analysis has a higher tendency to form factors around variables with few missing values, which is seen e.g. in the formation of a factor of climate variables, which have no missing values. While the first method probably gives more accurate results, the second method is useful for estimating the inaccuracy due to missing data.

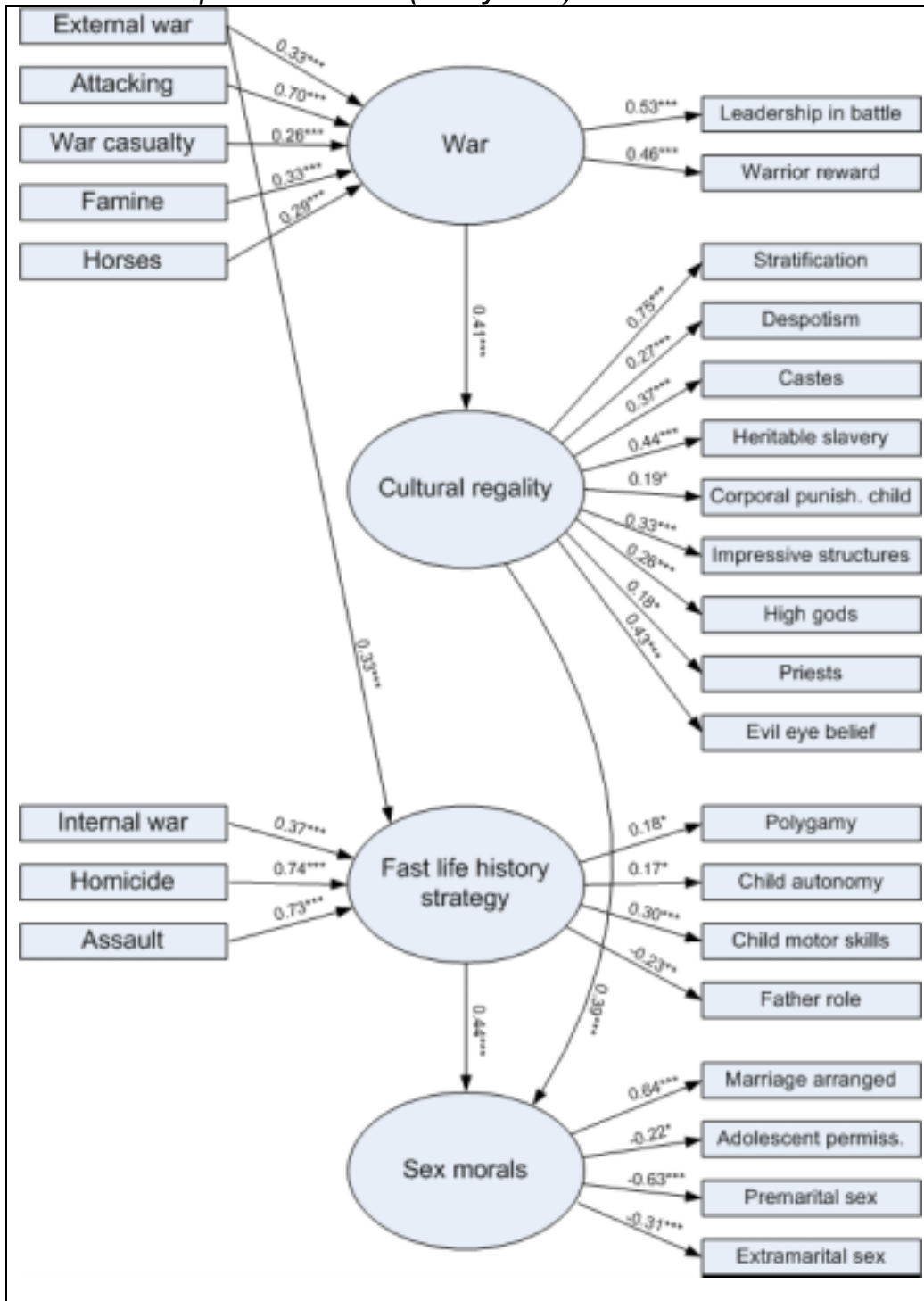
It is noteworthy that the war factor is always distinct from population density and political complexity. This means that the level of war is not simply determined by population factors. The prediction that internal and external conflicts have different psychological and cultural effects gets weak support from the first factor analysis and none from the second. We must conclude that the factor analysis does not give as clear answers as we could wish, due to mathematical problems and poor data quality.

A similar factor analysis made earlier by Russell found a war factor that correlates clearly with social hierarchy, slavery, polygyny, achievement and crime [1]. Interestingly, the war factor in Russell's study is also significantly correlated with a number of variables relating to sexual restrictiveness, tough treatment of children and early socialization. The correlation with religious variables is weak. An interesting finding in Russell's study is that people in warlike and hierarchical societies show a high level of boasting and display of wealth. The status competition and striving for wealth may lead to increased levels of theft and other crimes and conflicts [1], [55]. This finding may contribute to our understanding of the connection between external and internal conflicts. Another explanation is that boys are socialized for aggression in warlike societies [56].

Other studies have found that the level of intergroup conflict is positively correlated with harsh and punitive treatment of children and socialization for aggression [56] and moralizing religion [57]. Some of the predicted correlations have also been observed in modern cultures. Norris and Inglehart find that existential insecurity is linked with religiosity and high fertility [58], Carnagey and Anderson find increased pro-war attitudes [59], and Sipes finds a link with warlike sports [60].

A caveat is in place here when interpreting factor analysis results. The factors and factor loadings are quite sensitive to the design of the factor analysis, and in particular to the choice of variables included in the analysis. Other cross-cultural studies have found only weak correlations with a war factor, or no war factor at all [61], [62].

Structural equation model (study one)



The figure shows the influence of collective dangers and individual dangers on the cultural regality dimension and the life history strategy dimension, as well as the influence of both dimensions on sexual behavior. Rectangles indicate measured variables while ovals indicate latent variables. The directions of the arrows indicate the assumed dominating direction of causality, but the statistical results are insensitive to the directions of these arrows. It is impossible to distinguish between cause and effect with the available methods. Numbers on the arrows are path coefficients. Levels of significance are indicated as \*:  $p \leq 0.05$ , \*\*:  $p \leq 0.01$ , \*\*\*:  $p \leq 0.001$ . (Measures of fit: RMSEA = 0.076, 90% C.I.: 0.067-0.084, SRMR = 0.091, CFI = 0.61, AIC = 13782).

The structural equation model is shown in figure 1. This model is based on the theory that war and other collective dangers influence the level of regality while both collective dangers and individual dangers influence the life history strategy. Both factors influence sexual behavior. Various cultural indicators of regality and life history strategy are shown in the figure.

The war factor emerges from the level of war and various indicators that we expect to be correlated with war. The results suggest that famine is a significant cause of war. The availability of efficient means of transportation (horses) appears to be a significant contributing factor as well.

The war factor is significantly correlated with rewards for successful warriors. There are few variables relating to cowardice and desertion, and these variables show no significant correlation. The database has no variable indicating punishment for defection in war. Therefore, we have more support for the theory that attaches importance to the rewarding of brave warriors than the alternative theory that relies on the punishment of defectors only.

The cultural regality is modeled here as a latent variable which is influenced by war and other collective dangers. However, the regality is also influenced by unmeasured factors such as cultural traditions and subjective beliefs about dangers, including religious beliefs. A number of cultural indicators of regality are included in the model, and it is confirmed that they fit into the model with highly significant path coefficients.

The life history strategy is influenced by internal and external conflict as well as by other dangers. Only a few cultural indicators of life history strategy and parental investment are included in the model. Several other indicators of life history strategy have been excluded because they failed to give significant coefficients.

Sexual morals are influenced by both the regality dimension and by the fast versus slow life history dimension, and reflected in various attitudes towards sexuality and marriage. No reliable measure of fertility was available, but we are assuming that strict sexual morals lead to high fertility. Our hypothesis is that strict sexual morals allow only reproductive sex within marriage, while sex for pleasure only is suppressed. This puts a pressure on young people to marry early and get many children because alternative outlets for their sex drive are blocked [67].

The results from the structural equation model confirm that cultural regality is connected with political stratification, caste stratification, despotism and slavery, and these results are highly significant. The connection with disciplining of children is weaker, but still statistically significant ( $p = 0.013$ ). Few relevant variables relating to art are available, but the presence of large or impressive structures (large buildings, etc.) has a highly significant connection to cultural regality. Also, three variables relating to religion are significant. Finally, it is confirmed that sexual morals are influenced in the strict direction by both cultural regality and life history fastness. No direct path between regality and fastness was found.



Various correlation coefficients are given in table 4. The correlation between regality and fastness is moderate but highly significant ( $p = 7 \cdot 10^{-4}$ ). Regality is also significantly correlated with population density and with various modes of subsistence.

**Table 4. Correlation coefficients of selected variables against cultural regality, life history fastness and war**

Variable	Regality	Fastness	War
Regality		0.25***	0.49***
Population density	0.52***	0.11	0.20**
Political integration	0.73***	0.21**	0.43***
Urbanization	0.48***	0.04	0.31***
Agriculture	0.41***	0.13	0.15*
Animal husbandry	0.43***	0.09	0.17*
Hunting	-0.49***	-0.10	-0.09
Gathering	-0.50***	-0.13	-0.22**
Fishing	-0.25***	-0.11	-0.15*
Warrior reward	0.10	0.12	0.58***
Warrior prestige	0.18*	0.15*	0.61***

\*:  $p \leq 0.05$ , \*\*:  $p \leq 0.01$ , \*\*\*:  $p \leq 0.001$ .

### *Multiple correlation analysis (study one)*

The results of the multiple correlation analysis are shown in table 5. There is a correlation of regality with agriculture, which disappears when population density is controlled for, as we can see when comparing table 4 and table 5, while the correlations of regality with other means of subsistence remain significant. The correlation of sexual morals with both regality and fastness remain significant when population density is controlled for. Polygamy is significantly related to fastness but, contrary to the expectation, not to cultural regality in this test. The expected correlation between regality and suicide was not found. The variable named classical religion is a mixture of very different religions and therefore not as specific as we would wish, but it is included table 5 because it gives a significant correlation with regality.

**Table 5. Multiple regression of various variables against regality, life history fastness and population density**

Variable	Regality	Fastness	Population density
Political integration	0.59***	0.04	0.27***
Urbanization	0.26***	-0.07	0.46***
Agriculture	0.07	0.05	0.63***
Animal husbandry	0.47***	-0.01	-0.08
Hunting	-0.21**	0.01	-0.55***
Fishing	-0.20*	-0.06	-0.06
Gathering	-0.30***	-0.01	-0.37***
Sex morals	0.42***	0.42***	-0.11
Trend in autonomy	0.24**	0.02	0.19*
Urbanization	0.26***	-0.07	0.46***
Class stratification	0.85***	-0.11**	0.04
Caste stratification	0.52***	-0.08	-0.08
Severity of famine	0.27**	-0.03	-0.04
Heritable slavery	0.63***	0.00	-0.17*
Polygamy	-0.04	0.24**	-0.13
Suicide	-0.01	0.38***	-0.09
Formal sanctions	0.23**	0.10	0.14
Horses	0.22*	-0.12	-0.18*
Classical religion	-0.24**	0.10	-0.09
High gods	0.41***	-0.05	-0.15
Evil eye beliefs	0.55***	0.03	-0.05

\*:  $p \leq 0.05$ , \*\*:  $p \leq 0.01$ , \*\*\*:  $p \leq 0.001$ .

### *Subsample study (study two)*

Many of the cultural traits that we would like to test, especially those that belong to soft areas such as religion, sexuality, discipline, treatment of children, art, etc., are poorly represented in the standard cross-cultural sample. The relevant variables are either not included in the SCCS database or they are unreliable or have too many missing values. The data in the database are coded into simple categories and values that may be poor representations of the complex behaviors, beliefs and social structures in the cultures that we study. It is difficult to guess what the human realities that lie behind a number in a database are.

First hand observation and collection of the missing data is no longer a possibility because the cultures in question have been heavily transformed by modernization if not completely annihilated or absorbed into modern cultures. We must resort to the original ethnographic literature and hope that we can find the missing data there. This has the advantage that the data are presented in a coherent and meaningful way. Therefore, it was decided to extract the relevant data from the original ethnographic literature for a subset of the cultures represented in the SCCS. The subsample was selected on the basis of the following criteria:

1. The selected cultures must be geographically, culturally and genetically distant from each other in order to avoid similarity due to cultural diffusion or common descent (Galton's problem).
2. The cultures should be different in terms of subsistence ecology. Where several cultures resemble each other, only one is included.
3. The population of each society must have lived in relative isolation long enough to develop a distinct culture.
4. The influence from modern cultures must be minimal.
5. The culture is not pacified by any colonial authority or other external power.
6. The culture must be well described by more than one ethnographer.

The subsample consists of fourteen cultures, which were selected for further study. The ethnographic literature for the selected cultures was studied in order to extract sociocultural information relevant to the theory. A number of cultural variables were evaluated in order to test if the correlations predicted by our theory could be confirmed. Details for each culture are described in appendix 1.

The different types of conflict, such as war, raiding and feuding, are often difficult to distinguish, and this is a serious problem for our testing of regality theory. Feuding is usually motivated by the desire to obtain justice by retaliating against the perpetrator of some wrongdoing or his family. This takes place mostly where there is no organized system of justice, which is typical for a kungic culture. Territorial war, on the other hand, is expected mainly in regal cultures, according to our theory. Any confusion between feuding and territorial war will thus tend to blur the statistics. Unfortunately, it is difficult to determine whether the main motive behind a raid is retaliation, plundering, capturing women, or territorial expansion. For example, anthropologists cannot agree whether Yanomamo Indians fight over women, hunting territory or steel tools [68].

It was decided to use environmental, ecological and technological parameters, rather than the level of war, as the independent variable in order to avoid the difficulties in determining the level of war and distinguishing between different motives for conflict. A statistical correlation cannot distinguish between cause and effect, but it is probably reasonable to assume that the environment influences the culture more than the culture influences the environment, even when the available technology is included as an environmental factor. The semi-fixed status of available technology and ecological environment makes a statistics based on these factors less ambiguous in terms of distinguishing between cause and effect.

Thus, the prediction we want to test is that environmental and technological factors that enable intergroup conflict are positively correlated with those sociocultural variables that indicate a regal culture, according to our theory. Other environmental factors that threaten a sociocultural group, such as unpredictable natural disasters, may also have an influence in the regal direction.

