

# DO NATURAL HAZARDS TRANSFORM CULTURE?

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Some preliminary results

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*Front row from left: Peter Peregrine, Carol Ember, Eric Jones and Ian Skoggard. Back row from left: Michele Gelfand, Ben Felzer, and Teferi Abate Adem.*

FOR THIS PROJECT AT HRAF WE  
APPRECIATE THE ASSISTANCE OF:

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Leon Doyon

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Amelia Piazza

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# MAIN RESEARCH QUESTIONS

**A.** How have human cultural groups responded to and been transformed by climate hazards, particularly those with the potential to seriously destroy food supplies (such as droughts, insect infestations and floods)?

➤ This is the focus of the results presented today

**B.** How does variation in frequency, severity, and predictability of hazards affect the nature of those societal transformations across space and time?

# The project is conducting three types of comparison

## Cross-cultural comparisons

using ethnographic data.

## Archaeological comparisons

of post-disaster changes.

## Cross-country comparisons

**Data sources include the Standard Cross-Cultural Sample (SCCS) and eHRAF World Cultures where possible.**

# BASIC ASSUMPTIONS

- A. Unpredictable natural hazards seriously destroying food supplies (hazards hereafter) may be increasing with climate change, but they are not new.
- B. We presume that societies surviving in hazard-prone environments developed a suite of adaptive culture traits for those environments.
- C. If so, we should find consistent cultural differences when we compare societies living in hazard-prone environments versus those living in less hazard-prone environments.
- D. The cultural differences we find are strong candidates for being adaptive cultural traits in hazard-prone environments.

# Measure Of Hazards: The Main Independent Variable

Our main measure of hazards comes from Ember and Ember (1992a, 1992b) who rated resource problems in the course of their study of warfare for the Standard Cross-Cultural Sample.

1) **Number of unpredictable natural hazards that seriously destroyed food supplies in the 25-year time frame around the ethnographic present**


- **Hazards include: droughts, floods, hurricanes, killing frosts, insect and pest infestations, and plant pathogens**

2) **Although famines are not always caused by natural hazards, we also looked at the number of deadly famines in that same time period**

The scope of the dependent variables we are examining is quite broad....

ranging from diet and subsistence diversity, property systems, mutual aid, political economy, and general cultural “tightness”

all of these domains have been newly coded for this project



MY TALK TODAY FOCUSES ON  
RESULTS FROM THE  
ETHNOGRAPHIC COMPARISON  
REGARDING:

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- ▶ **property rights**
- ▶ **mutual aid**
- ▶ **“Tightness or “looseness” of cultures**



# Control Variables

- Most of the dependent variables are predicted by some aspect of social complexity.
- In each analysis, we have controlled for the complexity measure that has the strongest predictive value. We analyzed the following
  - political integration
  - social stratification
  - dependence on hunting, gathering, and fishing
  - sedentariness of settlement
  - intensity of agriculture
- The measures of social complexity come from Murdock and Provost (1973) and from the Ethnographic Atlas (column 7)

# TURNING NOW TO PROPERTY SYSTEMS . . .



# OUR EXPECTATION REGARDING LAND TENURE

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Communal ownership will be more likely in hazard-prone environments.

