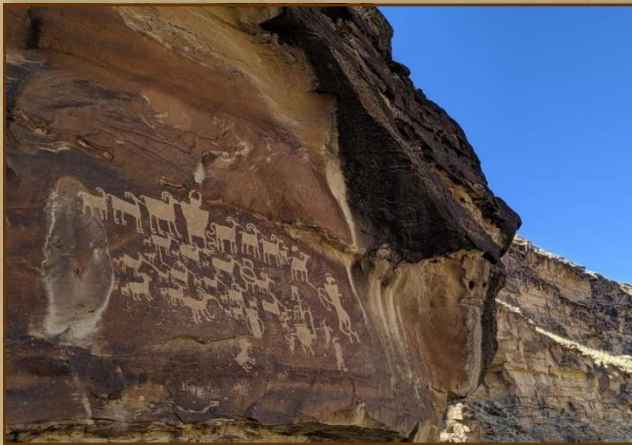


Furthering Perspectives

Anthropological Views of the World



Anthropology Graduate Student Society

Spring 2020

Volume 9



**ANTHROPOLOGY
AND GEOGRAPHY**
COLORADO STATE UNIVERSITY

Furthering Perspectives Anthropological Views of the World

Anthropology Graduate Student Society

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Editor's Note

Welcome to the Spring 2020, Volume 9 edition of *Furthering Perspectives: Anthropological Views of the World*! I am so pleased to present the following collection of articles written by our dedicated students here at Colorado State University. Anthropology is a field that studies all of that which makes us human, and thus, *Furthering Perspectives* invites perspectives from a broad array of disciplines. The following collection of articles present only a few of the many theoretical and applied approaches that contribute to our anthropological knowledge.

Acknowledgements

The Anthropology Graduate Student Society thanks every student, reviewer, and editor who helped make this volume of possible. Thank you to all the faculty members who gave their invaluable support to students as they wrote and underwent the review process. A big thank you to all the reviewers for their feedback, and thank you to all the students who provided the cover photos for this volume.

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Taxonomic Identification of Dentally-Unassociated Postcranial Fossil Elements in Early Eocene (~56-52 MA) Mammals

John Johnson

Introduction

At the beginning of the 2019 CSU Paleontological Field School, there were a vast number of postcranial fossils in the Primate Origins Lab that were unidentified and unassociated with dentition. These specimens were filling a large section of the lab, while not supplying the lab with any valuable data at the time. In order for these specimens to yield data for research, they would first have to be identified to a referenceable taxon (e.g. genus and/or species). This led to the following research question: could zooarchaeological methods, as used on modern extant faunal remains, be applied to extinct faunal postcranial remains for taxonomic identification and taphonomic descriptions in the absence of associated dental elements?

Teeth are the most common anatomical elements in the vertebrate fossil record and are the primary means of identifying fossil taxa. If postcranial remains are recovered in association with teeth, reliable taxonomic designations can be made. In this project, zooarchaeological methods were used to identify fossil anatomical elements lacking dental associations. The research consulted published descriptions of postcranial remains to build a database of information and documents that could be used for postcranial-based taxonomic identification. The fossils used in this research were obtained from the CSU Primate Origins Lab. First, the methodology was tested against fossil specimens in which dental & postcranial elements were recovered in association. Second, the positive results allowed the methodology to be applied to unassociated postcranial fossil elements. With taxonomic identification, postcranial remains of primates, their taxonomic relatives, and sympatric fauna can be examined for adaptive variations with the goal of understanding the paleobiome in which

the earliest true primates (Adapoidea, Omomyoidea) arose.

This will benefit the discipline of anthropology by providing the field with information and resources about postcranial and locomotive adaptation evolution. Having this information could further the understanding of the human body, as well as the environment where the Order Primates first began. These methods, which have been applied to modern, extant, mammals, could be applied to extinct animals of not just the Eocene, but also to Pleistocene fauna of North America, which humans have had an impact on. By combining the practices of paleontology and zooarchaeology, the understanding of the Order Primates can well be expanded.

Methods and Materials

The study sample was obtained from the CSU Department of Anthropology and Geography's Primate Origins Lab collection of early Eocene (~56-52 Ma) Willwood Formation, Bighorn Basin, WY fauna. The fossil specimens were recovered during the ANTH 470 Paleontology Field School 2013-2019 field seasons and consisted of more than 200 fossil specimens. Most of the specimens that were examined were mammalian, with a few exceptions. Within the unidentified specimens, some reptiles and birds were found among the sample. The reptiles and birds, however, will not be included in this research's results. This research will focus primarily on the mammals in the hopes of identifying postcranial elements of the earliest primates and their relatives, the Plesiadapiforms, that existed during the Eocene.

The process used to identify the taxa starts with first identifying the Bunn Size Class for each fossil element in the collection. This ranks the postcranial elements from the smallest size (Size

1A; less than 10 lbs.) up to the largest size (Size 6; greater than 6000 lbs.) (Bunn 1982). Each of the species documented to be found in the Eocene received a Bunn Size Class as well, in order to minimize the total number of faunae that had to be investigated for each fossil. This created a bias on the fossils that would be first observed in this research, due to the desire to primarily identify primates. Given the size of the primates of the Eocene Epoch, the first postcranial fossils identified in this research were those in the 1A to 2 size range (less than 10 lbs. to 250 lbs.) (Bunn 1982). Each fossil fragment was then identified to its skeletal element (e.g., humerus, radius, femur) and the portion of the bone (e.g., distal, proximal) it represented. By identifying the fossil fragment, the research was able to identify key osteological features that might be present. This would include features such as the presence of a supertrochlear foramen on the distal end of the humerus, or the direction and height of the greater trochanter on the proximal end of the femur.

From here, linear measurements were obtained using calipers. The calipers were accurate to the hundredth of a millimeter. This included maximum length of the fossil, maximum width of the epiphysis, maximum diameter of the shaft, and independent measurements of the osteological features that are present. Once this data was obtained, the fossils could be compared with other specimens, and identified to the same taxa and skeletal element. The first comparison came from fossils within the lab collection with associated dentition provided. When collection examples were unknown, publications from paleontological literature were consulted (listed in the references section of this article).

This would provide a strong taxonomic verification of the fossil specimens, while also providing the research with a series of taxa that the specimen could be mistaken for. For example, a characteristic that can be contributed to the distal humerus of *Hyracotherium* is that the shape of the distal epiphysis is similar to that of *Homogalax*. The two are similar in shape and both have the presence of a supertrochlear foramen in the center of the distal end of the humerus (Rose 1996). Both taxa have a distal epiphysis that is rounded, whereas many other mammals of the Eocene are elongated medial-laterally and are either rectangular or

triangular. On average, the medial-lateral breadth of *Hyracotherium*'s distal epiphysis is roughly 15 ± 5 mm (Wood et al. 2011; Kitts 1956). *Hyracotherium* thus falls into the size class 1B to 2 (10-250 lbs.) (Bunn 1982).

When comparing *Hyracotherium* to *Homogalax*, there are some notable size differences in the distal humerus. *Hyracotherium* (an early horse) and *Homogalax* (an early tapir) both belong to the Order Perissodactyla. *Hyracotherium* is smaller in total body mass (TBM) when compared to the much larger *Homogalax*. *Homogalax*'s distal humerus medial-lateral breadth tends to be 25 ± 2 mm (Rose 1996). By documenting the presence of all these characteristics, as well as determining it to be too small to be *Homogalax*, the fossil specimen can be attributed to *Hyracotherium* (Fossil example seen in Figure 1).



Figure 1: DMNH 77347 *Hyracotherium* (Order Perissodactyla) distal humerus, anterior view

The final step in the process was documenting each fossil using the lab's photo stand with a scale of 10 mm and a high-quality camera, then recording all data recovered in previous steps on an excel data sheet that will be uploaded to the lab's main database. This ensures that each fossil can be remeasured and evaluated by future researchers.