We are assuming that the following environmental and technological factors make intergroup conflict more likely:

- An ecology and technology that enables a high food production per unit area, and thus a high population density
- Neighbor groups with similar ecology competing for the same resources
- Efficient means of transportation of warriors to enemy territory
- Efficient means of communication over distance
- Efficient means of food storage and transportation
- Efficient weapons
- Favorable climate

Intergroup conflict is likely to be impeded or prevented when these factors are reversed, i.e. when food is sparsely distributed, when there are geographical barriers to travel, niche specialization, or when extreme climate conditions make work and fighting difficult. Our prediction is that a culture will be regal when these factors enable intergroup conflict and kungic when not. We will predict an intermediate level on the regality scale when some factors point in one direction and other factors point in the opposite direction. These assumptions do not hold in modern industrial societies where international economic interdependence or third party intervention often can prevent war. Also, the assumptions do not hold when the society is pacified by colonial rule or other foreign powers. This is the reason why pacified and modernized societies are excluded from our subsample.

The expected conflict level is evaluated on a five point scale, where a 1 indicates that intergroup conflict is unlikely because of environmental factors or niche specialization, and a 5 indicates that environmental factors make large scale war possible.

The following variables are evaluated for each culture in the subsample and correlated against the expected conflict level:

**War or intergroup conflict.** The level of intergroup conflict is interpreted as the frequency, intensity, degree of violence and casualty rate of conflicts against other social groups that do not have the same self-defined ethnic or tribal identity. Territorial conflicts are given higher weight than plundering and retaliation of injustice. (Coded as 1 = none; 2 = only small raids, feuds, vendettas; 4 = rare or low scale; 5 = frequent large wars).

**Internal conflicts and feuds.** Internal or intragroup conflicts are conflicts between people with the same ethnic or tribal belonging. Examples are conflicts between families over properties or marriage, or conflicts between leaders and followers. Feuds are series of retaliations over real or alleged wrongdoing. The theory predicts that intergroup conflicts, but not necessarily internal conflicts, are positively correlated with regal indicators. (Coded as 1 = rare; 5 = frequent).

**Political system.** A hierarchical political system with strong centralized power is expected in a regal society. In a kungic society we will expect an egalitarian political system with little or no hierarchy, or in extreme cases no formal system of leadership at all. (Coded as 1 = none or simple; 2 = formal leadership; 4 = complex or varying; 5 = strong and highly hierarchical).

**Justice and punishment.** We expect a strict justice system and harsh punishments in a regal society, but a mild or lenient degree of punishment in a kungic culture. (Coded as 1 = mild or lenient; 2 = somewhat mild; 4 = somewhat strict; 5 = very strict).

**Religion.** We expect the religion in a regal society to support the power structure by mirroring or being part of the hierarchical political structure and by legitimizing or exalting the ruler. The religion in a regal culture often has a disciplining function by enforcing strict rules, possibly with supernatural punishments. The religion in a kungic culture is typically non-discriminatory and not connected with political power, discipline, elitism, dogmatism or strict rules. (Coded as 1 = mild, unorganized or non-authoritarian; 2 = religion supports politics; 4 = some disciplining; 5 = strict, legitimizes ruler).

**Group identity.** We expect people to be hostile to strangers and have a strong sense of ethnic or tribal identity in a regal society. We expect less distinction between *them* and *us* in a kungic culture. (Coded as 1 = low; 3 = hostility to or fear of strangers; 5 = high).

**Fertility.** We expect people to get more children in a regal than in a kungic society. Kungic cultures may keep the birth rate down by post-partum sexual taboos, long breastfeeding periods, anti-contraceptive means, abortion or infanticide. (Coded as 1 = low; 3 = medium; 5 = high).

**Suicide.** We expect the incidence of suicide to be higher in kungic than in regal cultures, according to [2]. This applies only to the types of suicide that Durkheim has labeled anomic and egoistic suicide [69], not to culturally prescribed suicide or self-sacrifice in battle. (Coded as 1 = rare or no mentioning; 3 = occurs; 5 = common).

**Sexual morals.** We expect regal societies to have strict taboos and rules regulating sexual behavior, including bans on premarital and extramarital sex. Kungic societies are likely to be more tolerant of a variety of sexual behaviors. (Coded as 1 = lax, permissive; 3 = mixed or intermediate; 5 = strict).

**Marrying age.** We expect the marrying age to be lower in regal than in kungic societies. The marrying age is recorded separately for men and women. Where the literature specifies a range for the marrying age, the median of this range is used in the statistics.

**Divorce.** We expect divorce to be easier and more tolerated in kungic than in regal societies. (Coded as 1 = rare, difficult; 3 = occurs; 5 = easy, frequent).

**Children work.** We expect children to work harder, and from an earlier age, in regal than in kungic societies. (Coded as 1 = no; 3 = some; 5 = much or early).

**Art.** Different cultures produce different kinds of art. We are considering many different forms of art, including carving, painting, sculptures, decorated clothing, body adornment, architecture and other material art as well as poetry, tales, drama, music, singing and dance. We expect the artistic production of regal cultures to be highly embellished and perfectionist, possibly glorifying representatives or symbols of power. We expect kungic cultures to produce a more individualistic art with less conformity. (Coded as 1 = simple, individualistic; 3 = somewhat embellished; 5 = embellished, repetitive, stylized).

The evaluation of these variables for the fourteen societies is summarized in table 6. Most variables are evaluated on a scale from 1 to 5, where intermediate values are not always used. A rank correlation of these variables against the predicted conflict level is also shown in the table. A review of the analysis of each culture is given in appendix1 below.

**Table 6. Rank correlation of various socio-cultural parameters against the expected conflict level for 14 non-industrial cultures**

Culture	Expected conflict level based on environment	War or intergroup conflict	Internal conflict, feuds	Political system	Justice, punishment	Religion	Group identity	Fertility	Suicide	Sexual morals	Marrying age, men	Marrying age, women	Divorce	Children work	Art
!Kung	1	1	1	1	1	1	1	1	1	1	26	15.5	5	1	1
Gilyak	1	1	5	1	1	1	1	1	5	1	22.5	na	5	na	3
Mbuti	2	1	1	1	1	1	3	1	3	1	18	16	5	1	1
Yahgan	2	1	5	1	2	2	3	5	1	3	18	15	3	3	1
Warao	2	4	1	1	1	4	3	5	1	1	21	19	3	3	1
Andaman	2	4	5	1	1	1	3	1	1	1	20	18	1	3	1
Arernte	2	4	5	1	4	1	1	1	1	1	na	na	3	1	1
Yi	3	5	5	2	2	1	3	na	5	1	13	13	3	3	3
Apache	4	4	5	1	5	4	na	na	3	5	20	18.5	na	na	3
Somali	4	5	5	4	2	5	na	na	1	5	21	16	5	5	3
E De	5	5	5	4	4	4	3	3	1	3	na	na	1	3	3
Ganda	5	5	1	5	5	2	5	5	1	5	15.5	14	5	5	1
Inca	5	5	1	5	5	5	na	na	1	5	25	18	1	5	5
Babylonians	5	5	1	5	5	5	na	na	1	3	29	17	na	5	5
$\tau$		.81	-.14	.81	.75	.62	.74	.51	-.25	.64	-.05	.02	-.32	.74	.53
p		.0005	.3	.0004	.0008	.005	.01	.075	.17	.004	.5	.5	.12	.003	.016

Variables are indicated on a scale of 1 - 5 as described in the article, except for marrying age which is indicated by the median.  $\tau$  = Kendall's tau, p = level of significance, one-tailed. na = data not available.

**Table 7. Rank correlation of various socio-cultural parameters against the expected conflict level for 15 non-industrial cultures**

Culture	Expected conflict level based on environment	War or intergroup conflict	Internal conflict, feuds	Political system	Justice, punishment	Religion	Group identity	Fertility	Suicide	Sexual morals	Divorce	Children work	Art
Yanomamo	3	4	5	1	1	1	1	3	1	3	5	3	1
$\tau$ (14 cultures)		.81	-.14	.81	.75	.62	.74	.51	-.25	.64	-.32	.74	.53
p (14 cultures)		.0005	.3	.0004	.0008	.005	.01	.075	.17	.004	.12	.003	.016
$\tau$ (15 cultures)		.80	-.12	.78	.70	.59	.53	.50	-.23	.67	-.24	.75	.52
p (15 cultures)		.0003	.3	.0004	.001	.005	.04	.056	.18	.002	.19	.002	.015

Extension to table 6. Comparison of statistics with and without Yanomamo culture added.

At the regal end of the scale we find empires like the Babylonians and the Incas, while we find isolated cultures like the Gilyak and niche cultures like the Mbuti pygmies and !Kung bushmen at the kungic end of the scale.

The statistical results indicate that the level of intergroup conflict is strongly correlated with the environmental and technological parameters, thus confirming that environmental factors have a strong influence on the amount of war. The important difference between intergroup and intragroup conflict is confirmed by the finding of a slightly negative and non-significant correlation of internal conflict with the environmental factors.

The political structure is strict and hierarchical in high conflict cultures, and simple or egalitarian in the low conflict cultures. This is confirmed by a strong and highly significant correlation. The expectations for a strict justice system, a strict and disciplining religion and a strong sense of group identity in high conflict cultures are also strongly confirmed.

The fertility or population growth is higher in the high-conflict cultures, as expected, but the trend is not significant at the 0.05 level. The level of suicide shows a negative correlation, as expected, but not significant. Sexual morals are stricter in high-conflict cultures, as expected, and the trend is highly significant. The marrying age shows hardly any correlation at all. This may be explained by the very inaccurate data for marrying age (some cultures do not count years), and perhaps also by the dependence of marrying age on economic factors and educational level. Divorce is more difficult in high-conflict cultures, but the trend is not significant. Perhaps divorce is more common in polygamous relationships and this neutralizes the predicted effect of strict sexual morals in regal cultures.

Children work more, or from an earlier age, in the high-conflict cultures. This result is as expected and highly significant.

The prediction that art is more elaborate and embellished in high-conflict cultures than in peaceful cultures was confirmed, and this result is statistically significant.

### *Search for exceptions to the theory*

One of the most powerful ways to test a scientific theory is to search for examples that appear to falsify the theory. In an attempt to find a non-industrial culture that does not fit the regal versus kungic culture theory, we have chosen the famous example of the Yanomamo living in the Amazon rain forest. These people have a reputation for being fierce and warlike despite geographical isolation and a relatively low population density. The Yanomamo were not included in the subsample of study two because the SCCS lists only a single author of literature for this culture, and because the Yanomamo are geographically and genetically close to the Warao, who were included



because of their unique niche. Several authors have studied the Yanomamo since the SCCS lists were compiled. We can therefore investigate the Yanomamo using the same methods and criteria that were used for the other cultures. This investigation is included at the end of appendix 1.

The Yanomamo have a higher level of conflict than the Mbuti who live in a similar environment. However, their means of subsistence is different. The Yanomamo practice slash-and-burn agriculture while the Mbuti are hunters and gatherers who obtain agricultural products through barter with other peoples. The more efficient food production of the Yanomamo enables them to have larger village populations than the Mbuti and hence a more regal culture. Chagnon finds that the level of conflict among Yanomamo is higher in the lowlands where villages are large than in the highlands where villages are smaller due to ecological factors [70]. Thus, it appears that differences in village size can explain most, if not all, of the difference in conflict level between Mbuti and Yanomamo. Ferguson proposes that the Yanomamo are fierce because they fight over access to steel tools and other western products [68]. However, there is no reason why the Mbuti should not do the same. Another possible factor is that the Yanomamo make heavy use of hallucinogenic drugs which make them violent, and which may give them visions of dangerous spirits [71].

The level of intergroup conflict among the Yanomamo may be higher than expected, but other cultural indicators turn out to be more kungic than expected. Table 7 shows how the test statistics of table 6 are influenced by addition of the Yanomamo culture. The level of significance becomes slightly higher on some parameters, and slightly lower on other parameters, but the overall picture is largely unchanged by the inclusion of this culture in the statistics.

### *Summary of evidence*

To summarize, the findings from both study one and study two confirm that the level of intergroup conflict is correlated with several cultural variables, and the correlations are in the direction predicted by regality theory. These findings are in agreement with earlier studies [1], [55]. Study two confirms that the level of intergroup conflict, and thus the cultural regality level, is strongly influenced by environmental and technological variables in non-industrial and non-pacified societies. While the regality level is strongly connected with the political complexity and population density, it cannot be reduced to these factors alone. The factor analysis and the multiple correlation analysis indicate that significant effects remain when population density is controlled for. However, the subsample in study two is not big enough for controlling for the confounding influences of population density and life history strategy.

It is confirmed that a high level of intergroup conflict or collective danger is associated with a hierarchical political system with strict discipline and punishment and a strong sense of group identity. Such a system is likely to have strict sexual morals and a strict religion that legitimizes the political system and contributes to the disciplining of the people. The art produced by such a society is likely to be highly embellished and perfectionist. The absence of collective dangers leads to kungic cultures, which are typically peaceful, egalitarian and tolerant. The predicted correlations for fertility, marrying age, divorce rate and suicide rate were not statistically significant in the present study, perhaps because many data are missing or inaccurate.

The missing data caused mathematical problems in the factor analysis and the structural equation model analysis. The various methods used for dealing with the missing data problem may have caused artifacts in the results.

It must be emphasized that the statistical analyses applied in these studies cannot prove causality. The structural equation model is useful for testing if the proposed causal theory fits the data, but it does not rule out the existence of alternative models that fit the data equally well [72]. Many variables were removed from the structural equation model because they showed no significant effect. This removal of variables may have caused selection bias resulting in false significance. Ideally, the confirmatory test on the structural equation model should not use the same data set as the exploratory factor analysis. Unfortunately, no extra data set is available since the number of relatively independent cultures is limited. This is a general problem in cross-cultural research.

Many previous studies have found effects of collective danger that are relevant to our theory. Table 8 lists some of these studies. All of these studies find correlates of collective danger that are in accordance with regality theory, though a few studies fail to find all the effects that we would predict.

Schmitt and Pilcher recommend that theories of psychological adaptations should be evaluated by the *breadth* of evidence and the *depth* of evidence [74]. The breadth of evidence means the number of different forms of evidence, such as theoretical, psychological, cross-cultural, etc. The depth of evidence means the quality of the evidence and methodological rigor. In the present situation, the support for regality theory is more broad than deep. We have theoretical support; lab experiments, natural experiments and correlation studies; individual-level psychological studies as well as cross-cultural studies of collective effects; and studies of modern as well as non-modern cultures. The evidence is not very deep, however. Several of the studies listed in table 8 are using non-representative samples, unrealistic manipulations of danger, and are measuring only short-term effects. The cited studies are based on other theories than the one discussed here, or no theory at all. We need similar studies based on

regality theory in order to make more detailed predictions that can be tested, including predictions that differ from alternative theories. The present study is relying on the best sample of non-modern cultures available to us, but the fact that these cultures no longer exist gives rise to serious methodological problems, as discussed above. We have proposed a theory of individual and collective responses to collective danger. Future research should test this theory in various different ways in order to further develop and possibly refine or modify the theory presented here.