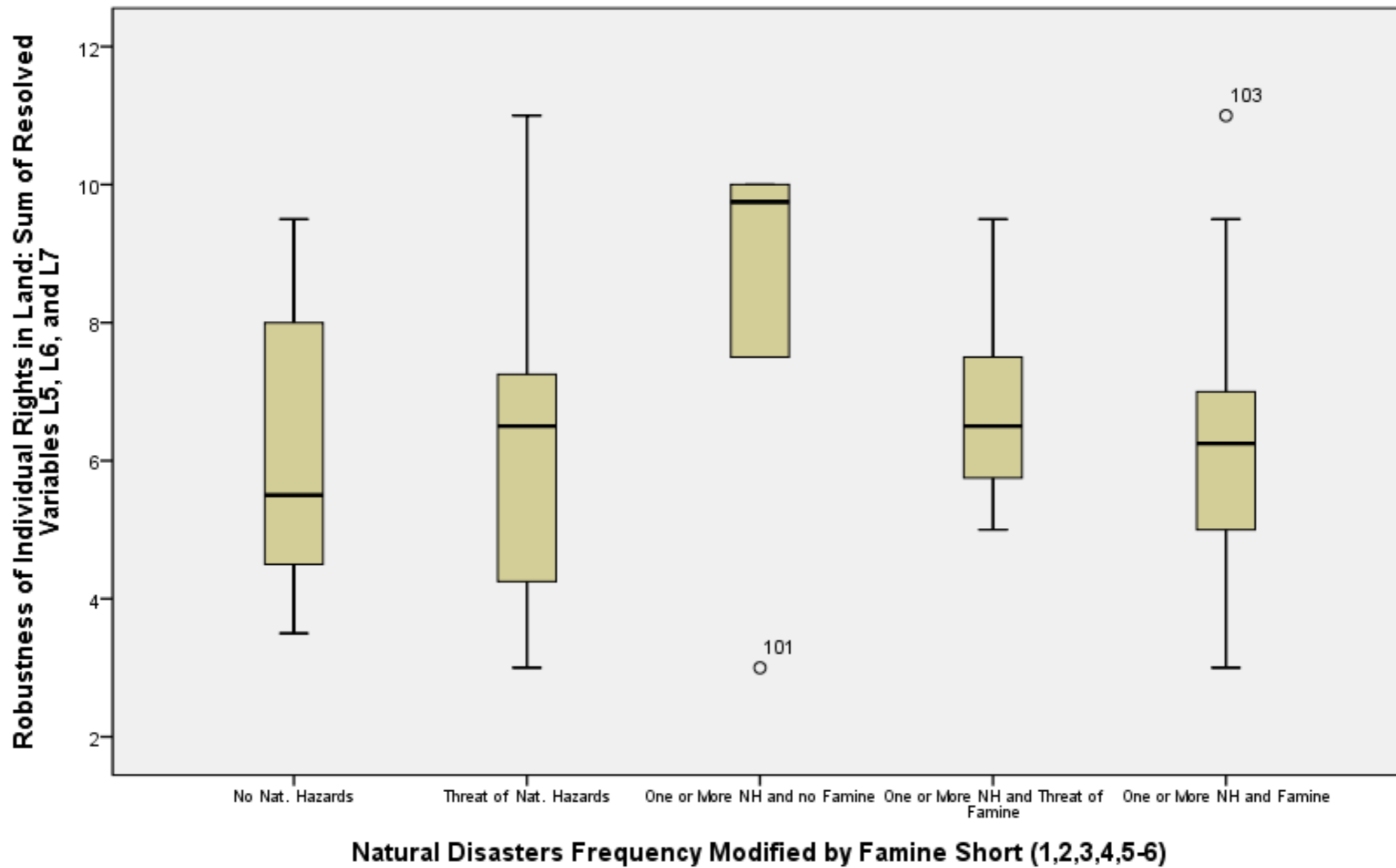
- We suggest that communal systems are more adaptive in hazard-prone environments because they are
  - more inclusive
  - more flexible (allowing people to return if they have to migrate)

# OUR RESULTS ARE A LITTLE MORE NUANCED

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- **Kinship-based communal** property systems (e.g., lineage, clan) are **significantly more prevalent** in natural hazard-prone environments than individual ownership systems
  - But, other communal systems (residence or polity-based) are not more prevalent
- If we look at **robustness of individual land rights** using variables that judge leeway of individual households to manage, allocate, or transfer resources even when there is communal ownership
  - the relationship looks curvilinear when we combine natural hazards and famine together (see next slide)

# Relationship Between Robustness Of Individual Rights In Land And Natural Disasters Frequency Modified By Famine



# LAND TENURE RESULTS

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- **Moderate levels of resource problems are significantly related to more robust individual rights**
- we suspect that moderate problems increase the need to innovate and hence there is somewhat more flexibility in individual rights
- **Social complexity predicts more robust individual rights**
- controlling on complexity (the strongest variable is sedentariness), moderate resource problems remain a significant predictor of more robust individual rights