Results

This research project identified 146 fossil fragments to skeletal elements. Whereas some individuals were represented by a single bone, other individuals were represented by several associated skeletal elements. The research included specimens



Figure 2: Omomyoid: An Early True Primate (Lineage of Modern Haplorrhine)

DMNH 126699 (10mm scale) OMOMYOID PROXIMAL RADIUS CHARACTERISTICS:

- Proximal Radial head is measured at 5mm.
- The radial ridge, where the ulna overlays the radius on the posterior side, starts 5.5mm (10mm to distal end of ridge) down the shaft from the articular surface of the radial head. This is to align radial head with the Coronoid process.
- Shaft diameter is 3.5mm.

OMOMYOID TOTAL BODY MASS (TMB):

- Similar in size to modern tarsiers.
- Per Bunn (1982) Animal Size Groups, Omomyoid is classified as a 1A (less 10 lbs.)

OMOMYOID COMMONLY CONFUSED WITH VIVERRAVUS:

- While much of the postcranial of these two are very different, the sizes however are very similar. *Viverravus* and Omomyoid are similar in shape with the radius, however *Viverravus* has the presence of a bicipital tuberosity and a hooked radial head (Heinrich and Houde 2006).
- Omomyoids do not have these features and have the presence of the posterior radial ridge and a circular radial head.

DIAGNOSIS: The fossil specimen can be attributed to Omomyoid.

from the following taxa: *Anacodon* (1 individual), *Bunophorus* (1 individual), *Arfia* (2 individuals), *Cardiolophus* (4 individuals), *Hapalodectes* (2 individuals), *Microsyops* (1 individual), *Plesiadapiform* (1 individual), *Thryptacodon* (3 individuals), *Coryphodon* (6 individuals), *Diacodexis* (11 individuals), *Homogalax* (9 individuals), *Hyopsodus* (1 individual), *Hyracotherium* (42 individuals), Rodentia (23 individuals), *Pachyaena* (13 individuals; with 4 *P. gigantea*, 1 *P. gracilis*, and 8 *P. ossifraga*), *Phenacodus* (9 individuals), *Viverravus acutus* (5 individuals), and most importantly, primates (10 individuals; with 8 Adapoidea and 2 Omomyoidea). Analytical descriptions were detailed for skeletal element by taxon and nearest alternate taxon. Figure 2 is an example of database files described in the Methods section. These descriptions are provided for each fossil within the collection. Each

figure depicts the taxa of the fossil, the skeletal element, and any taphonomic abnormalities that might inform researchers about the life of these specimens (e.g. toothmarks from predation and/or unfused epiphysis common in death as a juvenile.). Many of the specimens within the collection demonstrate these taphonomic markers and can inform us about the ecosystem primates originated in.

Discussion

Future plans are to create a database with images on the postcranial variables is necessary for identifying Eocene taxa in the absence of dental associations and will be brought together to form an overarching database for each skeletal element of each taxa identified. An example of this can be seen in Figure 2. This project can be built upon by future Primate Origins Lab student volunteers and

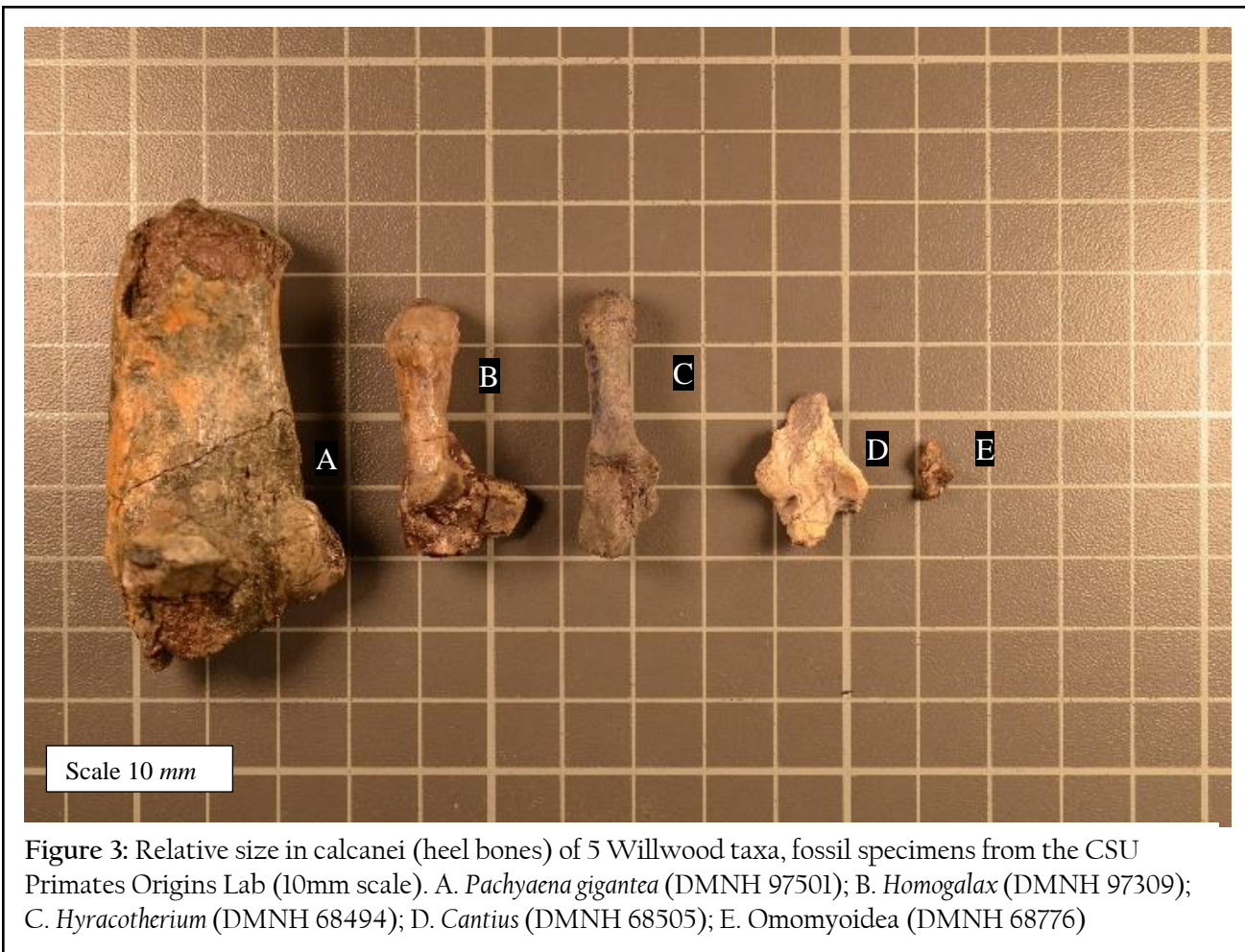


Figure 3: Relative size in calcanei (heel bones) of 5 Willwood taxa, fossil specimens from the CSU Primates Origins Lab (10mm scale). A. *Pachyaena gigantea* (DMNH 97501); B. *Homogalax* (DMNH 97309); C. *Hyracotherium* (DMNH 68494); D. *Cantius* (DMNH 68505); E. *Omomyoidea* (DMNH 68776)

independent study enrollees to better improve the data used by the Primate Origins Lab. With this information, the research will provide ways to identify taxa in the absence of dental elements in order to gain a better understanding of early Eocene fauna for comparative studies of Willwood adaptations (Figure 3).

Publication of this project as an e-document could be accessed, and added to, by other researchers from outside CSU who are interested in the paleo-ecosystem in which the earliest confirmed primates arose. At this time, it is unclear when this e-document would become available for external use.