**Table 8. Examples of studies finding correlates of collective danger**

Study	Level of effect	Type of culture	Type of danger	Sample	Source of variation	Observed effect	Theory
Present study	culture	non-industrial	war	world cultures	natural	politics, justice, religion, morals, treatment of children, art	regality theory
Russell [1]	culture	non-industrial	war	world cultures	natural	punitiveness	psychology
Sipes [60]	culture	non-industrial	war	world cultures	natural	combative sports	cultural evolution
Roes & Raymond [57]	culture	non-industrial	intergroup competition	world cultures	natural	religion	various
Inglehart & Welzel [63]	individual and culture	contemporary	existential insecurity	world cultures	natural	nationalism, politics, religion, discipline, fertility	political psychology
Jugert & Duckitt [4]	individual	modern	economy, violence	students	imagined scenario	prejudice	authoritarianism
Feldman & Stenner [64]	individual	modern	economy, war	representative	correlation study	hostility to minorities, etc.	authoritarianism
Wohl, Branscombe & Reysen [65]	individual	modern	group extinction	self selected	salience manipulation	strengthen group	social psychology
Riek, Mania & Gaertner [66]	individual	modern	various	meta-analysis	various	hostility to outgroup	various
Ladd [5]	individual	modern	terrorism	representative	natural	support for president	political psychology
Carnagey & Anderson [59]	individual	modern	terrorism	students	natural	war attitudes, punitiveness	psychology
Huddy & Feldman [73]	individual	modern	terrorism	representative	natural	strict foreign policy	psychology
Curşeu, Stoop & Schalk [96]	individual	modern	immigration	semi-random	correlation study	prejudice	integrated threat theory

## Comparison with alternative theories

The traditional way of promoting a new theory is to prove previous theories wrong. We do not believe that this naive form of falsificationism has been very fruitful in the social sciences [75]. While we believe that regality theory explains our findings better than alternative theories do, this does not mean that previous theories should be completely rejected. Previous theories may still contain some important insights that might be remodeled and combined with the new discoveries in a synthetic process that makes our knowledge evolve and expand its explanatory power.

In the following sections we will look at various other theories that deal with some of the same phenomena as the present study, and discuss the strengths and weaknesses of each theory. Hopefully, this process can lead to an expansion of our knowledge rather than just the replacement of one theory with another.

### *Cultural selection theory*

The theory of fast versus slow life history strategies, also called biological *r/K* theory, is based on *biological* selection acting on gene populations [40]. A somewhat similar theory for *cultural* selection acting on culturally inherited memes [76] was proposed in 1997 [6].

A selfish meme complex can use different strategies for utilizing the resources of its hosts (the persons holding the memes) to produce either a high quantity or a high quality of cultural offspring. A cultural *r*-strategy is a strategy where the meme complex makes its hosts spend a lot of resources on propagating their culture and beliefs to others. This is seen e.g. where the winning group in a war is imposing their culture and military strategy on the losing group, and also where a religious sect is spending a lot of energy on winning new converts. The opposite is a cultural *k*-strategy (written with a small *k*), which allocates few resources to winning new hosts and more resources to making its hosts satisfied so that they will not choose competing memes [6]. This is typically seen in times of peace where ideals of individual freedom become more popular than ideals of patriotism and unity.

This so-called cultural *r/k* theory predicts that the cultural *r*-strategy will be most efficient in times of intergroup conflict while the cultural *k*-strategy will be most efficient where there is no culturally different neighbor group to compete with. Interestingly, the predictions of this cultural *r/k* theory are so similar to the predictions of the theory of a psychological desire for a strong leader in times of intergroup conflict, that any of these two theories would provide a logical explanation for the cultural effects found in the present study.

Individual psychological responses are not captured by the present study, but the individual-level studies listed in table 8 give us reason to uphold the theory of a desire for a strong leader. We will

argue that psychological responses to intergroup conflict are likely to be much faster than cultural r/k selection, and therefore more effective, but the cultural r/k mechanism probably has at least some effect as well. For now, we will assume that there is a synergy between the two effects, perhaps as the result of some kind of gene/culture coevolution [77], and we will incorporate both mechanisms in our theory of regality. We will use the terms *regal* and *kungic*, regardless of which of the two mechanisms is strongest in each specific case.

It must be noted that the analogy between biological r/K theory and cultural r/k theory is so weak and imperfect that it may be preferred to regard the connection between biological and cultural r/k strategies as a correlation rather than an analogy.

### *Authoritarianism theory*

The psychological characteristics that we call regal have a striking similarity with the phenomenon that social psychologists call *the authoritarian personality* [78], and in fact many of the findings of the current study could possibly be explained with the theory of authoritarianism.

A particularly useful version of authoritarianism theory distinguishes two measures called *Right-Wing Authoritarianism* (RWA) and *Social Dominance Orientation* (SDO) [79], which are connected with certain characteristic worldviews. RWA is linked with the view of the world as a dangerous place and SDO is linked with the view of the world as a competitive jungle where might is right. RWA leads to social conformity and SDO leads to tough-mindedness, according to this theory, and both lead to negative attitudes towards outgroups [79], [80], [81], [82]. The RWA theory is particularly relevant here because the *view of the world as a dangerous place* in RWA theory can be regarded as almost equal to *perceived collective danger* in regality theory. The SDO theory may have some relevance for our study as well because it refers to a worldview that assumes social inequality, but some of the aspects of SDO theory seem to be inspired by a competitive market economy, which has little relevance for Paleolithic hunter-gatherer cultures. Several studies have found that authoritarianism and group cohesion are increased by threats to the social group as a whole, while threats to the individual have less such effect [4], [64], [83], [84].

These theories are in good agreement with regality theory because they link social conformity, punitiveness and xenophobia to collective danger. Evidently, authoritarianism theory and regality theory are two different paradigms looking at the same phenomenon. None of our experimental findings are in disagreement with authoritarianism theory, but many of the predictions that were tested in our study would have been difficult to make from authoritarianism theory because it has more focus on individual psychology than on social and cultural structures.

Our main criticism of authoritarianism theory relates to its poor theoretical foundation. Authoritarianism theory has its roots in psychoanalytic theories, which are not falsifiable [85], though modern versions such as RWA and SDO theories have little or no connection to psychoanalysis. The theoretical model behind authoritarianism theory has limited empirical support, and the theory has often been criticized for political bias [81], [86], [87], [88]. The term *right-wing authoritarianism* is ill chosen because of its inherent political bias, and also because the concept of right-wing ideology makes sense only in a certain cultural context. In fact, some studies have found the same kind of authoritarianism among communists who, by definition, must be called left wing [89].

While many authoritarianism theorists regard certain political ideologies as undesired psychological aberrations, regality theory sees the same ideologies as adaptive responses to perceived collective danger (or, at least, would-be adaptive in the environment of evolutionary adaptation). The evolutionary theory is less likely to lead to biased and ethnocentric thinking, and we should bear this in mind in our choice of terminology. While authoritarianism theory certainly needs revision and a change of terminology, it builds on a research tradition that has produced many interesting experimental results that may be valuable when reinterpreted in the light of regality theory.

### *Other cultural theories*

Peter Turchin's theory of historical dynamics has some resemblance to regality theory [90], [91]. Turchin explains the rise and fall of empires by the historical observation that group solidarity, loyalty and military strength grows in a conflict zone between culturally different peoples, such as a frontier between farmers and nomadic pastoralists. Such a conflict zone can form the nucleus of a growing empire.

The cohesive force decreases and the state or empire stops growing when the borders are far removed from the political center. Turchin's theory resembles the explanation of the rise and fall of empires in regality theory [2]. The main weakness of Turchin's theory is that his concept of solidarity or cohesive force is poorly defined and it is not very clear how it is generated.

While Turchin's theory makes little sense in stateless cultures, a theory of Marc Howard Ross about cultures of conflict explicitly refers to non-industrial societies [92]. His hypothesis is that psycho-cultural dispositions for conflict and violence are formed through harsh childhood socialization and male gender identity conflict, and the targets for the aggressive tendencies can be either group-internal or -external depending on structural factors, which he calls cross-cutting ties. His finding of a correlation between harsh childrearing practices and violent conflict is actually in agreement with our experimental

findings, but there is disagreement about the direction of causality, which cannot be determined from the available statistical data. The idea that cross-cutting ties can mitigate conflicts is quite reasonable, but the hypothesis that internal and external conflicts form equivalent targets for an aggressive disposition is not in accordance with the findings of the present study, and the drive-discharge theory of violence has often been criticized [e.g. 60].

Ronald Inglehart reports on a number of surveys of the beliefs and values of people in 81 contemporary societies around the world [63], [93]. He found that most of the variance in cultural values can be expressed by two factors: (1) traditional versus secular-rational values and (2) survival versus self-expression values. The traditional values reflect the importance of religion, deference to authority, traditional families, moral standards, desire for a large number of children, and resistance against abortion. The survival values reflect traditional gender roles, hard work, confidence in government, and intolerance of deviants. Inglehart explains the traditional values on the first dimension by the need for collective action in complex agrarian societies, and the survival values on the second dimension by the need for physical security in terms of economy and health. Inglehart's findings may not be directly applicable to the data of the present study because his theory deals mainly with economic insecurity and health rather than with insecurity in connection with intergroup conflict, but they confirm our claim that collective danger is connected with a number of cultural variables. The fact that Inglehart's data have been factorized somewhat differently from the present study should be no big surprise to those familiar with the mathematics of factor analyses.

## Discussion and conclusion

The predictions of our theories are generally confirmed by the present study. Regality theory predicts that a high level of conflict between ethnic groups and a high level of perceived collective danger will influence the social and cultural structure of a society in the direction called *regal*. Peace and security will make an influence in the opposite direction - *kungic* - as we have proposed to call it after the most extreme example of this type of culture in our study, the *!Kung*. (Previous literature uses the word *kalyptic*). Characteristic indicators of regal and kungic cultural tendencies are listed in table 1 (page 5).

We have tested several predictions of regality theory on ethnographic data from non-industrial societies. These tests confirm that a high level of intergroup conflict makes the political system more hierarchical, makes the culture more punitive, makes the religiosity more strict, increases group identity, makes sexual morals more strict, makes children work more, and makes art more embellished, stylized and perfectionist. The predicted tendencies for fertility, marrying age,

divorce rate and suicide rate were not statistically significant. It was also confirmed that the level of intergroup conflict can be predicted from environmental and technological factors. The results were satisfactory despite methodological limitations and problems with data quality.

We have compared regality theory with authoritarianism theory and various cultural theories and found that regality theory is the one that best explains the observed results. We prefer regality theory because of its sound theoretical basis and its ability to make predictions for a broad range of psychological, political and cultural variables. It is worth noting, however, that many relevant observations have been made in connection with other theories and these observations may be useful for further development of our theories.

Regality theory sheds new light on the question of why people are fighting for their group rather than free riding, as simple Darwinian models would predict. Our finding that both reward and punishment are used for disciplining warriors is better explained by regality theory than by alternative theories. Punishment is difficult to explain by other theories if it is costly to deliver or if it leads to retaliation, and reward is even more difficult to explain by alternative theories. The opportunity to capture goods and women from the enemy is an automatic reward, according to some theories [14]. However, such a theory explains offensive fighting better than defensive fighting; and it is difficult to imagine how these and other kinds of rewards and punishments can be distributed and how a successful military strategy can be deployed, unless there is a powerful leader. Therefore, the theory that best explains the present observations is regality theory. By supporting a strong leader, the individual makes sure that no free riders benefit from his fighting. Either everybody fights or nobody fights.

The regality dimension is only one dimension of personality and cultural ethos. This dimension depends on collective danger, according to the evolutionary explanation. Another interesting dimension is the fast versus slow life history strategy, which is influenced by both collective danger and individual danger. The connection between danger, fertility and parental investment that is predicted by life history theory is only weakly supported by the present study, but more convincingly supported by other studies, cited in the life history section above. The regality dimension and the fast versus slow life history dimension are significantly correlated and have similar effects on sexual behavior. But our study confirms that collective danger and individual danger have different effects on the social structure, as predicted.

The arrows in the structural equation model of figure 1 should not mislead the reader to think that the causal relations are linear and unidirectional. In fact, many of the causal relations can be viewed as bidirectional or circular. While frequent wars make a culture more regal, a regal culture is also more likely to initiate or escalate a conflict.



Similarly, a high mortality will cause people to choose a fast life history strategy; and a fast life history strategy may cause overpopulation and consequently conflict and high mortality. The statistical analysis cannot detect circular causalities with static data, but a circular causal model can explain dynamic effects, such as the rise and fall of empires, as described by Fog [2].

Regality theory offers interesting contributions to the understanding of diverse aspects of individual psychology, including tolerance, punitiveness, sexual behavior and art preferences, as well as social-level phenomena such as morals, ideologies, religious power, political organization and international conflicts. The present study has looked only at social-level effects, not individual psychological reactions. Some of the predicted individual-level effects are confirmed by the studies listed in table 8, though more studies are needed to test these psychological reactions in connections with the specific predictions of regality theory.

The present theory improves the possibilities for a scientific understanding of history based on environmental and technological factors and intergroup relations. Rather than explaining a war as caused by the whims of a particular bellicose leader, we can start to study why this leader was bellicose and, more importantly, why he had enough supporters to stay in power, or why the population did not overturn this despot and replace him with somebody more peaceful.

Our theory describes some very basic psychological tendencies that we believe have arisen in a distant evolutionary past, but we should be cautious when applying this theory to modern societies. The theory does not fully account for the effects of the complex layers of culture that have later been added on top of the basic social structures. The modern society is very different from the more "primitive" cultures studied in the present article. Wars are no longer prevented by lack of food for the soldiers or geographic barriers to their travel, but by democratic structures, economic interdependence, military alliances, deterrence, third-party intervention and international peacekeeping efforts. War, or fear of war, still plays a role as a regalizing psychological factor in many parts of the world, but the frequency of international territorial wars is decreasing. However, there are other psychological factors that can make regal influences on modern cultures. Possible regalizing factors include economic crises, natural disasters and terrorism, as well as fear mongering in the mass media that make people perceive the world as more dangerous than it is [94], [95].

The beauty of regality theory lies in the fact that it can explain previously unrelated observations from very different fields of study with a single theoretical model, whereby it bridges the gap between different scientific disciplines such as evolutionary biology, individual psychology, social psychology, cultural studies and political history. Regality theory combined with the fast versus slow life history theory

has potential applications in many areas of science. The causal connection between perceived collective danger and a number of demographic, political, cultural and psychological variables gives the theory a valuable explanatory power and predictive power. With the growing focus on global issues such as peace, democracy, overpopulation and ecological balance, it is obvious that these theories have many important applications. Such applications are, however, outside the scope of the present article.

### *Discussion forum*

A forum for discussion of regality theory is available at [www.kungic.org](http://www.kungic.org).

## **Appendix 1**

Here follows a discussion and evaluation of each of the cultures in study two.

### *Andamanese*

The Andamans is a group of islands in the Bay of Bengal, totaling 6400 km<sup>2</sup>. The islands are volcanic mountains with dense vegetation. The temperature is between 17 and 36 °C all year round. At the time of the first anthropological studies the islands were populated by twelve tribes of Negritos speaking different languages. They lived from hunting, fishing and gathering and had sufficient food at all times. Their only vehicles of transportation were canoes, which were used for fishing and traveling along the coasts of the islands. The canoes were unable to sail in open sea. The Andaman Islands have had very little contact with the surrounding world until the mid-nineteenth century [97], [98]. The Andamanese is one of the oldest and most isolated human populations outside of Africa [99].