# TURNING NOW TO MUTUAL AID BEYOND THE HOUSEHOLD . . .



# OUR EXPECTATIONS REGARDING SHARING BEYOND THE HOUSEHOLD

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## The more hazards

- the more sharing in general
  - although the literature suggests some pullback with extreme stress
- the more sharing at greater distances
- the more sharing across wider social networks

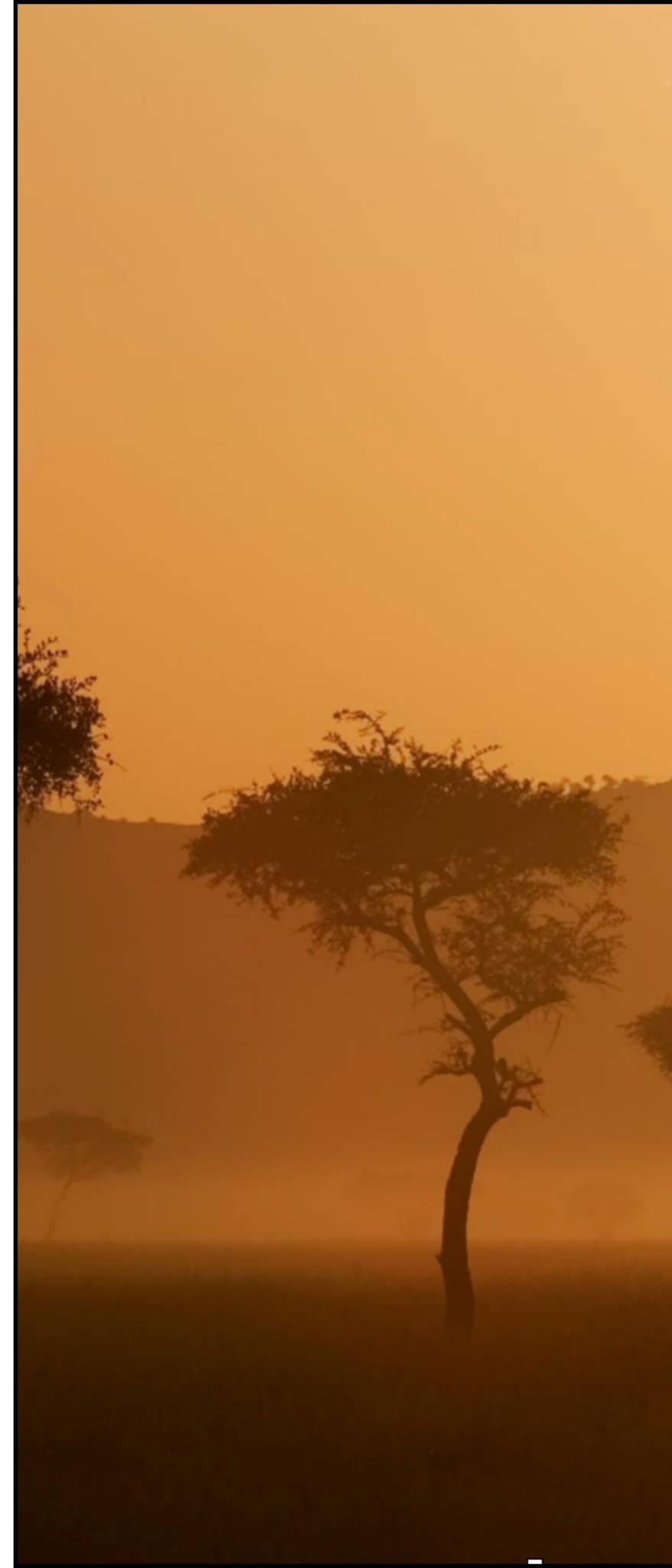
The more social complexity, the less sharing