Conclusion

Zooarchaeological methods proved to be useful for identifying extinct faunal postcranial remains. With the addition of fossil specimens with associated dentition and postcranial elements in the Primate Origins Lab collection as well as

paleontological literature describing postcranial features in known taxa, taxonomic identification was possible. This supports the value of applying zooarchaeological methods to vertebrate paleontological investigations. Using these methods, future enrollees in the CSU Paleontology Field School, as well as other field groups, may be able to identify postcranial fossils in the field. This will help eliminate the dentition collecting bias many paleontologists may have, furthering science's understanding of the ecosystems of ancient Earth, as well as understanding the early primate ancestors.

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Size Matters: Testing Dental-Based Total Body Mass Estimate Formulae-More Than a Means to Determine Diet in Early Eocene (~56-52 MA) Primates (OMOMYOIDEA, ADAPOIDEA) in the Bighorn Basin, WY

Kristina Magyar

Introduction

Body size, as indicated by total body mass (TBM), is a well-established correlate of dietary protein (faunal, plant) consumption in modern primates. Kay's threshold states that in primates TBM above 500 g are reliant on plant sources for protein, while total body masses below 500 g depend on animal sources.¹ Because the primate fossil record more often yields dental elements rather than complete skeletons, formulae have been developed that allow TBM estimations based on mandibular first molar (m1) & second molar (m2) occlusal surfaces.^{2 3} The resulting dental-based TBM estimates, in combination with dietary dental morphology (*e.g.*, cusp shape, *etc.*), are critical to the interpretation of extinct primate dietary adaptations. Therefore, the accuracy of dental-based TBM estimations is essential. The formulae developed by Gingerich and Legendre are the most frequently used method to make TBM estimations and determining any significant variances could affect researcher selection for future testing. As the difference in determining dietary protein consumption is measured in just grams, accurate TBM measurement is also vital in establishing dietary taxonomic grouping.

I report the results of my comparison of the degree of agreement in dental-based TBM estimations by testing (1) Gingerich's m1 formula against Legendre's m1 formula for TBM estimates

and (2) Gingerich's m1 formula against Gingerich's m2 formula for TBM estimates. These comparisons are obtained by descriptive indicators (mean, median, and range) and statistical analysis tests (Chi-square χ^2 tests) to determine the accuracy of these formulae. In the past, the first mandibular molar has been the industry standard to use for TBM testing, however m1's placement in the jaw can lead to a greater degree of damage. An additional benefit to this study may be the ability to use the second mandibular molar interchangeably to obtain TBM estimations. This gives the advantage of larger sample sizes, or the use of a specimen that may be in better condition which could lead to more accurate data. Finally, the results of the data analysis are charted and employed to illustrate patterns in taxonomic responses to temperature variations around the Paleocene-Eocene Thermal Maximum. This could model responses from extant primates to current climatic events and impact modern primate conservation methodology.

Methods

This project focused on fossil primate dental specimens housed in the CSU Dept of Anthropology & Geography Primate Origins Lab. This fossil collection dates to the earliest Eocene (-56-52 Ma) & was recovered between 2013-2019 from over 100 Willwood Formation localities in the

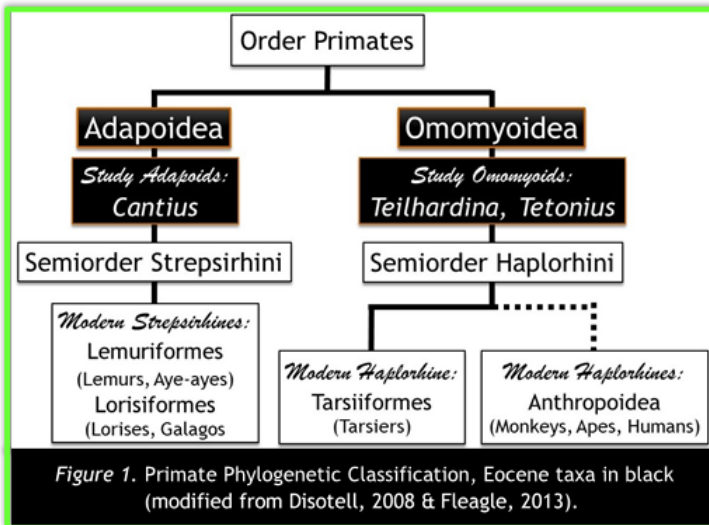
¹ Kay, Richard F., and Herbert H. Covert. "Anatomy and Behaviour of Extinct Primates." *Food Acquisition and Processing in Primates*, (1984): 467-508.

² Gingerich, Philip D., B. Holly Smith, and Karen Rosenberg. "Allometric Scaling in the Dentition of Primates and Prediction of Body Weight from Tooth Size in Fossils."

American Journal of Physical Anthropology 58, no. 1 (1982): 81-100.

³ Legendre, Serge. *Analysis of mammalian communities from the late Eocene and Oligocene of Southern France. Palaeovertebrata.*, 16 (1986): 191-212.

Bighorn Basin, WY. The extinct primates represent the two earliest confirmed primate taxa (Adapoidea, Omomyoidea). Whereas adapoids have traits suggesting modern strepsirrhine affinities, such as anatomy more in line with lemurs, lorises, and galagos; omomyoids have haplorhine traits similar to better known primates, however, their anatomy appears closer to tarsiiiformes (Tarsiers) than to anthropoids like monkeys or apes (Figure 1).

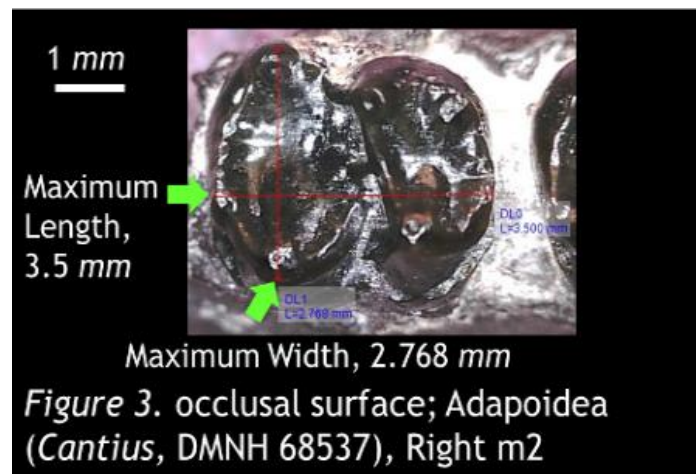
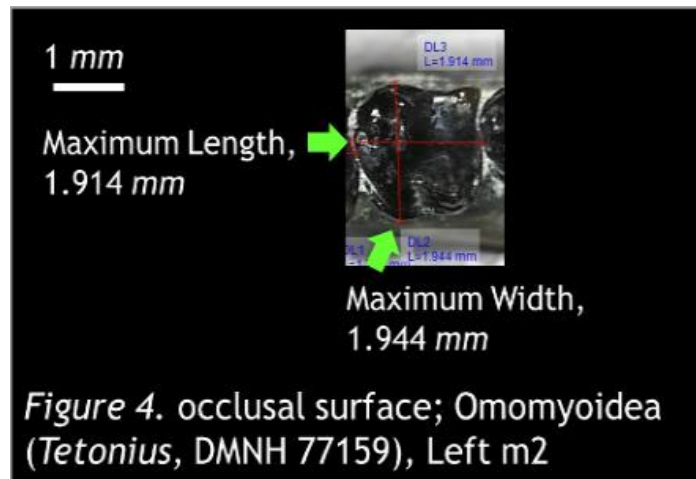


The study sample consists of mandibular lower molars, as follows:

Taxa	First Lower Molar (M/1)	Second Lower Molar (M/2)
<i>Adapoidea*</i>	<i>n</i> = 103	<i>n</i> = 121
<i>Omomyoidea*</i>	<i>n</i> = 42	<i>n</i> = 35

Table 1: Study Sample Sizes (*The implications of taxonomic variation within each group will be addressed in the discussion.)