Based on the geographic variables we would expect the Andamanese culture to be moderately kungic. The mountains and dense jungle make traveling on land very difficult and the available means of transportation by sea were insufficient for large-scale war. The natives had no knowledge of any people living more than 32 km away. The favorable climate and abundance of food can be expected to allow a moderately high population density, which would weigh in the regal direction. The possibility of natural disasters such as cyclones, volcanic eruptions and earthquakes might also have a limited regal influence, but the mountains would offer some protection, at least against the cyclones.

The frequency of warfare is listed in the standard cross-cultural sample as continual or once every 1 - 2 years. However, this listing is very misleading and due to a vague definition of war. There is no

evidence that large scale fighting has ever taken place on the Andaman Islands. The literature agrees that the only evidence of fights is of "brief and far from bloody skirmishes" where "only a handful of warriors were engaged on each side and rarely more than one or two were killed". These skirmishes were usually feuds between neighbor groups, belonging to the same or different tribes. The feuds may be ended after some time with a peace-making ceremony. No weapons of war have been found other than the bows and arrows used for hunting [97], [98].

While no evidence of large-scale war has been found, some inferences can be made. The many different tribes living in close proximity would quite possibly lead to conflicts over territory. One of the tribes, the Jarawa, who live on the South Andaman Island are believed to be invaders from the Little Andaman Island because their language is similar to that spoken on Little Andaman. It is possible that the Jarawa have taken territory from the original inhabitants in a more serious conflict in a long forgotten past. The Jarawa are in constant conflict with their neighbors.

The remarkable fact that so many tribes have been able to coexist on a small area for as long time as it has taken to develop different languages is an indirect evidence that traveling was limited and that the Andaman tribes were willing to maintain peace and respect territorial boundaries, with the exception of the Jarawa.

The Andamanese were hostile to foreigners and have systematically killed all shipwrecked sailors who entered their land. Especially the Jarawa were so hostile to foreigners that it has been impossible to study them. The Jarawa are surviving today for the very same reason, while most of the other tribes have perished after contact with modern settlers [100].

The Andamanese had no political organization above the local group. There were influential older men and women but no leaders with authority. There was no penal system, and neither children nor adults were punished for wrongdoing [97], [98].

The religious beliefs were fluid, flexible and incongruent. The Andamanese believed in spirits and other supernatural beings who control diseases, weather and other natural phenomena. E. H. Man has found several similarities with Christian beliefs [97], but these are convincingly refuted by Radcliffe-Brown as projections of his own faith [98]. All other observers agree that no supernatural beings ruled the Andamanese or punished their misdeeds in life or in the afterlife [98], [101], [102].

The relationships between neighbor tribes were friendly except in times of feuds and except with respect to the Jarawa. Intermarriages occurred as well as adoption of children across tribes.

The fertility was low, possibly because children were breast-fed for three to four years. There was no birth control or infanticide. Mortality was high, and nobody became older than fifty years. Suicide was unknown. Children started to help their parents with various work

from about the age of ten. Children as well as adults played many games [97], [98].

The marrying age was approximately 16 - 20 years for women and 18 - 22 years for men. Betrothals in childhood occurred, but in most cases the young people were free to choose their spouse. There was no polygamy. Divorce was very rare. The sexual morals were lax. Premarital sex was almost universal, and adultery was frequent. Syphilis has spread fast [97], [98], [101], [103], [104].

Men and women had almost equal status and influence. Children were named before birth and the same names were used for boys and girls. The most important of their gods was described as female more often than as male.

Their art was simple. They adorned themselves with necklaces, body paint and scars. The body painting consisted of simple patterns such as parallel lines or zigzag lines, with variations due to individual taste or changing fashions. The same adornments were used for men and women. Tools and canoes were decorated with similar painting or cuttings. Singing and dancing occurred on many occasions, often for ceremonial reasons. The songs were about everyday activities, not religion. Each singer had his own songs, while dancing was communal [97], [98], [101], [105].

The conclusion for the Andamanese is that most observations fit the expectations for a kungic culture. The observations regarding political organization, discipline, religion, fertility, sexual morals, marrying age, length of childhood, art and music are in agreement with a kungic culture. The absence of suicide, absence of divorce, and especially the hostility towards strangers point more in the regal direction.

One explanation for the xenophobia of the Andamanese is their belief that dangerous spirits have a lighter skin color than themselves. They have regarded all light-skinned strangers as dangerous spirits [97]. However, this is just a proximate explanation with little theoretical value. The belief in dangerous light-skinned spirits is likely to have a historical origin in encounters with foreigners with firearms. And indeed, the history gives the Andamanese ample reason to fear foreigners. Malay and Arab slave traders, shipwrecked sailors, and European and Indian settlers have all treated the Andamanese with deadly violence [101], [106]; and the latest reports indicate that the violent confrontations with the Andamanese have continued until present time [100]. They have been friendly to foreigners in previous times according to some reports [101].

The frequent feuds between neighbor groups, whether they belonged to the same or to different tribes, are easily explained by the absence of any political system for resolving conflicts. The fact that the Jarawa appear to be more hostile than the other Andaman tribes has no immediate explanation since almost nothing is known about their history.

## *Arrernte*

The Arrernte (Aranda, Arunta) tribe of Australian aborigines was a semi-nomadic people living in the desert-like areas near Alice Springs in central Australia. They had no means of transportation other than walking naked and barefoot. The few navigable rivers sometimes dried out and there was no timber suitable for making boats. The relatively flat land with sparse vegetation did not constitute any serious barriers to traveling, but the lack of efficient means for carrying water made it impossible to travel too far away from water resources except in occasional wet periods. The climate is dry with large variations in temperature. Day temperature can exceed 40 °C and night temperature can go below the freezing point. They lived as hunters and gatherers and had no metals, no pottery and no efficient means for food storage [107], [108].

Based on this information, we can expect the culture to be fairly kungic because the population density must be low and because mass traveling was limited by lack of drinking water for the Arrernte as well as for the neighboring tribes. However, the droughts that appeared at unpredictable intervals constituted a significant collective danger that occasionally killed significant parts of the population. This may have pushed the culture somewhat in the regal direction.

Large-scale war was absent at the time of the first studies, but war has reportedly been more common in earlier days before the spread of European diseases had decimated the population. Deadly clashes could occur when droughts forced people to migrate into enemy territory. The political structure was very simple. Decisions were taken by deliberation among the old men. Some men had leadership status but none had absolute power. There was no leader at the level of the whole tribe [107], [108], [109].

Men often beat their wives. Physical punishment was common and the death penalty was prescribed for several offences, including some rather trivial ones. The literature is not clear on how often the death penalty was actually executed in practice. Vendettas were very common.

Beliefs in a life after death were weak or absent. Women became pregnant and gave birth as a result of totemic ancestors entering their body. The father played little or no role in this process, according to Arrernte beliefs. There was no supreme being ruling over the humans. Sickness, death and misfortune were blamed on taboo violations, evil spirits, and most commonly on magic performed by enemies. Witch doctors had some political influence but no strong power. There were many painful rituals. Many religious traditions and objects were monopolized by men and kept hidden from women and children [107], [108], [110].

People's identity was defined in terms of totem group and a complicated system of marriage classes. Tribal unity was not a strong factor. Foreigners were not allowed into their territory unless they had a

peaceful purpose such as negotiation or barter. However, there were often friendly relations between neighbor tribes and intertribal marriages were common [107], [108], [110].

The fertility was sufficiently low to keep the population size stable. Abortion was known and infanticide was common. Twins were always killed at birth. Suicide was unknown. Children were breastfed for several years [107], [111].

The Arrernte had little or no idea of biological fatherhood and consequently no notion of illegitimate children. A man might therefore lend his wife to other men for a number of reasons, with or without her consent. There were plenty of rituals and traditions that allowed, or even prescribed, extramarital sexual contacts in certain situations. Premarital sex, however, was generally not tolerated. Homosexuality has been reported for both men and women. Girls married around puberty, boys much later. Promises of marriage were often made for the expected future daughters of a woman, even before she got pregnant. Polygamy was common. Divorce occurred [107], [111].

Children were treated kindly and much time was devoted to them. Punishment of children is not mentioned in the literature [109].

Artistic expression was simple. Religious objects were embellished with lines, dots, circles, etc. Body adornments included necklaces, nose piercing, scarification, etc. Objects adorned with feathers and paintings were used in ceremonies. There were songs and dances for many occasions, but only few and very simple music instruments. Marriage ceremonies were rather simple, while initiation ceremonies were more elaborate, especially for young men [107], [111].

The conclusion for the Arrernte is that most observations fit the expectations for a kungic culture. The political organization, religion, group identity, fertility, sexual behavior, treatment of children, and art are all as expected for a kungic culture. The possible occurrence of severe punishment, intolerance of strangers, absence of suicide, and the strong male dominance point more in the regal direction. The marrying age is low for girls but high for boys. The amount of war before the spread of European diseases is difficult to estimate.

### *Babylonians*

The alluvial plains along the rivers of Euphrates and Tigris in what is now Iraq has been the seat of many city-states and empires that waxed and waned through many thousand years. We are considering only the period before the advent of monotheism, with the main focus on the era of king Hammurabi. The climate was dry and hot in the summer months and the temperature went below the freezing point in the winter. The fertile river plains were surrounded by desert. Boats of various sizes were available for transportation of goods and people along the rivers and the many canals that have been dug. For transportation on land, the Babylonians had donkeys, camels, horses and wheeled vehicles. Cuneiform writing was used for communication

over long distances. They practiced intensive agriculture with a well-organized irrigation system. They had metals for tools and weapons [112], [113], [114].

There are strong regal factors here. Nothing hindered the mobility of the people. They had means for storing and transporting food and water, and they could travel far by land as well as on the rivers. The intensive agriculture could sustain a high population density, and the area that could be traveled was large enough for including multiple states that could wage war against each other with efficient weapons. The only kungic factors we can find are the hot climate in the summer, and the low population density in the surrounding desert. Since the regal factors are much stronger than the kungic factors, we can expect to find a rather regal culture here.

The political system was a monarchy where the king was the supreme ruler, though the priests also had a considerable influence. The religion was polytheistic with a high number of gods and demons. Humans were created by gods for the sole purpose of doing service to these gods. Humans were thus servants of the gods, represented by the king. Humans were punished by the gods for their sins [114], [115].

War was frequent and the army was one of the most important institutions of the society. Armies numbered thousands of men, probably more than hundred thousands, and war casualties amounted to high numbers [115], [116].

Slavery and slave trade was widespread. A man could be reduced to slavery if unable to pay a debt. Political and economic matter as well as marriage and divorce was regulated by a detailed set of laws, written by the king. Discipline was harsh. The law prescribed death penalty or mutilation for many common crimes. It is unknown whether the actual legal practice followed the laws or if law-breakers could get away with paying a fine. It is more certain that slaves and prisoners of war could be treated harshly, and there is ample evidence of torture [113], [114], [117].

The cuneiform scripts and other archaeological sources tell only little about the life of children. Children were set to work and subjected to strict discipline, but the presence of toys indicates that there was also time for play. Children could be lent out as slaves for three years, perhaps longer, in order to pay their father's debt [112], [113], [114], [116], [118].

Little is known about the fertility of the Babylonians. On average, between two and four children per family survived into adulthood. The marrying age has been estimated to 14 - 20 for women and 26 - 32 for men, though these estimates are uncertain. The sexual morals gave men more freedom than women. Girls were supposed to marry as virgins. Adultery between a married woman and a man was punished by drowning both, according to the law, while a man was free to have concubines and to visit prostitutes. Prostitution was widespread and

regulated by law and by religion. Homosexuality was tolerated [113], [114], [118], [119].

Babylon had a large production of art, mainly under the patronage of the state and the priesthood. The numerous temples and palaces were highly embellished with bas-relief and monuments glorifying gods and kings. Favorite motives were royal hunting scenes and battle scenes, supplemented with stylized religious symbols. Geometric patterns reflecting a *horror vacui* tendency were common embellishments. Likewise, song, poetry and literature often glorified gods and kings [112], [113], [116], [117], [120].

The conclusion for the Babylonian culture is that the political organization, the discipline, the religion, the treatment of children, and the art all show typical regal characteristics. The sexual morals are ambiguous. We have insufficient information about the fertility.

### *Chiricahua Apache*

The Chiricahua Apache Indians originally lived in Southern Arizona and New Mexico. They belong to the Na-Dene language group having migrated from the Beringia later than the Amerind speakers [121]. The Apache had been displaced to reservations at the time of the anthropological studies. What is known about their original lifestyle is therefore based mainly on the recollections of old informants [122], [123], [124].

The environment included semiarid plains and mountains. The Indians lived a semi-nomadic lifestyle and they were able to travel far, especially since the acquisition of horses in the 17th century.

We would expect a plains culture to be more regal than a mountain culture. The Apache culture is a mixture of these two [122]. The access to easy traveling on the plains and the possibility of simple communication by smoke signals makes war possible and likely. However, the relative scarcity of food sets a limit to the population density and to the scale of war. The maximal possible size of a war party was limited by the availability of food rather than by political factors [123]. We can therefore expect the culture to be moderately regal, though the scale of war is limited by the sparseness of food.

The tribe was divided into four autonomous bands at peace with each other. The bands were divided into camps, and each camp might include several families. There were leaders at the camp level and the band level, but there was no leader of the whole tribe. Leadership was based on common recognition. While the position of leader was often inherited from father to son, it was not necessarily so. The leader was generally obeyed, especially in times of war, but his power was not absolute. An unpopular leader could always be replaced without violence [124], [125].

Discipline was strict, especially for children. Small children were strapped to a cradleboard where they could hardly move. Larger children were taught obedience, and they might be subjected to



physical punishment, including whipping, if their wrongdoing was severe. Adults were occasionally punished severely, especially for such crimes as marital infidelity or murder. Deviants were often accused of witchcraft. Suspected witches might be tortured until they confessed and then killed [122], [123], [124].

Religious practices and shamanism were based on individual revelations with no orthodox teaching. Everybody could have supernatural powers and perform magic rituals. People could specialize in different rituals for different purposes. There were many supernatural beings, but none of these had a supreme position. The supernatural beings were much involved in human affairs. They gave power, were prayed to, and they could punish people with sickness and misfortune, but there was no punishment in the afterlife.

The most important ceremony was the girls' puberty rite. This was a very elaborate and expensive ceremony lasting for four days, where neighbors were invited for dancing and feasting. The initiation rite for boys was very different. The boy had to go as a novice on four raids or war expeditions before he was considered a man. He was trained to endure all kinds of hardship [122], [123], [124].