# SHARING RESULTS

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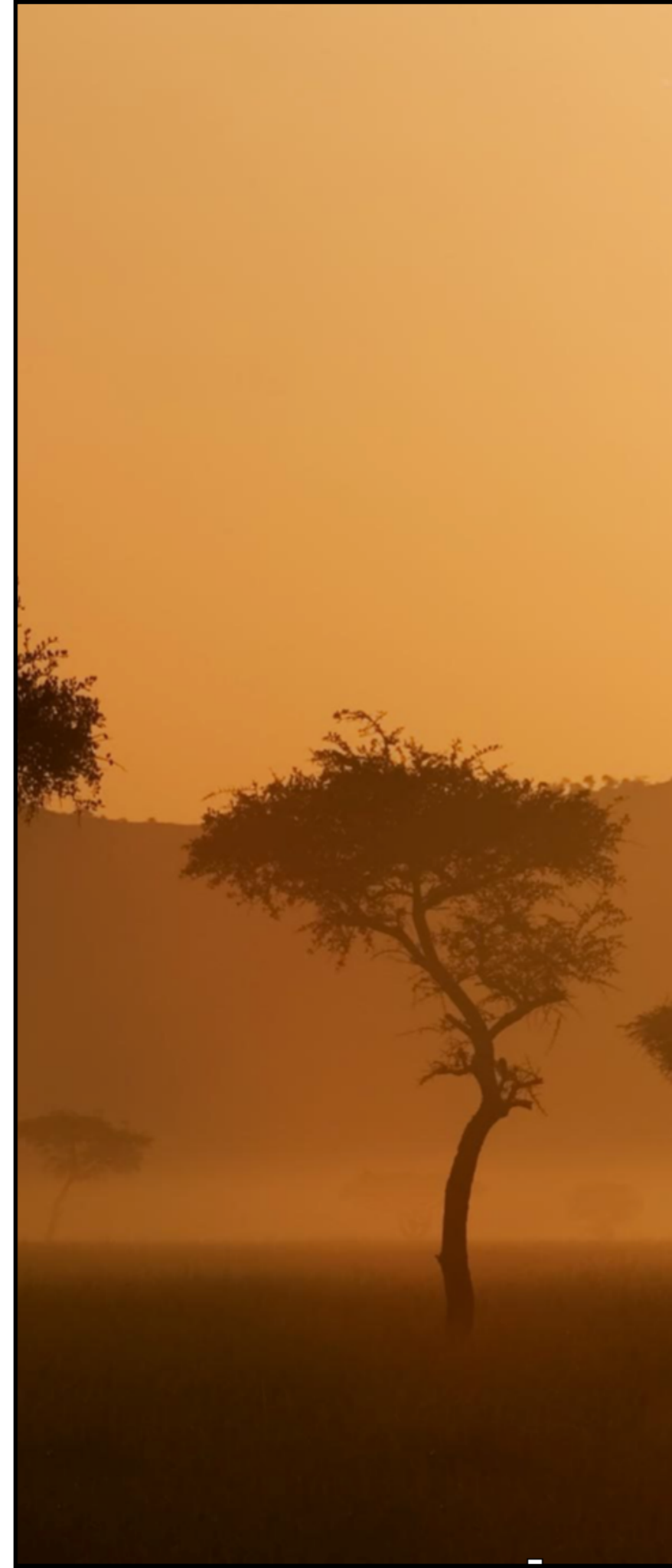
- **Frequency of Sharing**
  - At least occasional food and labor sharing between households is a near universal; most of the variation is with more than occasional sharing
- **Hazards, Famine, and Sharing**
  - Both hazards and famine generally predict more than occasional sharing in the daily to seasonal range



# SHARING RESULTS CONT.

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- **More social complexity**
  - generally predicts less frequent sharing
  - A notable exception is sharing during religious and healing ceremonies—social complexity generally predicts more of this type of food sharing
- **Controlling on complexity** does not alter the significance of the relationship between hazards and/or famine and more sharing