I used a Dino-Lite 7013 series digital microscope & imaging software to obtain linear dimension data on occlusal surfaces of first (m1) & second (m2) mandibular molars from Adapoidea (*Cantius*) and Omomyoidea (*Teilhardina, Tetonius*) taxa in the Eocene primate fossil sample (Figure 2). With this technology, I obtained maximum length and maximum width variables on the mandibular molars at the occlusal surface (Figure 3, Figure 4).



After I obtained the dental linear dimension data, I calculated TBM estimates using three formulae. By comparing the estimates received from the differing formulae on the same specimen, I could determine whether there was significant variation in researcher formula or a consistent degree of agreement.

Gingerich Formulae⁴

Gingerich & colleagues developed two dental based TBM estimation formulae specific to primates, one for m1 & the other m2.

1. Gingerich m1 formula: $1.495 \times LN(t) + 3.558 = LN(b)$ LN = natural log; t = tooth surface area; b = body mass
2. Gingerich m2 formula: $1.310 \times LN(t) + 3.920 = LN(b)$ LN = natural log; t = tooth surface area; b = body mass

Legendre Formulae⁵

Legendre developed dental-based TBM estimation formulae for mammals of varying size, including one for primates applicable to m1.

1. Legendre m1 formula: $1.490 \times LN(t) + 3.577 = LN(b)$ LN = natural log; t = tooth surface area; b = body mass

Extinct Primate TBM Provides Insights Beyond That of Dietary Protein Consumption

The TBM variable is additionally related to speciation & diversification. I charted the sample primates by TBM estimates (Gingerich TBM m1 formula), by taxon (Adapoidea species; Omomyoidea species), & stratigraphic position by meter level in the Willwood Formation (Bighorn Basin, WY) against established thermal temperature fluctuations (Figure 7, Figure 8, both discussed in the results section of this paper). The Paleocene-Eocene Thermal Maximum (PETM) occurred ~56 million years ago.^{6 7 8 9}

The PETM is associated with a 9-15°F (5- 8°C) increase in global temperatures. I observed unexpected variation in TBM correlating with fluctuating thermal temperature stressors. This allowed me to discern patterns of response for adapoid species (Figure 7) & omomyoid species (Figure 8). At Biohorizon A (160-210 meters), both primate groups are speciose. This middle period of cooling temperatures appears to evidence faunal turnover.

Hypotheses

I tested three hypotheses. The first concerned assumptions about TBM and extinct primate dietary protein consumption. The second compared researcher formulae^{10 11} for TBM estimates based on first mandibular molar (m1) surface area. The third concerned how well Gingerich's formula for TBM estimate on m1 predicted the results of Gingerich's TBM formula estimates for m2.

❖ Hypothesis 1

Mandibular molar (m1, m2) based TBM estimates on Eocene primates support current models of dietary protein consumption with adapoids falling into foliage protein consumers (TBM over 500 g) and omomyoids aligning with faunal protein consumers (TBM less than 500 g). *Null Hypothesis* – there is no support for Hypothesis 1.

❖ Hypothesis 2

TBM estimates based on the first mandibular molar (m1) using the Legendre

⁴ Gingerich, Philip D., B. Holly Smith, and Karen Rosenberg. "Allometric Scaling in the Dentition of Primates and Prediction of Body Weight from Tooth Size in Fossils." *American Journal of Physical Anthropology* 58, no. 1 (1982): 81-100.

⁵ Legendre, Serge. "Analysis of mammalian communities from the late Eocene and Oligocene of Southern France." *Palaeovertebrata*, 16 (1986): 191-212.

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⁷ Bowen, Gabriel J., Bianca J. Maibauer, Mary J. Kraus, Ursula Röhl, Thomas Westerhold, Amy Steinke, Philip D. Gingerich, Scott L. Wing, and William C. Clyde. "Two Massive, Rapid Releases of Carbon during the Onset of the Palaeocene-

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⁸ Mcinerney, Francesca A., and Scott L. Wing. "The Paleocene-Eocene Thermal Maximum: A Perturbation of Carbon Cycle, Climate, and Biosphere with Implications for the Future." *Annual Review of Earth and Planetary Sciences* 39, no. 1 (2011): 489-516.

⁹ Wing, Scott L., Thomas M. Bown, and John D. Obradovich. "Early Eocene Biotic and Climatic Change in Interior Western North America." *Geology* 19, no. 12 (1991): 1189.

¹⁰ Gingerich, Philip D., B. Holly Smith, and Karen Rosenberg. "Allometric Scaling" (1982): 81-100

¹¹ Legendre, Serge. "Analysis of mammalian communities" (1986): 191-212.

formula are identical to the results yielded by the Gingerich formula. *Null Hypothesis* – there is no support for Hypothesis 2.

- ❖ *Hypothesis 3*
TBM estimates based on Gingerich’s first mandibular molar (m1) formula are identical to the results yielded by Gingerich’s second mandibular molar (m2) formula. *Null Hypothesis* – there is no support for Hypothesis 3.

Results

The first hypothesis involved comparison of descriptive statistics (median, mean, range). The second & third hypotheses used Chi-square (χ^2) tests of the differences between observed & expected data. The results were tested for strength of correlation. The *p-value* indicates the probability that the variables are independent. Importantly, primate sample sizes are significantly larger than in previous studies (Adapoidea, $n = 51$, Omomyoidea, $n = 10$, Natalia Clark and Adapoidea, $n = 74$, Omomyoidea, $n = 16$, Courtney Patton) using the Primate Origins Lab collection.^{12 13} This is due to expansion of the fossil collection and field localities over the 2013-2019 Paleontology Field School seasons.

Hypothesis 1 is supported

Eocene primates meet standard primate TBM protein thresholds.

- Adapoids are above the 500 g threshold associated with foliage protein consumption.
- Omomyoids fall below the 500 g threshold associated with faunal protein consumption.

Researcher Formula TBM estimate	Median	Mean	Range
Gingerich- ml	1,440.74 g	1,524.65 g	682.12 - 3194.01 g
Legendre- ml	1,448.37 g	1,537.63 g	689.71 – 3,037.86 g
Gingerich- m2	1,434.36 g	1,525.21 g	840.13 – 3383.09 g

Table 2: Adapoid Statistics Support Hypothesis 1

Researcher Formula TBM estimate	Median	Mean	Range
Gingerich- ml	277.83 g	282.53 g	117.33 - 417.38 g
Legendre- ml	281.74 g	286.45 g	119.34 - 422.42 g
Gingerich- m2	297.6 g	297.6 g	155.16 - 494.11 g

Table 3: Omoyoid Statistics Support Hypothesis 1

Hypothesis 2 is supported

Chi-square (χ^2) tests of TBM estimates for m1 do not indicate significant variation regardless of researcher formula (Gingerich versus Legendre) or taxonomic group.

Taxa	χ^2 result	p-value
Adapoidea	102 df	p-value=1.0 alpha 0.05 = not significant alpha 0.10 = not significant
Omomyoidea	41 df	p-value=1.0 alpha 0.05 = not significant alpha 0.10 = not significant

Table 4: Chi-square Statistical Analysis Tests Support Hypothesis 2

¹² Clark, Natalia, Kimberly Nichols, Lucas Weaver, and Thomas Bown. “Dental-Based Body Mass Estimation in Early Eocene Primates & Plesiadapiformes; Willwood Formation, Bighorn Basin, WY.” 67th Geological Society of America Meeting (2015).

¹³ Patton, Courtney. “Of Fossils and Teeth: Applying Paleontology to Understand Modern Climate Change.” Senior Thesis Department of Anthropology, Colorado State University (2016).

Hypothesis 3 is supported

Chi-square (χ^2) tests of TBM estimates for m1 & m2 using Gingerich's formulae do not indicate significant variation.