Raiding and war was an integrated part of Apache life. They were going on raiding expeditions to enemy tribes several times a year for the purpose of stealing horses and cattle or for avenging the deaths of lost warriors. They might take prisoners of war, who were tortured and killed. Captured boys might be adopted and raised to become warriors. Women were not captured [122], [123], [124], [125].

Girls married at age 18 or 19, boys a little older. Marriages were arranged, but in most cases in agreement with the wishes of the young people. Sororal polygyny was practiced. Children were breastfed for three years. No information is available on the fertility or birth rate. Birth control was practiced by supernatural means and occasionally by abortion or infanticide. Suicide occurred.

Sexual morals were strict. Social contact between the sexes was limited. Nudity was not allowed, not even when no members of the opposite sex were present. Masturbation was unknown. Girls were guarded for chastity. There was more sexual freedom for divorced women and widows than for married women and unmarried girls.

Art was elaborate. Clothing and utensils were decorated with colorful patterns or figures. Music and dance was used for ceremony as well as for social gathering. It was the girl who chose partner at social dances [122], [123], [124].

The conclusion for the Chiricahua Apache is that this culture shows a mixture of regal and kungic signs. The cultural importance of war, the strict discipline and the strict sexual morals are definitely regal signs. However, the political system was less hierarchic and dictatorial than one would expect for a regal culture. The low population density made it impossible to incorporate a large number of people under a single leader. Political leaders did not have absolute power, and there

were no religious authorities either. The realm of supernatural beings also lacked a supreme ruler. It seems, nevertheless, that the religion had a disciplining function in the sense that people feared supernatural punishment and witchcraft accusations.

There is no reliable information about fertility or family size, but the fact that birth control was practiced or attempted seems to indicate that the population size was controlled by the availability of food as much as by war. On the other hand, the practice of capturing young boys from enemy tribes indicates a clear desire to raise as many warriors as possible.

Art, body adornment and ceremonial paraphernalia were elaborate, embellished and so expensive, that this may be interpreted as a moderately regal sign.

Conflicts with white settlers and the availability of horses since the 17th century has no doubt increased the possibilities for war and raids, but the earliest available historical sources seem to indicate that the Apache had frequent conflicts with other tribes before the arrival of Europeans [125].

### *E De (Rhadé)*

This is one of several tribes that live in the highlands of southern Vietnam. The present study will focus mainly on the time before colonization. The mountain environment consisted of forests, dense bush and grasslands. They grew rice and other crops using slash-and-burn and shifting cultivation. Irrigation of rice fields was used only where the environment was favorable. They were herding buffaloes and several other animals, including a limited number of horses and elephants. They had tools of iron and other metals [126], [127], [128], [129].

The environment had many obstacles to travel, but given the availability of horses and elephants we would expect the E De people to travel far. An efficient means of travel combined with efficient food production makes us predict a regal culture.

The E De people lived in villages consisting of several long-houses. Each long-house was the home of a matrilineal group of up to 300 people. The political level of integration has varied considerably. The villages have often been partially or fully autonomous under the leadership of a village chief. In some cases a group of several villages have formed a mini-state. In one period the E De paid tribute to the closely related Jarai tribe. The E De have been part of the Champa kingdom and paid tribute to the Champa king for a period of possibly several hundred years, although the Champa influence appears to have been very limited. Inter-village raids and wars were common [126], [127], [128].

The E De society was highly stratified. The village chief and other rich people were very powerful, while up to two thirds of the population lived in slavery or dept dependence [128].

The justice system was based on a large set of orally transmitted laws. Prescribed punishments ranged from payment of fines and religious offerings to enslavement and rarely death. The animist religion supported the social stratification and the socially unequal justice system by the belief that wealth was sanctioned by the spirits and the belief that misdeeds must be expiated by expensive offerings to the spirits. Unable to pay for these offerings, many people ended up in the possibly life-long slavery-like conditions of dept dependence [128], [130].

Families typically had 5 - 6 children, and the population appears to have been growing. Infanticide was not allowed. Boys were married at age 16 or older, girls perhaps younger. Child marriage has been practiced in the past. Premarital sex was tolerated if the couple entered a secret marriage. The wedding ceremony was very simple. Extra-marital sex might have been punished, but was often tolerated as long as it didn't have economic consequences. Polygyny was rare. Divorce was disapproved of. Children started helping their parents from age 7 - 8 and work in the fields from age 10 - 13 [126], [127], [128], [130].

Little has been published about old E De art and music. Buildings and weaved clothes sometimes had rich ornamentation. Rich people collected jewelry, decorated gongs and other prestige items [128], [129].

Though the available data for pre-colonial E De are sparse, we can conclude that the cultural indicators are in accordance with a moderately regal culture, though not quite as regal as expected.

## *Ganda*

The Ganda or Baganda is a Bantu people still living in the kingdom of Buganda comprising 50,000 km<sup>2</sup> to the north and west of lake Victoria in East Africa. Buganda is now part of the state of Uganda. The environment consists of flat hills, savanna, swamps, rivers, lakes and forests with a height of 1000 - 1400 m above sea level. The position at equator provides a climate with only small seasonal variation. The average day temperature is between 25 and 28 °C all year round. There are two rainy seasons a year and no completely dry season.

The area of Buganda is very fertile and more suited for agriculture than the neighboring areas. The staple food was bananas or plantains, which were harvested all year round. Other crops were harvested twice a year. The diet was supplemented with protein from domestic animals, hunted game, fish and insects [131], [132].

The traditional Baganda had good roads that were traveled by foot. They had no wheeled vehicles and they did not use animals for work or transport. They had canoes for sailing the lakes and those of the rivers that were navigable. They used iron for making spearheads, hoes and other tools [132].

Based on these facts, we can expect the culture to be regal. The population density was high due to the fact that they had plenty of food all year round. They were able to travel far through the savannah and grassy hills as well as on rivers and lakes. Their range of movement was limited, though, by their inability to build bridges across large swamps and rivers [132].

Buganda was the strongest military power in the region. Their power is generally attributed to the efficient production of plantains and to the availability of iron. They attacked and plundered the neighboring peoples on regular raids where they captured cattle, women and slaves and killed as many men as they could [131], [132].

The political system was a highly hierarchical system of chiefs headed by the all-powerful king. The king ordered large numbers of men to be killed. Some were killed for minor offenses, some were sacrificed to the gods, some were killed to honor the ancestor kings, but most of all, the king killed men just to confirm his power to kill.

All crimes and signs of disloyalty were severely punished. Theft, disobedience, adultery and other crimes were punished by death, by cutting off a limb or by heavy fines. The fines were to be paid in barkcloth, goats, cows and women. The culprit might enslave himself or his relatives to pay the penalty. The question of guilt could be tried by a system of courts that might hear testimony and use divination, ordeals or torture to reach a verdict [132], [133].

The Baganda worshipped various gods, most of whom were spirits of men who had served previous kings well while they were alive. Dead kings were worshipped in almost the same way as gods, but the living king did not have god-status and he could be killed and overthrown by rival princes. Anthropologists have discussed who was most powerful, the king or the gods. The king, and nobody else, could punish the gods by killing their priests and plundering their temples. The gods, in turn, could punish the king with disease and misfortune. There appears to be no clear winner in this contest of power. Most of the time, however, the king made rich sacrifices to the gods, and the gods in turn supported the king and gave him advice through mediums.

The gods did not punish undetected sins, but some sins led to automatic punishment. For example, a child would die if its father committed adultery during the breast-feeding period. There was no punishment in the afterlife, except for the belief that a person who had had a limb cut off as punishment would continue to be maimed in his afterlife or next incarnation [132], [133], [134], [135], [136].

The members of the kingdom were generally loyal and willingly sacrificed their lives in the frequent wars against neighboring peoples. In some cases, the hostility towards strangers was an obstacle to trade, but for the most they welcomed Arab traders [132], [137].

Polygamy was widespread. The later kings had hundreds of wives and concubines, perhaps thousands. High-ranking chiefs had many wives as well. Such a degree of polygamy was possible because

of a sex ratio of three women for every man. The surplus of women was due to the loss of men in war, the king's mass killings of men, and the capture of women in war. No fertility data are available for the period prior to the introduction of Christianity and the abandonment of polygamy in the late 19'th century. By the mid 20'th century the birth rate was three to four children per mother. The common opinion of the natives is that the fertility was higher in the old times, and this is in accordance with the few individual genealogies that have been reconstructed [132], [133], [138], [139]. Suicide was probably rare. The only reports of suicide refer to the motive of shame [132].

Girls married at age 13 or later, boys at 15-16. The marrying age increased after the introduction of Christianity. A man had the right to beat his wife and could even kill her with impunity. Divorce was relatively common, especially in connection with polygamy. Women were guarded carefully to preserve their chastity. It was a big shame for a girl to become pregnant before marriage. The punishment for adultery was severe, but even the risk of death penalty was apparently not sufficient for completely deterring this crime [132], [136], [137].

Babies were sometimes nursed by maids so that their mothers were free to work. Children were often placed with relatives or chiefs so that they could receive a stricter upbringing. Children were taught politeness, etiquette and cleanliness. Boys had time to play while they were herding animals, while girls spent their time making mats and baskets [132], [136], [137].

The Ganda had very little material culture. All that people needed was a grass hut to live in, barkcloth for clothing, and a few tools for harvesting and cooking. The early kings did not even have chairs to sit on. Palaces, temples and shrines were built of reed.

Ganda art was more decorative than representational. High-ranking persons had some decoration and pomp to signify their status, and religious artifacts were embellished. These decorations were typically made of plant material, cowry shells, ivory, and bird feathers. Such embellishments may have impressed the natives, but they were quite simple compared to other cultures. The Ganda had many different music instruments, but we do not have sufficient information for evaluating the degree of embellishment in Ganda music and dance [132], [133], [135], [137], [140].

The conclusion for the Ganda is that the observations regarding political system, discipline, religion, fertility, marriage, sexual morals, and length of childhood are in agreement with a regal culture.

The prediction fails, however, on the question of art. Regal cultures typically make impressive pieces of art and architecture of durable materials. The Ganda culture has none of this. No royal or religious buildings, monuments or sculptures were made of stone, brick or metal. The fact that the art was non-naturalistic and the architecture perfectionist is in accordance with the theory, but it did not have the degree of embellishment that other regal cultures have. The low

sophistication of material art may be connected with the low sophistication of material culture in general. There appears to have been very little impetus to technological inventions because food was available everywhere for a minimum of work.

The lack of highly embellished art makes one suspect that the extremely regal political system was not fully internalized in the psychology of the people. While most cultural indicators are relatively regal, they are not fully on the same level as the political system. There were songs about military events, but no systematic glorification of kings, heroes or gods in Ganda music and art. The religion supported the king by sanctioning the mass killings that his power depended on, but the disciplining function of the religion was less effective than what we have seen in other regal cultures [132], [134], [137]. It is worth noting that sub-Saharan Africa is dominated by kungic cultures because of the dense vegetation that impedes traveling and a climate that is too hot for hard work. As a regal enclave, the Ganda culture may not have been able to evolve a cultural ethos that is too far from the surrounding cultures. We can thus observe a mixture of typically African traits with typically regal traits. We may speculate that the king had to compensate for this slight discrepancy in his culture by consolidating his power with mass killings of his own men.

### *Gilyak*

The Gilyak lived in east Siberia along the river Amur and on the Sakhalin Island. Their main means of subsistence was fishing. The climate was very cold in winter. The vegetation was primarily Taiga (primeval forest), which was difficult to penetrate. The means of transportation were limited to dog sleighs and snowshoes in the winter, and rowing boats in the summer. The boats were unable to sail on open sea [141], [142].

We can expect to find a kungic culture based on the fact that the means of transportation were too inefficient to make war likely and that the environment could not sustain a high population density.

The Gilyak culture had a moderately high level of internal conflict, but no external wars. The Gilyak did not keep record of their own history and had no memories of any war. According to one source, there has probably been a conflict between the Gilyak that lived along Amur and those that lived on Sakhalin, as well as a conflict with the Russians. However, no solid information about these conflicts is available. Internal conflicts were relatively common. The main reason for such conflicts was rivalry over women [141], [142].

The Gilyak had no political system at all beyond the family or clan. There was no chief or ruler. Common decisions, if necessary, were taken through deliberations where the most respected men had the most influence. Sources of respect were high age and experience, as well as wealth and bravery. There was no formal system of policing,

and punishments for wrongdoing were generally mild. Corporal punishment and capital punishment were rare [141], [142].

The religion was mainly based on beliefs in spirits and animals. There was no orthodox teaching, and not even the shamans were able to explain their beliefs in the level of detail that the explorers expected. The prophecies and teachings of the shamans were readily disputed or doubted. The Gilyak had a weak concept of a good god that they may have learned from Buddhists or Christians, but they did not pray, and this belief was completely void of influence on their daily life. There was no opposition to other religions. Some Gilyak even worshiped a few church bells that they had found as well as the ruin of an old Buddhist temple [141], [142].

The Gilyak had no word for their own tribe other than the word for humans. The name Gilyak is used only when talking with foreigners. They had regular barter trade with the Chinese, Japanese and Russians. The Gilyak were highly tolerant of foreigners and readily mixed with the neighbor tribes.

The fertility rate was consistently described as low, but there are no accurate accounts beyond the observation that there were no child-rich families. Children were breastfed for 2 - 5 years. Suicide is often mentioned in the literature on the Gilyak. No specific rates can be inferred, but at least it seems safe to conclude that the suicide rate was not low [141], [142].

The literature contains discrepant accounts of the sexual morals of the Gilyak. Schrenck characterizes the sexual morals as strict [141], while Seeland describes them as fairly lax [142], and Sternberg tells that the Gilyak were quite promiscuous [143]. We must recognize that sexual behavior is particularly difficult to study. There may be considerable differences between what people say and what they do. Sternberg's accounts are quite detailed and appear to be the most reliable. Schrenck mentions the sexual morals only briefly while he is more concerned with describing physical objects. Apparently, Schrenck has been unable to penetrate through the initial facade of modesty, which Sternberg has described. It seems safe, therefore, to conclude that the sexual morals of the Gilyak were quite lax. The marrying age was quite variable. 23 - 25 year old bachelors were commonly seen, but child marriages have also been reported. Divorce was easy.

The Gilyak produced very little art. The most common product of art was small religious figures carved in wood. These wooden figures were quite simple and could be made by any member of the tribe. Women's clothes were often embellished with small brass plates and other adornments. Knives and other tools were sometimes embellished with inlaid pieces of brass, copper or silver. These adornments were used as signs of wealth. Music instruments were very primitive. Songs were simple and often improvised. It was quite common that each singer had his own song. Dance has not been observed, except for shamanic acts [141], [142].

The conclusion for the Gilyak is that the culture was quite kungic, in accordance with the geography, climate and transportation means. The predictions for a kungic culture are in excellent agreement with the observations of level of external conflict, political system, discipline, religion, tribal identification, tolerance of foreigners, fertility rate, suicide rate, sexual morals, art and music. The occurrence of child marriages is in disagreement with the expectation of a high marrying age. The amount of adornment on clothes and tools is somewhat higher than expected. This adornment served the need to display wealth, which was an important source of political influence.