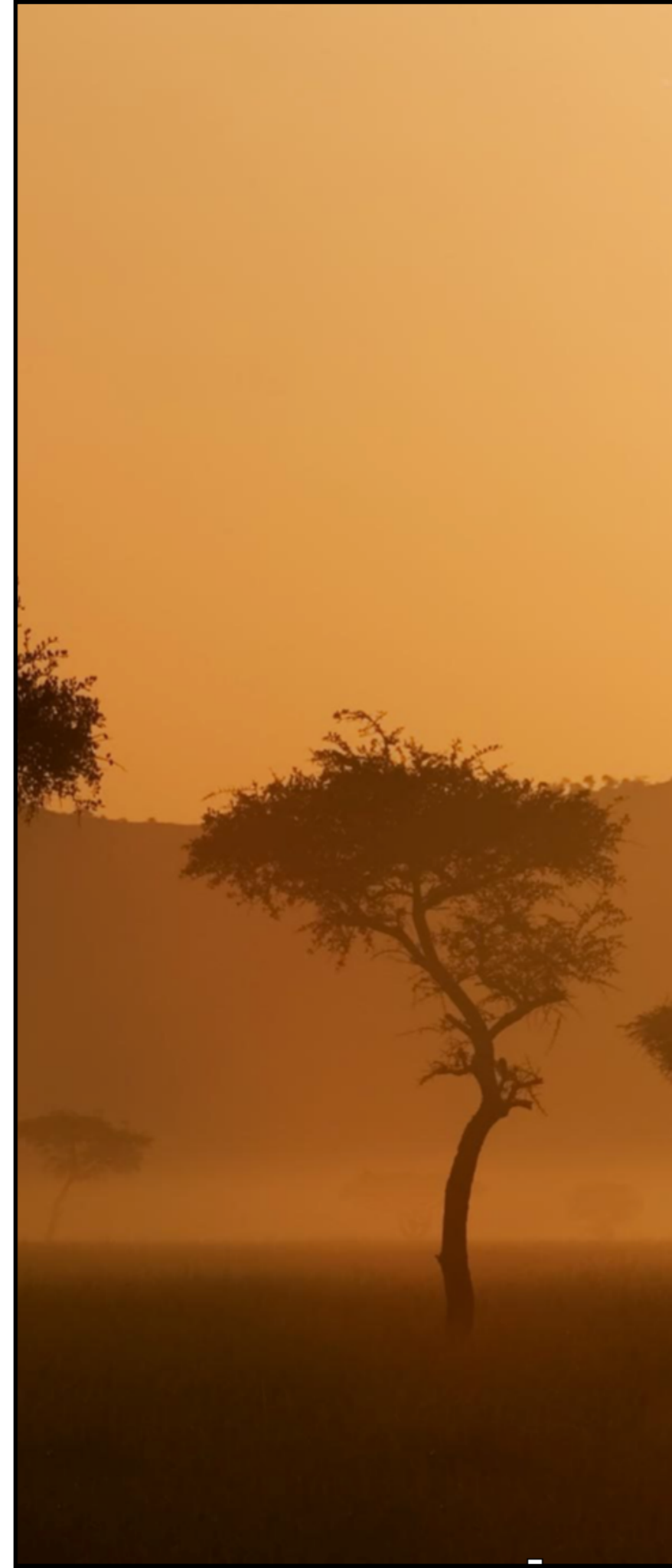
# SHARING RESULTS, CONT.

.....  
During disasters—although we don't have many cases with information—societies with more hazards and famine

- almost always share labor and food during disasters; the distribution on the non-hazard side is more equally distributed

More frequent hazards, which predict more daily labor sharing, also predict that such labor sharing is

- more likely to be communal rather than dyadic
- more likely to involve some non-kin