Taxa	χ^2 result	p-value
Adapoidea	102 df	p-value=1.0 alpha 0.05 = not significant alpha 0.10 = not significant
Omomyoidea	34 df	p-value=0.9998 alpha 0.05 = not significant alpha 0.10 = not significant

Table 5: Chi-Square Statistical Analysis Tests Support Hypothesis 3

Discussion

The results of this study provide confidence in the predictive value of dental-based TBM formulae estimations. All dental formulae examined in this study^{14 15} provided similar TBM estimate outcomes based on first mandibular molar (m1) surface area & Gingerich's TBM estimates for the first mandibular molar (m1) were predictive of results for his formula on the second mandibular molar (m2). This was surprising, especially for the Omomyoidea, which I expected to have a greater degree of variance due to the small TBM and difficulty in measuring methodology. Therefore,

dental-based TBM estimates appear to be a reliable indicator of primate body size.

TBM is an important correlate of dietary protein consumption in primates.¹⁶ Whereas primates above 500 g in TBM are reliant on plant proteins, small-bodied primates with total body masses below 500 g depend on animal (invertebrate, vertebrate) proteins. This well-established correlation in modern primates provides a useful tool for inferring dietary protein consumption in extinct primates. Dental morphology provides a test of the TBM-based dietary protein prediction (Figures 5 and 6).

Dental morphology confirms the dietary patterns indicated by TBM estimates (Kay, 1975). The results support expected correlations between TBM & dietary protein consumption. Adapoids had body masses above 500 g, as associated with foliage consumption. Omomyoids had body masses below 500 g, as associated with faunal consumption.

Thermal Correlation & Total Body Mass In Adapoidea

Three adapoid species (*Cantius* spp., *C. trigonodus*, *C. mckennai*) are present before Biohorizon A with a combined TBM range of 682-1,958 g. After the event, adapoid TBM increases to a range of 1,207-3,019 g. Importantly, the smallest-bodied adapoid, *Cantius mckennai*, disappears (possibly due to range contraction or local extinction). As temperature continued to decline, the largest of the *Cantius* species appears. This



Figure 5. ANTHROPOIDEA Dental Dietary Adaptations
A. *Cantius*: TBM over 500 g, high & crested molar cusps for shearing plant materials.

Figure 6. OMOMYOIDEA Dental Dietary Adaptations
B. *Teilhardina*: TBM under 500 g, high & pointed molar cusps for processing animal matter.
C. *Tetonius*: TBM under 500 g, high & pointed molar cusps for impaling invertebrates.

¹⁴ Gingerich, Philip D., B. Holly Smith, and Karen Rosenberg. "Allometric Scaling" (1982): 81-100

¹⁵ Legendre, Serge. "Analysis of mammalian communities" (1986): 191-212.

¹⁶ Kay, Richard F., and Herbert H. Covert. "Anatomy and Behaviour" (1984): 467-508.

indicates that selection was operating on larger body mass as a response to cold thermal temperature.

Thermal Correlation & Total Body Mass In Omomyoidea

Omomyoids also exhibited faunal turnover at Biohorizon A. Of the two genera (*Teilhardina*, *Tetonius*), only two of four species (both within the Genus *Tetonius*) survive. These are the largest taxa, but none are over 400 g in TBM. Unlike adapoids, omomyoids are unknown from this study above 375 meters. Two variables may explain omomyoid declining numbers: (1) the small-bodied primates were unable to respond sufficiently to cooler thermal temperature and (2) their likely dependence on faunal proteins was impacted by the loss of invertebrates & small vertebrates who also could not withstand the decline in temperature.

Conclusion

My test of congruence/accuracy in dental-based TBM formulae led to insights on Early Eocene primate responses to thermal temperature change. This offers a predictive model for modern primate responses to fluctuating climatic changes. I plan to investigate this pattern further using the Primate Origins Lab collection and examining TBM responses to thermal temperature fluctuation in primate sibling taxa (Order Plesiadapiformes) & small-bodied mammals such as early elephant shrews (*Haplomylus*). Future lines of questioning should explore a deeper probe of taxa response to temperature changes with a wider variation of body masses and include other taphonomic factors for assemblage makeup such as extinction, speciation, or migration. Modeling the future based on the past could prove beneficial to extant primate conservation and lead to interpretations of differing responses dependent upon body size. This research could advance the approach to conservation methods and provide solutions to increase the success of primate survival rates due to ongoing climate change.

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Moshing: A Game with Complex and Subtle Undertones

Denise Frazier

In this paper I propose to look at the connections between traditional concepts of play and non-traditional styles of dancing. The style of dance I am looking at specifically is mosh style dancing, sometimes called “slam dancing”, as a form of game play. The definition that Bennett and Csikszentmihalyi present of play is that it is “an action generating action” (Bennett, Csikszentmihalyi 1971, 45). This is interesting when put in the context of the creation and participation of a music scene. A music scene and the culture that it creates are precisely that of actions creating more movement and action. The whole concept of moshing fits precisely under that definition. The music being created or played is a direct influence in the creation of a genre, a sub-culture and an emotional existence. Games are often competitive and violent but an interesting point “is that competition or violence in [the] play should obey such strict limits” (Bennett, and Csikszentmihalyi 1971, 46). Moshing, as a play form, does not allow the participant to become too violent or get seriously injured because of its implied rules. Violent actions are not expected to be controlled or performed with purpose. This makes the regulated nature of moshing interesting when it is viewed as a violent action by outsiders.

Webster’s Dictionary defines mosh as: “to engage in uninhibited often frenzied activities (as intentional collision) with others near the stage at a rock concert” (Webster 2015). The word “mosh” was created by a band called Bad Brains in the early 1980s as a direct reflection of the things happening at their shows. The lead singer used the term “mash” in lyrics and stage show repartee to both incite and describe the aggressive and often violent dancing of the scene. To “mash it up” was a frenzied physical response to the aggressive music. Due to the vocalist’s thick Jamaican-accented pronunciation of the word, fans mistakenly heard “mosh” instead (Riches 2011, 315). The term stuck as mosh, despite its original pronunciation. This term and its action are now the steadfast way of

identifying oneself with the music and the culture that surrounds it. The dancing reflects the emotion and enthusiasm the crowd feels towards the music and the band playing it.

The action of moshing is more than just a dance that reflects the appreciation of the music; it is also a communication between the participants. The interactions between participants in moshing, adds to the play experience. It is the inter-personal part of the play that is enacted in the music scene which makes it so that a person’s ‘self’ is “forgotten when action is plentiful, and perhaps of what the experience of ‘self-lessness’ is like” (Bennett, Csikszentmihalyi 1971, 56). A person’s own identity does not exist in the mosh pit it is all about absorbing the action around you and how the reaction to help someone up is almost instinctual and not considered for very long. This communication and comradery in the act of moshing contributes to the overall experience. Mosh pits have their own subculture and rules, which enhances that play experience for some music concertgoers.

Dancing, Subculture and Rules

The author of “Symbols, Song, Dance and Features of Articulation”, Maurice Bloch explored the concept of singing and dancing as a form of language in ritual (Bloch 1974). Though I am not looking at dance as part of a ritual, but as a game, it is still important to explore the concept of communication within dance. In other games, such as soccer, the players must learn to communicate non-verbally with each other through nuanced physical movement that may not be understood by an outsider. This concept can also be applied to dance.

Bloch believes non-verbal communication can become stagnant, and that “messages carried by the language of the body...become ossified, predictable and repeated from one action to the next, rather than recombined as in everyday situations when they can convey a great variety of

messages” (Bloch 1974, 222). I think Bloch is underestimating the creativity and malleability of the messages conveyed in dance. Even though he is addressing it in the context of ritual and religion, there is still the possibility for change and intonation in physical movement just as in speech. A speaker can change the whole meaning of what he says based on the way in which he says it. This concept especially applies to the game of mosh pit dancing. These players are communicating non-verbally with one another through dance and are conveying those messages through their body movements.