### *Inca*

The Inca Empire had its center in the town of Cuzco in the Andes Mountains. During the last hundred years prior to the Spanish conquest in 1533 the empire grew fast to reach the size of several million km<sup>2</sup>, stretching from present Ecuador to Chile and part of Argentina. This vast area covered a wide variety of environments, including coastal areas, mountain plateaus, deserts and rain forest. The day temperature in the Cuzco area was 21 - 22 °C all year round, while night temperature occasionally fell below the freezing point. There are plenty of rivers running down the mountains, but these are not navigable [144], [145], [146]. Transportation by boat was possible only along the coast and in the lakes. The territory was connected by an elaborate system of roads totaling at least 23,000 km, and probably more. Relay runners were placed along major roads for fast communication. The Incas had llamas for transportation of goods, but no animals capable of carrying humans were available. Wheeled vehicles were not available [145], [146], [147]. Agriculture and animal husbandry has been practiced in the mountain plains and basins for 3000 - 4000 years. Terraces and large irrigation systems were built to intensify agricultural production [145], [148].

Based on the geography alone, we would not expect to find a regal culture in the Andes Mountains because of the many barriers to travel. However, knowing that water for irrigation, efficient food production technology and communication technology were available, the prediction is a different one. The main crops - quinoa, potatoes, maize, beans, etc. - provided highly nutritious and storable food in high yields. The environment and available technology therefore provided all the factors necessary for developing a highly regal culture: efficient food production for sustaining a high population density, efficient transportation and communication, a climate that was suitable for hard work, and highly different environments leading to trade and wars between different cultures and different life styles.

The political system of the Inca Empire was highly centralized. Everything was planned and controlled by a large bureaucratic system. People had hardly any choice about where to live and what kind of work to do. At the same time, the administration took great care to



make sure everybody had what they needed. Discipline was strict and punishment was severe. The worst crimes were punished by the death of not only the culprit but his entire village [144], [145], [146], [149]. The religion justified the dictatorial rule by making the emperor a direct descendant of the sun. Rich sacrifices were made to the gods, occasionally including the sacrifice of humans [145], [150], [151]. Sinners were punished in the afterlife in a hell. Suspected witches might be tortured to confession and killed. Religious ceremonies were plentiful and more pompous than puberty rites, marriages and burials [146], [149], [150].

The Inca rule did not enforce total cultural uniformity but they moved conquered people around to prevent rebellion. The different groups were allowed to maintain some of their cultural characteristics [145], [150].

Large families were desired but infant mortality was high. Abortion was known but illegal; other means of birth control were unknown. Infants were strapped to a cradle day and night and were breastfed only three times a day for one or two years. They were never held in the arms or on the laps of their mothers but were breastfed by their mothers bending over them. Larger children were confined to a hole dug in the ground. Children were required to contribute to household and agricultural work as soon as they were able to do so [144], [145], [146], [150].

Girls married at age 16 - 20 and boys in their mid-twenties. Some girls were selected for a religious life in celibacy or were given as rewards to high-ranking men. Most boys were probably able to choose their wife, but to stay unmarried was not an option [144], [146], [149], [150]. Polygamy was common among the nobility. Divorce from the first or principal wife was impossible, while divorce from secondary wives or concubines was easy. Trial marriages were possible in some areas, and the marriage ceremony made a distinction on whether the bride was a virgin or not. Except for the institution of trial marriages, fornication and all other sexual sins were severely punished [145], [149], [152].

Elaborate art was common. Festive and ceremonial clothes were finely woven and richly decorated. The decorations on cloth and pottery were typically highly repetitive with geometric patterns or stylized figures. Immense riches of gold and silver added to the glory of the empire [144], [145], [146], [150].

The conclusion for the Inca Empire is that the observations regarding political system, discipline, religion, fertility, sexual morals, length of childhood, and art are in agreement with a highly regal culture. We have found no mentioning of suicide in the literature, except in connection with war. The marrying age did not differ markedly from that in kungic cultures.

The observation that the Inca empire could grow only because of the elaborate road system and the intensive agriculture begs the

question: Was the empire built because they had good roads and efficient food production, or did they build roads and irrigation systems because the power of the empire enabled them to do so? The answer is, of course, that the causality went both ways in a self-amplifying process. The area is more suited for a sedentary life than for nomadism, and the population has had sufficient time for developing an advanced agriculture and a relatively high population density. The availability of water for irrigation and efficient crops like potatoes and maize were also important factors. The first regal developments may have taken place in the coastal areas where the ocean provided ample food and means of transportation. There has been trade as well as frequent wars between the coastal people and the mountain people for centuries. Numerous chiefdoms and kingdoms have waxed and waned at the coast as well as in the mountains for more than a thousand years before the Inca empire flourished [146], [149], [150]. Regality theory predicts that empires will collapse when they have reached the maximum manageable size [2], which is indeed what appears to have happened several times in this area. Each new empire may have grown bigger than the previous ones due to improved technology or political skills. The Inca empire, too, was probably at the verge of collapsing at the time it was conquered by the Spanish empire 146.

### *!Kung*

The !Kung Bushmen, also called San, have lived in the Kalahari desert of southern Africa for many thousand years, representing one of the oldest living human races [153]. The Kalahari desert is dry during large parts of the year. The !Kung depended on a few permanent water holes and on water-containing roots and melons during the dry season. They traveled long distances on foot and had no more possessions than they could carry. No other means of transportation were part of !Kung tradition.

Our theory predicts that the !Kung culture must be kungic because the low population density, lack of water, and lack of efficient means of transportation make war impossible. The neighboring tribes had no desire to conquer their land because it was unsuitable for herding and agriculture. The !Kung have adapted to the dry climate and were able survive the frequent droughts without starving. At the time of the first studies (1950's and 60's) they were happily unaware that their entire culture was threatened and that Bushmen in more fertile areas had been exterminated. The !Kung were not refugees expelled from other territories [154]. Had they been refugees they might have been more regal.

The !Kung have never engaged in war. They would usually run away and hide if foreigners entered their territory. Internal conflicts were mostly resolved by splitting up social groups. The traditional means of subsistence was hunting and gathering. At the time of study, some !Kung had started to work for neighboring black farmers who

treated them well. Others worked for white farmers under slave-like conditions [154], [155].

The political organization of the !Kung is consistently described as fiercely egalitarian. There was no political unit beyond the individual settlements with fluid membership. Various observers disagree on whether settlements had chiefs. There was obviously some degree of leadership based on kinship, age, experience and personal qualities [154], [155], [156].

Sharing was very important in !Kung life. Anybody who had food was required to share with others. Hunting tools, clothes and other possessions circulated widely through systematic gift exchange. Any attempt at boasting, self-promotion or accumulation of wealth was despised and effectively prevented through social pressure.

There was no formal system of justice and punishment. Even the worst cases of wrongdoing could go unpunished for children as well as for adults. Theft did not occur. Murder was occasionally retaliated - in most cases as an outburst of rage, but in a few cases in a planned way. Severe conflicts were more likely to result in the social group splitting up than in any kind of disciplining. The most severe punishment described by the observers was that somebody sang a song about the misdeeds of the culprit. The need for social acceptance was sufficient to keep people in line. When the first schools were set up in the area, the Bushmen did not accept the fact that corporal punishment was practiced in the schools [154], [155], [156], [157].

The Bushman beliefs were fluid, ambiguous and incoherent. They had no clear distinction between natural and supernatural, between human and divine, or between human and animal. Their legends included traces of Bantu religion, Christianity, and even European fairy tales. Several observers have equated the most powerful of their mythological characters, the creator of everything, with the Christian God. But this god had few similarities with the monotheist God. He has been, in a mythological past, a vulgar trickster displaying all the immoral behaviors that humans abhor. The gods and spirits interacted with humans in good and bad ways, but were not concerned with upholding human morality. Rather, they manipulated humans for their own obscure purposes. The religious beliefs were used in storytelling, in the use of oracle discs, and in trance dances and healing. The exercise of these rituals was not monopolized by any religious authorities, although some people were obviously better healers than others [158], [155], [159], [160], [161].

Anthropologists disagree on what to call the !Kung because they had no clear name for their own tribe or race. They did not recognize others that spoke the same language as tribe fellows. They readily mingled with neighboring people of different races and worked for them. Mixed marriages were common [155].

The fertility of the hunting and gathering !Kung was so low that overpopulation was avoided and the natural resources were not over-

exploited [154], [162]. Children were breastfed for 3 - 4 years, and birth spacing was 3 - 5 years. Infanticide occurred at a reported rate of 1 - 2 %. No other means of birth control was used. Children did not work but were free to play all day. The average marrying age was 14 - 17 years for women and 22 - 30 years for men according to some observers, but child marriages are also reported to have been common. Polygamy occurred, and a single case of polyandry has been reported in a neighbor tribe. Divorce was easy. Suicide was rare [154], [155], [156], [161], [162].

The frequency of premarital and extramarital sex is difficult to estimate. Marshall reports that illegitimate sex was rare because it was impossible to hide, but she also notes that spouse swapping was allowed [156]. Guenther notes that their marriages were "loose" [158], Eibl-Eibesfeldt writes that they were fairly liberal in sexual matters, but open promiscuity was not tolerated [163]. Silberbauer reports for a neighbor tribe that people often could get away with adultery [162]. Lee reports that gonorrhea was spreading fast [154]. Rape was rare.

The !Kung rarely produced pictorial art because it didn't fit into their nomadic lifestyle. The main art forms were song, dance and story telling. Women and girls decorated themselves lavishly with strings of beads. Men were tattooed as an element of hunting magic. They used bows as music instruments. Other simple music instruments have been introduced during the twentieth century. They appreciated individual inventiveness in art, and readily borrowed elements of art from neighbor cultures. There were no big ceremonies, not even at marriage or burial. The most important socially unifying ceremony was the frequent trance dance [158], [156], [161].

The conclusions for the !Kung are that the culture was very kungic, in accordance with the geography, lack of efficient transportation means, and niche specialization that prevented territorial conflicts with neighbor tribes during the times of early observations. The predictions for a kungic culture are in excellent agreement with the observations of a low level of conflict, an egalitarian political system, lax discipline, non-authoritarian religion, low degree of group identification, tolerance of foreigners, low fertility rate, long childhood, and flexible art and music. The expected high suicide rate has not been found. The sexual morals appear to be fairly liberal for a people without birth control.

The fertility has recently been increasing and the egalitarian ideals decreasing for those !Kung who have changed to a settled life style among the blacks based on herding or farming, as can be expected from our theory. It should be noted, however, that these changes can be explained without using this theory [154], [157], [164].

Previous literature uses the word *kalyptic* for the opposite of regal [6]. As this word sounds somewhat awkward and may be misinterpreted as an abbreviation of *apocalyptic*, we decided to replace it with the new term *kungic* in commemoration of the !Kung culture.

There is no circular reasoning in the observation that !Kung culture is kungic, as the decision to use this term was made *post factum*.

### *Mbuti*

Mbuti is a name for several groups of pygmies who lived in the Ituri forest, a tropical rain forest in the Democratic Republic of Congo near the Equator. The average day temperature was around 27 °C all year round. It was possible to pass through most parts of the forest by foot because of limited undergrowth. Rivers and swamps formed barriers to the movement of the Mbuti, who did not make boats. The Mbuti were nomads with a peculiar lifestyle alternating between two different cultures. For periods of several months they lived in the forest where hunting and gathering formed their subsistence. At certain times of the year they lived near villages at the edge of the forest where they traded meat for vegetables and tools with slash-and-burn agriculturalists of Bantu and Sudanese origins. The villagers had bound the Mbuti into a kind of serfdom, which was inherited on both sides - at least in the imagination of the villagers. However, the Mbuti could easily escape and change their allegiance because the villagers were afraid to enter the forest. The relationship between Mbuti and agriculturalists has lasted for so long that the Mbuti have lost their original language, but not their genetic uniqueness [165], [166], [167], [171], [172]. The only evidence that the pygmies have ever lived independently in the forest is archeological [173], [174], [175].

To make a regality prediction for the Mbuti, we first note that the population density in the forest was low. Walking through the forest was slow and there were rivers that the Mbuti could not cross. The environment was healthy and dangers were few. The forest provided good protection from the villagers, who would never pursue the Mbuti into the forest. These are factors that point in the kungic direction. Other factors point in the regal direction: The nomadic lifestyle could lead to territorial conflicts. The territory of the Mbuti was shrinking as forest was converted to agricultural land. Furthermore, the Mbuti were under heavy influence of the village culture, which we would expect to be more regal than the forest culture. Nevertheless, we will expect the kungic factors to dominate because the Mbuti could escape any conflict with the villagers, who were unable to penetrate their niche. Consequently, the prediction is that the Mbuti culture would be moderately kungic.

The Mbuti had very little political organization. Some people, mostly older men, took leading roles in the camps, but egalitarian principles were held in high regard and everybody had a say in discussions. Conflicts were handled collectively. Everybody in a camp was responsible for avoiding or stopping conflicts between camp members. Young bachelors sometimes played a key role in handling conflicts between the older married people by means of mockery and ridicule. Conflicts were diverted or dissolved into ridicule more often

than settled with a formal decision. Retaliation for wrongdoing was common, but organized punishment was very rare. Serious wrongdoing could lead to the flight or ostracism of the perpetrator, but the banished person might return after a few days of hiding in the forest where somebody had secretly brought him food. No case of permanent banishment is known [166], [169], [171], [172], [176], [177].

The Mbuti abhorred physical violence. They have been engaged by the villagers as scouts in wars with other tribes, but there is no evidence that the Mbuti have ever themselves been part in any war other than killing a few trespassers [169], [172], [176].

The religious beliefs of the Mbuti varied considerably and lacked precision and dogmas. Different observers disagree on even the most fundamental aspects of Mbuti beliefs, such as the names and nature of their supernatural beings, whether they prayed and sacrificed, witchcraft, and afterlife. The villagers involved the Mbuti in their rites of passage in an attempt to exercise supernatural control over them. The Mbuti willingly participated in these rituals and pretended to share the beliefs of the villagers, which they could use to their own advantage. The villagers believed that the forest was full of malevolent spirits, and the Mbuti actively worked to reinforce such beliefs among the villagers in order to keep them out of the forest. When no villager was watching them, the Mbuti would ridicule the beliefs of the villagers and deliberately violate the religious taboos of their villager hosts. When in the forest, the Mbuti had only few religious rituals. It is uncertain whether the Mbuti honestly believed in any form of supernatural punishment, but we can say with reasonable confidence that religion was not a strong disciplining force in Mbuti life [170], [171], [172].

Different Pygmy groups considered themselves as belonging to the same tribe, even if they spoke different languages (the languages of their respective village hosts). They did not allow trespassers. They were fearful but also friendly to foreigners and open to foreign cultural influences. They regarded the villages as hunting grounds and saw the villagers as "animals" to be exploited for their own advantage [169], [172].