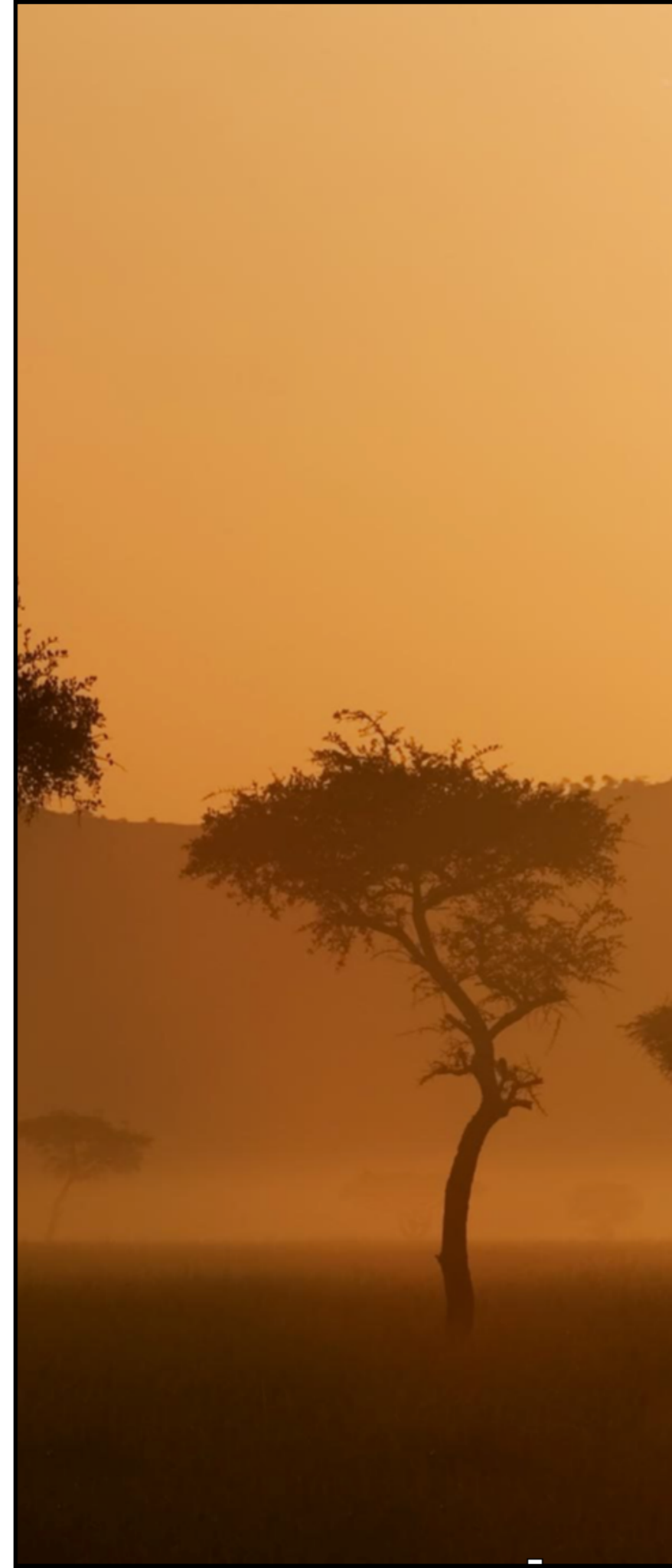


# SHARING RESULTS, CONT.

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Among societies that share, there is some evidence that extreme stress narrows the circle of food sharing to kin

- most of the correlations between two or more hazards (our highest hazards score) and food sharing with non-kin are strongly negative
- the result for famine is similar—more famine predicts less food sharing with non-kin
- seasonal food sharing (when supplies are likely plentiful) is the exception. Societies with more famines are marginally more likely to share with non-kin seasonally



**TURNING NOW TO “TIGHTNESS” AND “LOOSENESS” ...**



# “TIGHT” VERSUS “LOOSE” CULTURES

- Original concept came from anthropologist Pertti Pelto (1968)
  - “tight” vs. “loose” refers to the degree to which social norms are pervasive, clearly defined, and reliably imposed (Gelfand et al. 2011)
- Research on 33 countries (Gelfand et al. 2011) and the 50 U.S. states (Harrington and Gelfand 2014) found that “tighter” countries and “tighter” states
  - had significantly more climate-related disasters
  - “Tighter” countries had significantly more violence

## Tight/Loose Domains Coded So Far

- Standardization of clothing
- Standardization of adornment
- Etiquette involving eating

### Our expectations regarding “tightness” vs. “looseness”

- More natural hazards will generally predict more “tightness” (although we expect some groups in very unpredictable environments to be more flexible)
- The theory is that “tightness” reflecting strong norms will enhance needed cooperation
- more complex societies (in the preindustrial sample) will have more standardization