The act of moshing can often be seen as blatant violence by the outsider because of the forcefulness with which the players interact, but all of this is made acceptable because of the physical communication and implied agreement that the players have with each other. When you are in a mosh pit, it is understood you are engaging in a game that can potentially cause injury, but you feel safe in the knowledge that those around you understand the rules and the other players will independently reinforce these. Bloch says, “This treatment of dance...seems to go against the generally accepted view of art as a kind of super-communication, a supreme occasion for creativity. By contrast I am arguing that art is, in fact, an inferior form of communication” (Bloch 1974, 222). I believe that Bloch bases this argument on his lack of understanding of the communication being exchanged between the players. He views it, as an “inferior form of communication” because he does not understand what the individuals are communicating or only understands the surface level of what is being “said”. I believe that if he had more cultural context or was actually immersed inside the communication it would change his view.

The violent nature of moshing is comparable to the war games that are played by the Paiela tribe. The author of “To Die Laughing: Paiela Games and the Organization of Behavior as Communication”, Aletta Biersack, says, “Games and war are so coupled in the ethnography. Both are antagonistic or competitive forms of interaction” (Biersack 1982,181). Mosh pits are very competitive. The players are trying to assert their own dominance within the game by physical strength. The players in mosh pit dancing exhibit a war-like behavior in

their game; they are trying to compete to show who among them is the most spirited and the most physically involved in the music. This is similar to war behavior because it is a “zero-sum” (Biersack 1982, 183) outcome. This means that there will be a clear winner and loser in this display. One person will be obviously the most physically and emotionally involved in the music.

The similarities between the players in mosh pit dancing and the Paiela tribe also extends to their use of behavior as communication. The “Paiela games do not exhibit behavioral regularities; they exhibit communicational regularities and belong analytically to the realm of communication rather than the realm of action” (Biersack 1982, 185). This is also applicable to the players in mosh pit dancing. The dancing and game play displayed is more of a display enjoyment of the music and the individual’s involvement in the subculture than it is about the dancing. “If behavior is organized as communication, as it is among the Paiela, then, at least in this particular case, the link between behavior, itself a mode of communication, and language becomes necessary and the problem of justifying the linguistic analog is resolved.” (Biersack 1982, 186) This relates back to the concept that Maurice Bloch brought up of comparing dance to linguistic communication. The communication is displayed in part by the behavior of the people participating in both the subculture and the dance game.

Moshing from the Mosher’s View

In the article “Pit Etiquette,” Sacharoff talks their own personal experiences in moshing, otherwise referred to as slam dancing. As this form of dancing has become more mainstream in youth culture it is becoming increasingly important to ensure that newcomers understand the rules surrounding it. There are strictly “no personal vendettas. Slamming is a great way of transcending personal ego, getting a bash on the back of the head and returning it with a smile. If you want to get personal, that’s a fight, not a dance. Take it down the block where you won’t get the show shut down” (Sacharoff 1996, 2). This rule is important because it not only expresses the level of control that the violence must be performed under, but it also urges participants to keep in mind that the shows ability to continue may be contingent upon

their respect of the rules. Music shows in the punk and garage genres are often underground or barely tolerated by the society around them and cannot afford to have any more negative attention drawn to them.

The author also stresses the comradery of the pit; not only are personal vendettas not allowed, but you are also obligated to help your fellow moshers. It is important to “always keep an eye out for a comrade who’s fallen. First, brace yourself nearby with your knees spread out wide so they won’t get trampled. Next, offer a hand or a yank on the shoulder. This is a bonding ritual” (Sacharoff 1996, 2). I have personally experienced what it feels like to fall in a mosh pit and be immediately picked up by the people around you. It is surprising how short an amount of time it is between hitting the ground and being picked up by three or four people and set back on your feet to continue dancing. No one in the pit even seems to think before stooping down and picking up someone who has fallen. From my own experience, the author is correct in stating that this is bonding ritual where in which you realize that despite the roughness of the interactions around you no one truly wants you to get seriously injured.

After discussing a similar experience with a fellow moshers, Desmond, he said he considered “mosh pits are perhaps one of the most supportive forms of improvised dance in the western world” (Shields, 2015). This is due not only to the aid offered when someone falls but because of the inclusive feeling that one gets when moshing in a group. Since the people within a mosh pit are physically close it is necessary to have a feeling of closeness emotionally. This connection allows for the improvisational aspect of the dance to be cohesive within the group. There needs to be a certain level of communication through the group to achieve the fluidity of cooperative nature of the play and compensate for an individual’s inability to have full control over their own actions or capability for verbal speech. Desmond mentioned that he felt the decision to participate in moshing was a private and visceral act that is a combination between the things that are happening in your own life, the world and the music being played (Shields 2015). This puts moshing into a context where it is a meeting of the personal and the social and this

interaction creates a dance that is evocative of the current cultural feelings on multiple levels.

“Pit Etiquette” offers a personal perspective on the sort of rules that are in place to control the violence. It also offers an insight into some of the criticisms that come with this style of dance. The reference that the author makes to not being “a careless idiot. Being an idiot is great, but if you get yourself injured you’re just admitting, ‘I need supervision” (Sacharoff 1996, 2) points out that people often get hurt because they are pushing past their own limits. It is important to be aware of your own limitations in moshing because injury is so likely. In order to avoid further stigma for this type of play and music, players must maintain the autonomy and responsibility for themselves.

Countering Common Beliefs

Art is considered the representation of the dreams and visions of the artist, music and dance fall within the boundaries of art and must be considered thusly. This being said, “because we regard dreams as semblances, we don’t take them to be real or truthful representations of existence. This, in turn, permits dreams to serve as the raw material out of which the Apolline artistic drive creates the pleasurable illusions which help ward off disgust with life” (Hawley 2010, 2). Apollo as the god of music, sunlight, and truth among other things is often looked to as the provider of the inspirations that assist in the enjoyment of life. This comparison of cultural concepts to the likeness of Greek gods is similar to the work done by Ruth Benedict in *Patterns of Culture*. If one is a scholar of the Greco mythologies the comparison can succinctly show the traits of a culture. The art and mythologies of a time period can show an observer a part of culture that is not directly viewable on a surface level. The comparison of cultures to something that the individual already comprehends is an effective way of understanding a foreign concept. A speaker from The Institute for the Future recently told me that they (the Institute for the Future) use this concept when creating artifacts of the future. When presenting a new concept, it is better understood if 80-85 percent of it is something that the viewer recognizes and understands (Avery 2015). This is what makes the comparison of Greek mythology an effective way of

having an outsider understand a foreign culture.

The author of “Dionysus in the Mosh Pit: Nietzschean Reflections on the Role of Music in Recovering the Tragic Disposition”, Hawley, makes an interesting point that relates to the nihilistic and dystopian themes in punk and garage rock genres. Hawley says that, “A capacity for suffering, indeed the ability to draw strength from suffering and to use it as a means of bolstering an affirmative orientation to life, is characteristic of a life form suffused by the Dionysiac” (Hawley 2010, 5). In this context the negative discussion and political agendas that are often seen in these genres of music are more of a therapy than a denial of good in the world. The knowledge of the bad and in fact the inclusion of evil in the world into music can create a happy situation and dancing similar to the Dionysian’s ritualized bacchanalian festivities. Moshing is another aspect of this, by throwing oneself into violent actions; a person is actually reveling in being alive. The feelings, even of pain, can point to the continuation of humanity despite the appearance of wanton aggressive actions. The moshing should not then be viewed as simple aggression, but as the coping mechanism it can be.

It is important to understand youth culture in the constructs that it was intended to be understood. Often youth and subcultures are lumped into the same group as children or adults. This particular age demographic should be looked at within its own parameters, in “the separateness of youth culture from adult society and its closeness to the market through the consumption of popular music” (Amit-Talai, Wulff 1995, 3). Music is a constant in youth culture and an identifier of each subgroup within it. The concept is necessary to look at the dancing associated with each music genre as an expression of the cultural identity of those who participate in it and not under the viewpoint that it is a youthful or childish expression of emotion or as an adult’s blatant disregard for authority and societal norms. This dancing style and the music that goes with it, are a play experience that is representative of the subculture that participates in it and allows them to process life’s inequalities.