Sexual morals were liberal among the Mbuti. Premarital intercourse was sanctioned in certain puberty rituals. Marital infidelity was not a rare occurrence, and divorce was easy. Polygamy occurred. They married after puberty with little or no ceremony. The average age of first marriage was 18 for boys, 16 for girls. The marriage was not considered fully established until the first child was born. [165], [169], [171], [172], [177].

Children were breastfed for at least 1-3 years. Birth spacing was 3-4 years. Birth control was obtained by a post-partum sex taboo, and probably by other unknown means. Abortion was known but rare. Infanticide was practiced after twin births. The fertility was low according to some accounts, higher according to others, but the total population size was stable. Suicide occurred [165], [167], [172], [173].

Children were treated with affection. They had considerable freedom, were rarely punished, and did not have to do hard work [168], [169], [171].

The most important art forms were singing and dancing. The singing of the Mbuti and related Pygmy tribes is characterized as polyphonic. Everybody could join in or contribute in turns with possibly improvised harmonies in no predefined order and with no apparent hierarchy of voices. The result was a rich complexity of different voices to a common rhythm. The dance often formed mimicry of daily events. Erotic dances were also common. There was no graphic art other than simple body painting, body adornment and decoration of clothes [168], [171], [177], [178], [179].

We can conclude that Mbuti culture was even more kungic than expected. All the cultural indicators point in the kungic direction. The further away they were from village influence, the more peaceful and egalitarian was their behavior.

### *Somali*

The Somali live in the northeast of Africa at the Gulf of Aden. The climate is dry with temperatures ranging from below the freezing point to above 40 °C. Droughts occur at irregular intervals. The environment is mostly semiarid plains and plateaus with little vegetation. Most of the population lived as nomads and herders with milk as the staple food. There are only two permanent rivers in Somaliland. Agriculture with irrigation was practiced near the rivers. The coastal population lived of fishing, trade and crafts. There was extensive trade with Arabia and with other parts of Africa.

The Somalis traveled around with camels and donkeys as pack animals. Lack of water was no big obstacle to traveling because the camels could go long distances without water, and because the herders could drink camel milk on their travels. The sparse grazing resources for the animals set a limit to the size of troops that could travel together. The most important weapons were iron-headed spears. Horses were used in battle if available, but there were only few horses [180], [181].

Based on this information, we can expect the culture of the Somalis to be moderately regal. The relative ease of travel and the availability of metal weapons are factors that point in the regal direction. The occurrence of droughts at unpredictable intervals may also be a regal factor. However, the population density must necessarily be low, except near the coast and the rivers. This points in the kungic direction. The low-density nomadic population could not easily be incorporated into a larger political or military organization. The hot and dry climate also limited the fighting ability of the population.

Prior to European colonization, the political organization of the Somalis was fluid and ever changing. The political leader of a family, clan or tribe was chosen partly by majority decisions of the adult men,

partly by inheritance, and partly by power, influence and age. Higher-level political structures were either absent or unstable. City-states and small sultanates were formed from time to time, but they often disintegrated again after some time. The political leader and the religious leader was seldom the same person. Arab immigrants had a high prestige and a considerable political and religious influence. Slavery has been very common. However, slaves were reportedly treated well and many slaves have been freed [180], [181], [182], [183].

War, feuds, raids and plundering were frequent occurrences. The wars were of a relatively low scale with at most a few hundred deaths, but it is assumed that the territorial boundaries were ultimately defined by military strength [181], [184].

The religious belief of the Somalis was dominated by Islam due to a strong Arabic influence. The religion was a strong power, especially in moral and judicial matters. Legal matters were governed mainly by Islamic Sharia law. Crimes were punished by the payment of a fine, for example 100 camels for homicide, which was paid partly by the offender and partly by his group. Other forms of punishment were rare [180], [181], [182].

The literature gives no reliable information on fertility and population growth. Children were breastfed for two years, but were also given other food. Child mortality was high. Children were set to work from an early age. Children were well disciplined, but there are no reports about punishment of children. The marrying age varied from 12 to 20 for girls and between 17 and 25 for boys. Child betrothal and forced marriages occurred, but were not common. Men who could afford it practiced polygamy. The sexual morals were strict, except for the divorce rate, which was very high. Girls were infibulated to ensure chastity. Social contact between boys and girls was limited [180], [181], [183], [184], [185].

Pictorial art was not very important because of the nomadic lifestyle of the majority of the population. Clothing and body adornment was simple without excessive embellishments. Tools and objects were sometimes embellished with woodcarvings, showing simple figures and often repetitive geometric patterns. Dances were relatively simple, sometimes with a war theme. The most important art form was poetry, which was highly stylized and rule bound [180], [181], [183], [186].

The conclusion for the Somali is that the political organization is intermediate; the justice system and the relatively mild punishments can be characterized as kungic. The religion, the sexual morals, and the widespread slavery are more on the regal side. The artistic expressions show mixed characteristics, where especially the poetry shows regal tendencies while the clothing and body adornment look more kungic.



## *Warao*

The Warao Indians live mainly in the large delta of the Orinoco River in Venezuela, an area of approx. 18,000 km<sup>2</sup>. The environment is swamps, mangroves, tropical rain forest, and a labyrinthine system of rivers. The staple food was the sago-like pith of the Moriche palm, supplemented by fish and small animals. Food was plentiful, but seasonal. Food storing was practiced where necessary. In later times, the Warao have built their huts on stilts for protection against floods. They went everywhere by canoes. Their canoes were capable of sailing along the coast of Venezuela and to the nearby island of Trinidad, where they went for trading. Traveling over land was virtually impossible due to the dense forests, lack of dry ground, and many rivers. They had no pottery and no metal tools, except in later times where modern tools were obtained by trade [187], [188], [189].

Warao culture was adapted to a very specialized niche. No foreign tribe had the necessary skills to navigate the swampy delta, and much less to gather food and survive there. This gave the Warao good protection. Whenever the Warao were attacked by neighbor tribes, they found protection in the swamps and dense forests.

We would expect the Warao to be able to attack neighbor tribes because of the ability to travel far in their canoes, although they lacked efficient weapons and the population density was low. However, they would have little incentive to leave the area that fitted their specialized niche and outsiders would have little reason to attack them. Hence, we can predict that the niche specialization gave the Warao a moderately kungic culture.

The Warao were peaceful people who detested physical aggression. They were rarely involved in war, but there is evidence that they have been at war with neighbor Carib who allegedly cannibalized the Warao or sold them as slaves. There was no war between Warao subtribes. Internal conflicts were dealt with by public hearings or ritualized competitions; and territorial transgressions were prevented by (threats of) black magic [188], [190], [191], [192], [193].

The Warao were divided into subtribes. Each subtribe consisted of a number of bands, which were led by an elite of elders, patriarchs or chiefs, possibly including women. Shamans belonged to the elite, and chiefs were often shamans. There was only a loose organization of the subtribe and no political organization above the level of the subtribe [188], [189].

The political leaders had little power to discipline or coerce people. Shamans did, however, have considerable power because of their contact with spirits who could cause fortune or misfortune. The Warao believed in a supernatural world populated by spirits or deified ancestors. People were rewarded in the afterlife if they had been skilful at their work. There was no dogmatic system of beliefs [188], [189], [192], [194], [195].

The Warao have traditionally avoided contact with other tribes, except for trade of necessary products. In modern times, however, they have intermarried with foreigners, adopted Spanish names, migrated, and accepted foreign culture elements quite quickly [188], [189].

The fertility was very high. A woman who survived into old age would get almost nine children on average. It must be mentioned, however, that this fertility rate was measured at a time when modern medicine had reduced the - previously very high - mortality, and where a large fraction of the population had settled into an agricultural lifestyle. It is possible that infectious diseases have stabilized the population size in earlier times. Children were breastfed for 3-4 years. Infanticide was practiced [189], [193].

Girls were usually married in their teens or early twenties; boys were a few years older when they married. A few girls were married as children. Polygyny occurred. Most marriages were within the same subtribe. Promiscuity was common in connection with certain rituals and dances. A man could have sex with the unmarried sister of his wife. Premarital trial unions were common. Divorce was rare for couples with several children [187], [188], [189], [192], [193], [196].

Children were treated well, and parents made toys for their children. Children spent most of their time playing, but they also helped with light work. Children were rarely scolded, and teenagers were not well disciplined [188], [190], [193].

Some religious artifacts were decorated, while tools, canoes and huts were rarely so. People wore necklaces and other adornment. The main forms of art were songs, dances and narratives. Singers had much freedom for variation and improvisation. Typical narratives were fables, stories about magical transformations, and stories about the supernatural world. There were no narratives or songs exalting powerful leaders, gods or battles; but there were tales about past invasions and a few fables told about jaguars that symbolized the enemy Carib. The main occasions for large social gatherings were religious ceremonies. Ceremonies for marriages and other rites of passage were not very elaborate [188], [194], [195], [196], [197].

The conclusion for the Warao is that the level of war, political system, discipline, treatment of children, sexual behavior and art were all in agreement with the predictions for a kungic culture. The religion was relatively kungic, though it did have a disciplining function. The fertility was atypically high.

### *Yahgan*

The present study concerns the canoe Indians who lived in the southernmost part of South America, the Tierra del Fuego, with the main focus on the Yahgan tribe. The climate was harsh and cold, with frequent storms. The territory of the canoe Indians was an archipelago of islands with high mountains and dense forests. The land was difficult to penetrate and provided only very little vegetable food. Therefore, the

Indians lived as nomads traveling in bark canoes, eating mainly seafood. Their tools were made mainly of wood, bone and shells. They had no metals and no pottery. As they had very little clothes, they always kept a fire for keeping warm [198], [199], [200], [201], [202].

Fishing in this environment could sustain only a low population density. The Indians could travel from island to island in their bark canoes, but not in open sea. Large-scale war has probably been impossible because of the low population density and because the bark canoes were too small and fragile. Small-scale clashes were more likely to have taken place. If we have to make a prediction based on the geography and technology alone, we will expect the Yahgan culture to be moderately kungic. The niche culture, harsh climate, low population density, and absence of technology suitable for war are factors that point in the kungic direction. The ability to travel far, and the risk of territorial conflict that come with a nomadic lifestyle, are factors that point in the regal direction.

The Yahgan had no social organization beyond the family. Several families might live together or meet for social and ceremonial occasions or to feast on a stranded whale, but there was no common leadership and no group organization. War was unknown, but small-scale conflicts and feuds were common. Revenge was not always deadly. There were no weapons other than the usual hunting tools. There was no organized policing. Punishment occurred in the form of revenge from the wronged party assisted by his or her family, for example beating for marital infidelity. In most cases, however, public condemnation was sufficient for deterring undesired behavior [198], [200], [201], [202], [203], [204].

They had few religious activities other than rites of passage and a few ceremonies. Some sources say that they believed in a high god [200], [202], other sources deny this [205]. Medicine men worked to cure diseases by means of self-induced trance or dreams, but they had few or no religious paraphernalia; they did not sacrifice and they did not believe that supernatural beings could be influenced by prayer. They believed that diseases and death were punishments for wrongdoing. For this reason, we can say that the religion had at least some disciplining function [199], [200], [202], [205].

There were several tribes of canoe Indians with distinct tribal identities. They feared the neighboring Selk'nam, who lived on land rather than in canoes. They were surprisingly tolerant of Whites, considering that they have been treated very brutally by white sea-farers, gold diggers and settlers in the past [198], [200], [201], [206].

There are no reliable data on the fertility of the Yahgan, and the sources do not fully agree. Some sources tell that they got many children, but the mortality was also high. The population size may have been stable for hundreds or thousands of years. The population has gone extinct after contact with Whites, mainly due to infectious

diseases. Abortion and infanticide was known. Suicide was unknown [200], [201], [202], [204].

There are conflicting accounts of the sexual morals of the Yahgan. They tried to keep boys and girls apart from each other, but premarital sex was nevertheless common. Extramarital sex occurred. The marrying age was reportedly around age 17-19 for boys and 15-16 for girls, but these figures may be inaccurate since they didn't count their ages. Polygamy was rare in some areas; perhaps common in other areas. Authors disagree on whether divorce was frequent or rare [198], [200], [201], [202], [204], [205].

Children were treated with devotion. Weaning age was 3 years or more. Children were given miniature tools to play and practice with. Small children were never punished. Children were obedient and helped their parents with daily chores, but they were never forced to do hard work [200], [205].

Yahgan art was extremely simple. Body painting consisted of simple lines and dots without precision. There was little or no tattooing and body mutilation. Music consisted of just a few notes, sometimes only a single repeated note. There were no music instruments other than percussion. Dances were imitations of animals (Nordenskjöld mentions a war dance, but gives no detail [206]. His account appears to be unreliable). Legends were mostly fables, myths about culture heroes, and a few stories about revenge [200], [201], [202], [207].

The conclusion for the Yahgan is that the level of war, political system, discipline, treatment of children, and art are all in agreement with the predictions for a kungic culture. The religion was kungic, though it did have a disciplining function. The fertility was high.

### *Yi (Lolo, Nuosu)*

The Yi people live in the large mountainous region of southwestern China. The present study is focused mainly on the subgroup living in the Liang Shan area and the period prior to the rise of communism in China.

The climate is temperate, but winters are hard. The subsistence was based mainly on slash and burn agriculture and animal husbandry. Transportation was difficult because of the steep mountains. There were no roads except narrow footpaths. Roads built by Han-Chinese invaders were systematically destroyed to prevent invasion. The Yi used horses for transportation and in war, but many paths were difficult or impossible to travel by horse. Most traveling was done by walking barefoot. There were many rivers, but few were navigable. The weapons included bows and arrows, iron-headed spears and tridents, and in later times also primitive firearms [127], [208], [209], [210], [211], [212].

Attempting to predict a regality level based on this information, we get a somewhat mixed result. The rivers produce fertile valleys between the mountains, and although the agriculture was not intensive,

it could sustain a considerable population. The efficient food production, the possibility of storing and transporting food, the large territory, and the availability of horses and metal weapons, are all factors that make war likely. On the other hand, the harsh environment and the difficulty of traveling are factors that point in the kungic direction. The fertile valleys are separated by large mountains, steep cliffs and torrential rivers, so that the average population density was low. The overall expectation is that the regality level will be intermediate.

The Yi in the Liang Shan area had a persistent caste system. The ruling caste, known as the Black Yi, constituted about 10% of the population. The rest of the population belonged to the slave caste, known as the White Yi. The White Yi were of mainly Han-Chinese decent, while the Black Yi were related to the Tibetans. These two castes were further subdivided into social classes. Newly captured slaves were lowest in rank. Through generations, the slaves could work their way up the hierarchy and become partly independent and even own slaves themselves. But the line between Black and White could never be crossed. Interbreeding between the two castes was prevented by all means. The caste system has been dissolved centuries ago among other Yi groups living in areas with a stronger Han-Chinese influence [127], [208], [210], [213], [214].