# MEASURES OF CLOTHING AND ADORNMENT

- Since clothing and adornment scores are generally correlated, we have factor-analyzed answers to the following questions
- **Clothing**
  - To what extent is clothing for typical adult females standardized?
  - To what extent is clothing for typical adult males standardized?
  - Overall, with specific regard to clothing, how free (versus constrained) are people in this culture to act as they please?
- **Adornment**
  - To what extent is permanent adornment and/or nonpermanent adornment for typical adult females standardized?
  - To what extent is permanent adornment and/or nonpermanent adornment for typical adult males standardized?
  - Overall, how constrained are individuals to adorn themselves a certain way?
- **The factor analysis (PCA) produces two factors:**
  - Factor 1 appears to reflect a generalized standardization factor of clothing and adornment
  - Factor 2 appears to focus primarily on adornment variables



Most  
standardized



Considerably  
standardized



Less  
standardized



Note: Illustrative photos of standardization of clothing; not actual societies coded in the study

# FINDINGS ON CLOTHING AND ADORNMENT\*

	Predicting Factor Score 1 (Overall Clothing and Adornment Constraint) Model 1	Predicting Factor Score 2 (Overall Adornment Constraint) Model 2
Intensive Agriculture	.50**	-.25
Famine Trichotomized	.39*	.52*
Natural Hazards	-.09	-.24
N	30	30
R	.56 <sup>a**</sup>	.48 <sup>a+</sup>
R <sup>2</sup>	.32	.23
*p < .05, one tail; ** p < .01, one tail; + p < .10 <sup>a</sup> this p value is two-tailed		

*\*Since social complexity also predicts more standardization, we controlled for the strongest predictor of standardization which was intensive agriculture.*

# CLOTHING AND ADORNMENT RESULTS

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- ▶ The results suggest that famine (which is extreme resource stress) predicts standardization controlling for both social complexity (measured by intensive agriculture) and natural hazards
- ▶ Complexity remains a significant predictor of general standardization, controlling on hazards and famine

# FOOD ETIQUETTE AND RESOURCE PROBLEMS

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- **FOOD ETIQUETTE REFERS TO ORCHESTRATION OF MEALS, PRESUMABLY REFLECTING CULTURAL EMPHASIS ON RULES**