Conclusion

In this paper it was proposed that mosh pits have their own subculture and rules, which

enhances the play experience for some participants. It was found that the act of moshing provides the participant with an experience of selflessness and belonging to a group. This group has a level of non-verbal communication that allow them to participate in a seemingly harmful action without extensive damage. The comradery is also conjoined with a set of rules that increase the safety of this play experience. The participants in this game like dance style can use the aggressive physicality of the movement to accept the negative and ascertain a positive outlook on their own socio-cultural, economic and political issues. The dance can help them cope with the negativity of the world and increases the play experience of the music. These concepts when addressed in an objective light allow the observer to understand the play experience in an academic format, whereas from the participant observation standpoint it is possible to analyze the nuances of the interpersonal communication that may not be obvious to a non-member of that subculture. Further research may be conducted regarding the subculture’s interactions with the dominant society and the effect that this has on the play experience as well as the participants. Overall this paper supports the concept that moshing can enhance the play experience in a concert setting for those who choose to participate in it.

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The Importance of the Social Sciences in Climate Change Research

Danielle Beckman

Introduction

In less than 90 years, if humankind continues its current trajectory, global average temperatures could rise by an additional 3.5-4°C (Roscoe 2014). This means higher latitudes will see 20% more precipitation whereas mid-latitudes will see 20% less. The Arctic ice caps will have vanished along with 30% of the globe's coastal wetlands and 30% of all species. Additionally, the frequency and intensity of flooding, hurricanes, fires and heat waves will increase (Roscoe 2014). It is no longer possible to understand the Earth as independent of human influence, hence the beginning of the Anthropocene (Hastrup 2013), a period defined by exponential increases in human population, energy use, greenhouse gas emissions, water use, and industrial output, to name a few (Crutzen 2006). After 10,000-12,000 years of development and 200 years of intense industrialization, exponential population growth and urbanization, we are essentially at 'nature's end', meaning everything has become part of the human environment (Hastrup 2013). With major climate changes ahead, it is hopeful to view the Anthropocene in the future as not defined by excessive resource use and consumption, but by improved technology, careful manipulation and restoration of the environment as well as wise use of natural resources and control over human and domestic animal populations (Crutzen 2006). Developing a world-wide accepted strategy to adequately prepare for and reduce the impacts of climate change and move towards sustainability in ecosystems, social systems and the economy will be one of the greatest tasks of humankind, but one that is required for the future of Earth (Crutzen 2006).

Climate change is inhibiting the global pursuit of the sustainable use of natural resources and the promotion of an equitable society. Human induced climate change has been proven time and time again by world renowned scientists that make up the Intergovernmental Panel on Climate Change (IPCC); but the science behind climate change has

not been communicated effectively to those who can make significant changes and contribute to the pursuit of sustainability. In order to communicate climate change effectively to the public, researchers must understand various interpretations and perceptions of climate change and the factors that influence these to create the most effective framing of climate change information. To gather this information, instead of treating culture as an exogenous variable, culture must be permanently placed into the sustainability equation (Caldas et al. 2015). The social sciences need to be acknowledged and incorporated in climate change research for sustainability because these sciences are perfectly positioned at the intersection between human culture, behavior and earth science to contribute to climate change research and provide insight into effective climate change communication strategies (Fiske et al. 2014).

This paper will first provide an explanation of the link between climate change and sustainability, and it is argued that dealing with climate change will promote global sustainability. Then, issues associated with climate change research are put forth. An analysis of social science research on factors influencing climate change perception is described and it is argued that climate change research must include the social sciences to generate a deeper understanding of the complex systems that interact to drive climate change to promote climate action and sustainability. Additionally, incorporating the social sciences into climate change science will provide useful data into how and why people perceive and interpret climate change in various ways and provide insight into effective climate change communication strategies.

Connecting Climate Change to Sustainability

Modern definitions of sustainability and sustainable development describe these concepts as: "*meet[ing] the needs of the present without compromising the ability of future generations to meet their own needs*" (Brundtland Commission 1987:17). This common

definition arose out of concern for the impacts of climate change on human populations and was proposed by Gro Harlem Brundtland in 1987. While this definition is vague and allows for multiple interpretations, this paper refers to the general concept of sustainability as aiming to improve outcomes for the environment, the economy and people in the long term (Swart et al. 2003). Climate change is not the only problem faced by sustainability efforts, but it is likely to be more significant as a factor shaping sustainability over the next half century than technological change or economic restructuring (Wilbanks 2003). Climate change is a major roadblock in the pursuit of sustainability.

While this paper focuses on sustainability in its entirety, the driving impacts and forces of climate change have linkages within all dimensions of sustainable development (Swart et al. 2003). Sustainable development is more of an ambiguous slogan than an operational term; this 'slogan' incorporates the idea that for continued growth to be possible, development has to find pathways that achieve economic goals while finding a balance with the physical environment and utilizing equitable political strategies while considering the needs of both the present and future generations (Wilbanks 2003: S148). Climate change can and will affect development paths, and development choices can and will affect future greenhouse gas emissions and vulnerabilities to climate (Swart et al. 2003). For example, socio-ecological problems linked with climate change include ozone depletion through use of chlorofluorocarbons (CFCs), urban air pollution, desertification, land degradation and food production, land-use, land-cover change and loss of biodiversity, water quantity and quality, etc. In terms of links between socio-economic issues and climate change, examples include poverty, health, security and ability for economic growth and development (Swart et al. 2003). The Paris Agreement and the 15 Sustainable Development Goals (SDGs) that came out of this 2015 Agreement suggest climate change is the single biggest threat to sustainable development and calls for urgent action to halt climate change and deal with its impacts to achieve the SDGs (United Nations 2015). Climate change has the potential to become a dominant threat to sustainable development, and climate change should be seen not only as a

challenge to sustainable development, but also an opportunity for sustainable development (Wilbanks 2003). Climate change mitigation strategies can offer an opportunity to revisit ineffective development strategies (Beg et al. 2001).

Current sustainability policies aimed at climate change mitigation are blind to cultural difference (Roscoe 2014). To develop a world-wide strategy to combat pressing challenges, topics pertaining to climate change and sustainability that include culture can no longer be addressed in separate research and policy circles (Swart et al. 2003). Climate change is a spatially differentiated process, and therefore the physical and social impacts of climate change are also not homogenous (O'Brien and Leichenko 2000). The impacts of climate change will vary between ecosystems, sectors and/or social groups (O'Brien and Leichenko 2000). Further, climate change must be addressed at all scales, from the global to the local, and incorporate transdisciplinary collaboration (Wilbanks 2003). Society needs to go beyond the thinking of unidirectional effects of climate change on sustainability and recognize the role that culture plays in both climate change and sustainability. Additionally, society must see both climate change and sustainability as part of a complex system of interactions, ranging from issues of technological innovation and choice to questions of institutional management and design to abstract questions of agency, control, power and identity (Swart et al. 2003).

Current Climate Change Research

There is a need for a better understanding of the connections between climate change and other environmental, social, and economic problems (Beg et al. 2001). Climate change has been framed by the natural sciences as a problem related to the long-term disturbance of global biogeochemical cycles. The social aspects of climate change have been largely ignored and ineffectively incorporated into climate change research (Swart et al. 2003). A reason for this failure to include the social sciences is due to the idea that "studying culture is usually qualitative and these methods do not sit comfortably with quantitative approaches prevalent in sciences" (Adger in Roscoe 2014:537). Climate science is mostly conducted by physical scientists and results in numerical data that often

fails to be contextualized, which can be difficult for individuals and communities to make sense of. With many perceptions, interpretations and beliefs about climate and climate change, the social sciences can reveal how and why people engage or disengage with different representations of climate change (Hulme 2011). These disciplines are ideally positioned to improve human models used in climate change simulations and research (Roscoe 2014).