The political organization of the Yi was not as regal as one might expect for a society based on slavery. Most decisions were taken by public deliberation where even members of the slave caste had a say; and the leaders of villages and clans were chosen based partly on heritage and partly on merit. In some periods and in some areas there have been political leaders above the clan level, but these had limited influence in times of peace. For centuries or even millennia, the Chinese dynasties have tried to control the Yi territory and used Yi chiefs as suzerains. But the Yi have successfully rebelled time and again so that in effect the Yi have been mainly autonomous until the establishment of the People's Republic of China [127], [208], [209], [210], [213], [215], [216], [217], [218].

The political organization above the clan level - if any - was not strong enough to prevent the almost incessant feuds, raids and attacks between enemy clans or ethnic groups. The inter-clan conflicts were, however, of a relatively low scale where certain rules were obeyed and the opposing parties generally agreed to end a battle episode after a few hours when a winner had been found. Battles with more distant enemies, and in particular with the Han Chinese, were much more violent and merciless. Strangers that entered Yi territory without protection were habitually killed or enslaved [127], [208], [211], [212], [217], [219].

The available literature contains very little evidence of policing and punishment. Most crimes were punished by requiring that the offender pay compensation to the victim. Newly captured slaves were brutally tortured, but apart from that there is no evidence of corporal

punishment. Serious crimes were dealt with by persuading the offender to commit suicide. If he refused to do so he would be banished, but rarely killed [216], [218].

Religious rituals, linked to animism and ancestor worship, were controlled by priests and shamans. The priests (bimo) always belonged to the White slave caste. Their skills were transmitted mainly from father to son. Major political and judicial decisions required consultation of a priest and performance of certain rituals. The disciplining function of religion was probably limited. A few sources talk about supernatural punishments, but there is no agreement between the different sources regarding the kind of punishments or even whether they took place before or after death. Beliefs in supernatural punishments, if any, may be due to Chinese influence or Christian missionaries [215], [218], [219].

The Yi had a written language, which was mastered by the priests and only rarely by anybody else. Writing was used only for preserving religious rituals and formulas, not for trade or political administration [215]. We can assume that the priests had considerable influence. Whether they used this influence mostly in the interest of their own caste or mostly in the interest of the Black leaders, we do not know.

There is no reliable information about the fertility or birth rate of the Yi. Children were breastfed for 4-5 years but also given other food [212].

Suicide was customarily committed for different reasons relating to war, conflict, peacemaking, crime, infectious diseases and love [208], [210], [211].

The marrying age ranged usually from 9 to 21 for both girls and boys, though children as young as 4 or 5 could be married. Married girls stayed home with their parents until their first pregnancy. During this period they were free to have sexual relations with anybody they liked. For this reason, the first-born child often had another father than the woman's husband, but the latter had to accept the child as his own. Divorce was more common in the period before first pregnancy than after. Polygamy was rare [127], [208], [210], [212], [214], [219].

The sources tell very little about the life of children and nothing about the disciplining of children. Children were treated well, and boys were taught to be brave. Parents did not make toys for their children, but various games are known. Girls helped spinning hemp from age 4 and boys helped tending animals from age 7-8 [219], [220].

Clothing, tools and houses were often embellished. The Yi were fond of colorful clothes as well as gold and silver. Before firearms made face-to-face battle superfluous, the inter-clan feuds were not only contests of strength, but also opportunities to compete on fancy clothing or flute playing. The sources show no evidence of the highly repetitive geometric patterns typical of regal art. Singing and dancing

was common. Song texts were mostly about everyday topics, but there were also war songs [127], [208], [211], [219].

Evaluating the Yi culture, it is surprising how a slave system could persist for centuries when the political and religious means of disciplining the population were so weak. The caste system that allowed slavery may have been supported by ideology or religion, but the religion was managed by priests belonging to the slave caste. No slave rebellion has been reported. The agricultural production was also fully in the hands of the slave caste [212].

The caste system and the pervasive slavery are the strongest indicators of regality in the Yi culture. The full-scale wars with the Han Chinese are also regal indicators, while the frequent inter-clan feuds and raids with limited casualties can hardly be considered regal indicators.

The political administration, the discipline, the religion and the sexual morals appear to be mostly kungic. The use of body adornment in conflicts is a regal sign, but the adornment is hardly more elaborate than in other cultures. The almost complete absence of praise for gods or rulers in art and songs is an indication of a fairly kungic art.

### *Yanomamo*

This culture is considered here only for the purpose of the discussion in the section "*Search for exceptions to the theory*" on page 23.

The Yanomamo lived in the Amazon rainforest in Brazil and Venezuela. They resided mainly in semi-permanent villages with 20-400 inhabitants. Slash-and-burn agriculture was their main source of food. They were capable of living a nomadic life as hunters and gatherers, and it is speculated that they might have done so in pre-Columbian times since their main crop - plantains - has been brought to the Americas by Europeans. They traveled almost exclusively by foot on narrow paths that were almost invisible to foreigners. Many trails were impassable in the wet season. They went barefoot and almost naked. They had little or no means for sailing on the rivers; and they could cross big rivers only with difficulty. They had no domestic animals besides dogs. Their main weapons were clubs and bows and arrows. Arrow tips were mostly made of wood or bone, poisoned with curare. Metal tools were obtained by barter [68], [70], [71], [221], [222], [223].

The cultivation of high-yield crops made room for large village populations, but the dependence on hunting for acquiring protein made it necessary that each village had a sufficient hunting territory. This makes us predict that wars were likely; and the wars would be aggravated by the availability of strong arrow poison. On the other hand, the difficulty of traveling through the rain forest and the low overall population density are factors that reduced the possibilities for war. Considering these opposing factors, we will predict an intermediate level of regality.

The Yanomamo have a reputation for fierceness in war, but there has been considerable controversy among anthropologists over how fierce the Yanomamo actually were, why they fought, and whether their raids can be classified as war. It is undisputed, however, that violence was a frequent cause of death in some areas [68], [70], [224].

In their own understanding, the Yanomamo conducted raids against other villages for purposes of retaliation and to capture women. They were well aware that the enemy might move away as a consequence of a conflict, but they rarely mentioned the desire to make the enemy move away as a motivation for attack [68], [70], [221], [223]. An ethologist has suggested that we make a distinction between the proximate cause of Yanomamo warfare, which is the personal motivation, and the ultimate cause of the warfare, which is connected to the evolutionary function of securing a sufficiently large hunting territory [225]. Since Yanomamo conflicts had territorial consequences, we will classify them as wars with regard to regality theory.

The Yanomamo had no political organization above the level of the village, and the village headman had very little authority. There was no organized system of justice and punishment other than retaliation. Even rape and murder could go unpunished if there were no relatives to retaliate for the victim. Personal conflicts were handled by fighting duels. These duels were formalized and rule-governed. Afterwards, the issue was regarded as settled regardless of the outcome of the duel. However, a duel might sometimes escalate into collective fighting or even war, especially if somebody died [71], [226], [227].

The religious beliefs of the Yanomamo involved a close connection with animals and spirits. Many men were shamans. They took strong hallucinogenic drugs in order to get in contact with, or even become, spirits. They manipulated the spirits for purposes of curing diseases and for harming their enemies. They had no supernatural rulers, and only weak concepts of supernatural punishment after death [71], [222], [228].

The fertility was controlled by breastfeeding, abortion, infanticide and magical anticonception means. Birth spacing was 2-5 years. The overall fertility was 4 - 8 children per woman. Extramarital sex occurred when detection could be avoided. It was common for a man to share his wife with his brothers. Rape was common [71], [221], [222], [226], [227].

Most girls married soon after puberty. Girls might be married before puberty, but they did not live with their husband until after first menstruation. Men married at age 18 - 30. They often married for economic and strategic rather than romantic reasons. Girls had little self-determination about whom to marry. Polygyny and polyandry occurred. There was no marriage ceremony. Wife beating was normal. Divorce was common [70], [71], [221], [222], [227].

Children were rarely disciplined, but boys were taught to be fierce and to retaliate. Children were given miniature tools and other



toys. Girls were obliged to do work from a much younger age than boys [70], [221], [222], [226], [227].

The Yanomamo produced little art. Body painting was made as much for magical reasons as for decoration. Different colors and patterns were used for war paint, hunting, shamanism, etc. Some patterns symbolized or imitated various animals. Piercings in ears, lips and nasal septum were decorated with long sticks or feathers. Arrow tips were often decorated, while clay pots were not. Dance and singing was common. There were few or no music instruments. Myths and stories did not glorify war [71], [223], [226], [228], [229].

The conclusion for the Yanomamo is that the level of war is intermediate while the political organization, justice, discipline, religion, sexuality and art all tend in the kungic direction. The strong male dominance may be interpreted as a regal indicator.

## Appendix 2

**Table 9. Factor loadings for factor analysis of table 2.**

Variable number	Variable name	F1	F2	F3	F4	F5	F6	F7	F8
V64, V156	Population density	0.30			0.50	0.20			0.15
V61	Fixity of settlement	0.23			0.67		-0.25	0.13	0.20
V62	Compactness of settlement	0.30	-0.15		-0.18				-0.11
V63	Community size					0.91			
V66	Large or impressive structures	0.39			0.25		-0.18	0.19	
V149	Writing and records	0.66		-0.2		0.11	0.11	-0.11	
V152	Urbanization			-0.13		0.93			
V203	Dependence on gathering		-0.11		-0.44		-0.14	-0.21	-0.92
V204	Dependence on hunting	-0.16			-0.74		-0.38	-0.27	
V205	Dependence on fishing	-0.11			-0.16		-0.21	0.94	0.22
V206	Dependence on animal husbandry				-0.17		0.98		0.1
V207	Dependence on agriculture	0.19			0.92		-0.29	-0.27	0.27
V677	Migration	-0.31		0.26				0.13	0.16
V732	Importance of trade in subsistence		0.13	-0.10					
V1265	Occurrence of famine		0.22					0.11	
V1267	Severity of famine	0.23			-0.12				
V1684	Threat of weather of pest disasters						0.14	0.17	
V1685	Chronic resource problems	-0.12			-0.11	0.15		0.15	
V1260	Total pathogen stress			0.21	0.42			-0.25	
V854	Niche temperature			0.21	0.42			-0.24	-0.24

V855	Niche rainfall	-0.17			0.41		-0.3	0.19	0.11
V921	Agricultural potential	0.19			0.30	0.13	-0.20	-0.13	-0.20
V1122	Total population	0.58			0.22		0.14	-0.13	
V157	Political integration	0.91							
V1132	Political integration, state	0.41	-0.12	0.15		0.12			
V158	Social stratification	0.79							
V72	Intercommunity marriage	0.10	-0.17	0.15		-0.39	0.12		
V861, V79	Polygamy	-0.26	0.37	0.38				-0.20	
V82	Trend in autonomy	0.51	-0.20						
V83	Levels of sovereignty	0.87			0.14	-0.11			
V237	Jurisdictional hierarchy	0.92							
V270	Class stratification	0.77							
V272	Caste stratification	0.21					0.22	-0.15	
V274	Type of slavery	0.11		0.22			0.22		0.12
V920	Proportion of slaves		0.14		0.12				
V79, V1133	Polygamy, Maximum harem size	0.13	0.22	0.28	-0.31		-0.26		-0.12
V1134	Despotic bias in conflict resolution	0.41		0.32			-0.20		
V1743	Sanctions	0.18	-0.17	0.28		0.12			0.13
V1650, V774, V892, V893, V670	Frequency of external warfare	0.14	0.24	0.39	-0.12				
V892	Frequency of external war - Attacking	0.16	0.56	0.13	-0.19				
V893	Frequency of external war - Being attacked		0.46					-0.13	
V668	Wives taken from hostile groups			0.34	-0.12	0.10		0.14	
V894	Form of military mobilization	0.27	0.53						
V902	Leadership during battle	0.40	0.45					0.15	
V903	Prestige, soldiers or warriors	-0.13	0.82						
V905	Rewards for killing enemy	-0.22	0.73		0.17				
V907	Value of war		0.72						
V908	Military success		0.37					0.10	
V909	Subjugation of territory or people	0.61							
V1654	Pacification	-0.23	-0.23						
V1649, V1748, V773, V891	Frequency of internal warfare	0.12	0.17	0.34		-0.11	0.13		
V666	Interpersonal violence	-0.15	0.51						
V906	Expect violence to solve problems		0.54						
V1776	Intraethnic violence		-0.16	0.42			0.16		
V1665	Homicide	0.17		0.56					
V1666	Assault		0.13	0.63		-0.15			
V1667	Theft	0.16		0.47		-0.18			
V1676	Socially organized assault			0.36					
V1677	Socially organized theft			0.40			-0.14		
V1678	Socially organized trespass			0.23					0.20

V1721	Rich people	-0.13	0.31	0.13				0.20
V1726	Communality of land	-0.28	-0.16	0.40	-0.13			
V24, V25	Bodily restrictiveness in infancy	0.12	-0.16					-0.16
V31	Infant crying response			0.24				-0.10
V33	Childhood pain infliction			0.26				-0.12 0.10
V41	Autonomy-encouragement in childhood			0.17				0.14 0.15
V43	Covering genitals - age	0.18		-0.1	-0.11			0.30
V44, V45	Weaning age	-0.11	-0.10	0.19				-0.11 0.13
V53, V54	Role of father, infancy/early childhood			-0.25				
V242	Segregation of adolescent boys	-0.18		0.40				
V293	Duration of early childhood			-0.14	0.24			
V831, V832	Differentiation of adolescence from childhood			0.12				0.13
V453, V454, V455, V456	Corporal punishment of boys/girls			0.35				0.18
V667	Rape			0.30		0.12		
V34	Post-partum sex taboo			0.21	0.13			-0.14
V671	Menstrual taboos			0.28		0.20		
V672	Male avoidance of female sexuality			-0.18	0.29			0.11
V827, V828	Sexual expression in adolescent boys/girls	0.20		0.26	-0.17			-0.13
V829, V830	Sexual nonrestraint in adolescent boys/girls							
V740	Marriage arrangements (Female)	0.15		0.28			0.20	-0.11
V864	Rooming arrangement for wives			0.28	0.27	0.27	-0.14	0.11 0.11
V868	Multiple wives for leaders, headman, chiefs			0.14	0.37		-0.20	
V664	Ideology of male toughness	-0.11		0.32				
V657	Flexible marriage mores			-0.11	0.16	0.19		-0.17 0.12
V661	Female political participation			-0.26	0.21			-0.17 0.16 -0.12
V665	Male segregation			0.41		0.15		
V238	High gods	0.13	-0.13					0.33 -0.13 0.10
V713	Classical religion	-0.22						
V529, V530	Adolescent initiation ceremonies	-0.13	0.12	0.33	-0.11			0.22 -0.25
V1188	Evil eye	0.14		0.12				0.44 0.11
V1694, V1695	Scarification	-0.11		0.19				
<b>Total factor loading</b>		<b>7.198</b>	<b>4.723</b>	<b>4.492</b>	<b>3.705</b>	<b>2.423</b>	<b>2.400</b>	<b>1.911</b> <b>1.744</b>

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