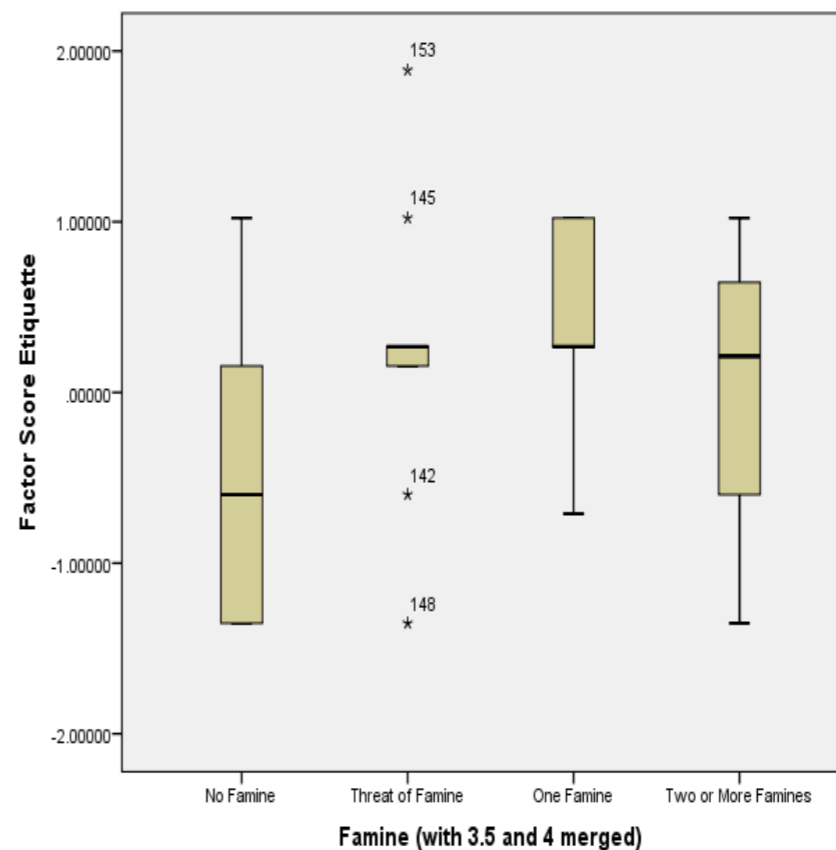
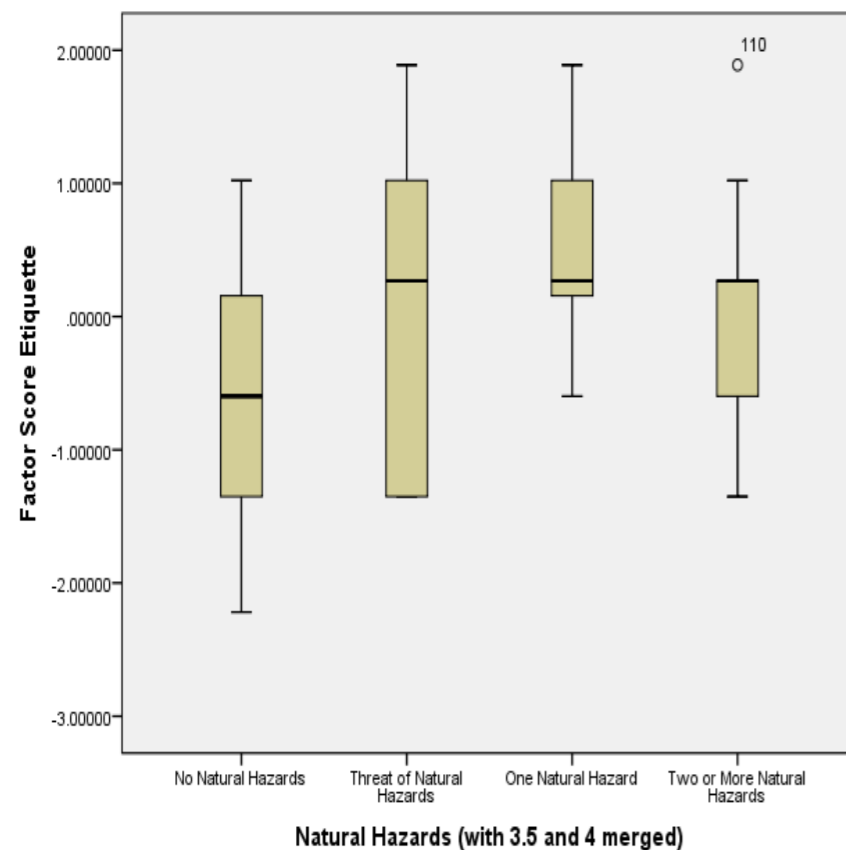
- We created a factor score from two questions on etiquette—one involving typical family meals and the other special occasion meals and feasts
- Results are not linear (see next slide), but after dichotomizing both natural hazards and famine, we find support for our expectation that there will be significantly more orchestration with greater likelihood of famine or more natural hazards

- **BUT ETIQUETTE ALSO INCREASES WITH SOCIAL COMPLEXITY**

Do resource problems still predict etiquette controlling on social complexity? **Yes. Using multiple regression and either famine or natural hazards, the resource variables are still significant.**

## Findings on eating etiquette using a factor score on degree of orchestration

Note that results are not linear—etiquette increases with threat of hazards and threat of famine and levels off



After dichotomizing both variables, there is a significant difference on the etiquette score between no natural hazards vs. other and no famine vs. other

# MEAL ETIQUETTE RESULTS

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- ▶ The results suggest that both threat of or actual hazards and threat of or actual famine predict more orchestration of meals consistent with our expectations.
- ▶ Results remain controlling for social complexity

# FUTURE PLANS

- *We will be looking at other hazards such as depopulation and pathogen stress*
- *We will be coding other variables—subsistence diversity and other measures of cultural “tightness.” If time permits, we will examine religious practices*
- *We will examine how all of these cultural features relate to violence, which was previously found by Ember and Ember (1992a) to be strongly predicted by natural hazards*
- *We will be looking at alternative measures of hazards with weather data from a 100-year time frame to see what time frame best predicts these possible cultural adaptations*
- *Additionally, we will look at predictability, constancy, and contingency of weather*

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