Climate change is a ‘wicked problem’ requiring ‘clumsy solutions’ (Rayner in Fiske et al. 2014) and poses a major threat to humans both now and in the immediate and long-term future. Climate change has multiple causes and there are solutions at different scales, suggesting climate change research requires the attention of multiple disciplines to address both the impacts and framings of climate change (Fiske et al. 2014). Climate change is a complex phenomenon meaning it occurs at multiple levels with differences in severity (Berkes 2009). The systems must be analyzed simultaneously across geographic and temporal scales (Berkes 2009). Anthropology and other social sciences are positioned at the intersection between human culture and behavior and can contribute to climate change research (Fiske et al. 2014). These social sciences are crucial to climate change research because climate change has cultural causes, implications and solutions and occurs on multiple spatial and temporal scales (Crate 2011).

Climate change is interpreted, explained and lived in local contexts based on local knowledge, culture, political positioning and the like (Fiske et al. 2014). Social sciences have the ability to investigate these cultural interpretations and implications and address the gap between the local and the global through the utilization of a broad array of tools and methodologies (Crate 2011). The utilization of the social sciences to understand various interpretations and perceptions of climate change is useful not only to improve climate change research but also to promote effective climate change communication and solutions for sustainability. Science communication about climate change to the public should be guided by careful social science research that spans various audiences and media platforms and helps facilitate conversations with the public that

acknowledge, respect and incorporate differences in knowledge, values, perspectives and goals (Nisbet and Scheufele 2009). Any climate change communication effort should be based on a systematic understanding of an audience’s knowledge, attitude, existing values, personal and social contexts, preferred media sources and communication channels (Nisbet and Scheufele 2009). The next section of this paper will emphasize how social science research can provide insight into factors that shape climate change perceptions and highlight how understanding these factors is important for effective climate change communication and avenues to sustainability.

Current perceptions of climate change

“Do weather and climate shape culture, or are our ideas about weather, climate and culture shaped by human organization and behavior?” (Rayner in Strauss and Orlove 2013:295)

Perceptions of climate are influenced by many things, thus leading to the inference that concepts like climate change are interpreted through many different lenses. Social science research on the topic has revealed that the way one interprets climate change may be impacted by factors like socio-economic status, political affiliation, gender, race, ethnicity, geographic location, etc. (Pearson et al. 2017). Those who have had a negative experience from climate change at the individual or community level are more likely to have a greater knowledge and understanding of climate change (Smith et al. 2014). Our various forms of collective life influence how we are affected by weather and climate which in turn creates forms of vulnerability and affects our capacity to reduce impacts (Strauss and Orlove 2013). When assessing interpretations of climate and climate change, one must ask questions of scale (geographic and temporal) as well as language to determine the cultural construction of climate at the time of questioning for example (Strauss and Orlove 2013). The next section describes factors that affect perceptions of climate change.

Religious affiliation

Religious affiliation is found to affect one’s perception and interpretation of climate and climate change. Evangelical Christians for example are split between those who interpret the Bible in

different ways. One interpretation suggests environmental mitigation is part of Christ's command to "be proper stewards of His creation" while the other interpretation views climate change as a sign of the 'End Times', suggesting climate change is part of God's Plan and should be accepted or encouraged rather than mitigated (Roscoe 2014:543). These ideas are prevalent in the findings of Smith et al. (2014) who investigated climate change perception, observations and policy support in rural Nevada among Native Americans, non-native ranchers and environmental resource managers. They discover the Native American group to view themselves as part of nature and utilize God's name by honoring what He has made by acting to pray for and protect nature. A significant percentage of the non-native ranchers however, utilized their faith (Christianity) as a reason not to act because they see it as arrogant to assume that humans can interfere with God's plan (Smith et al. 2014). These findings provide an example of how much climate change perception and interpretation can differ between and within cultural and religious groups. Today, climate change mitigation policies must engage the populations they target, which requires they be tuned to local cultural models, their dynamics, and how these factors shape perceptions of the environment and climate (Roscoe 2014).

Political ideology

The U.S. study by Smith et al. (2014) aimed to address links between socio-political variables and climate change perception to understand why climate change assumption, risk perception and policy preferences were perceived in different ways. They find political ideology to have a profound impact on climate change perception and suggest party affiliation and political ideology have the strongest effect on perceived climate change reality, indicating that self-identified conservatives tend to view climate change as non-harmful or non-existent (Smith et al. 2014). When asked if climate change is occurring now, 65% of self-identified Democrats responded 'yes' whereas only 21% of self-identified Republicans believed climate change is happening now (Smith et al. 2014). Both democratic and independent nonnative ranchers and farmers in rural Nevada were more likely than Republicans to believe that the world is in a period

of climate change. Additionally, democrats were over four times as likely to perceive that human activity has played a significant role in climate change (Smith et al. 2014). Those who did not perceive climate change to be happening now were less likely to support climate change mitigation policies and take voluntary action such as switching to renewable vehicles and energy efficient appliances (Smith et al. 2014).

Nisbet et al. (2014), looked at media and climate change knowledge and found that climate change knowledge among conservatives in America decreases with greater attention to political news but increases with greater attention to scientific news. It is suggested that ideologically based motivated reasoning (bias) is responsible for the heterogeneous nature of climate change information in the American media (Nisbet et al. 2014). In other words, politics is found to impact the misrepresentation of climate change in the media.

Race, education level and income

Pearson et al. (2017) investigated how nonpartisan identities and group memberships such as race, education level and income influence public perceptions and responses to the climate crisis because it is arguable that research on identity processes in climate change communication is primarily focused on the effects of political orientation and individual-level factors. They find a higher percentage of racial and ethnic minorities in the United States (compared to White Americans) reporting worry about climate change and expressing concern that it will pose "a serious threat to [them] and [their] way of life in [their] lifetime" (Pearson et al. 2017:4). Seventy-one percent of Hispanic Americans and fifty-seven percent of African Americans express concern for climate change compared to forty-three percent of White Americans (Pearson et al. 2017:4). This racial separation in perception of climate risk is likely due to persistent discrimination in housing, infrastructure development, real estate and insurance markets, meaning U.S. African and Hispanic populations are more likely than White Americans to live close to high pollution emitting plants and hazardous industrial sites (Pearson et al. 2017). They also suggest members of minority groups in the US may be motivated by concerns

that are less rooted in political partisanship when it comes to climate change, as minorities are generally less politically polarized than White Americans (Pearson et al. 2017).

Studies find that education level and income are predictive of stronger partisan divides on climate change beliefs and risk perceptions (Pearson et al. 2017). A higher education level is generally positively associated with awareness of global climate problems across all cultures (Pearson et al. 2017). Income seems to have divergent effects on climate change perception due to political orientation, as those with lower incomes are generally less politically polarized (Pearson et al. 2017). Generally, those with a higher position in society may be more motivated to maintain that position and be more likely to ignore the threats of climate change or perceive climate policies as threatening current socio-economic systems and therefore threatening their status (Pearson et al. 2017). Although belief and awareness of climate change generally increases with education and income level, political ideology and partisan affiliation systematically interact with these variables. Climate change communicators may have more success by focusing research on how and why individuals across levels of socioeconomic status are more or less vulnerable to climate change impacts (Pearson et al. 2017). By focusing on the impacts of climate change on various groups, climate change can be made more meaningful to those groups and real action can be taken.

Gender

The findings of Smith et al. (2014) that suggest more women accept and believe climate change is occurring, which remains consistent with a large amount of research pointing towards a small gender gap in climate change opinions. Pearson et al. (2017) find women to be more likely than men to believe climate change is happening, perceive more risk, worry about the effects of climate change, and believe it poses a threat to them within their lifetime. This information suggests women are slightly more likely than men to have environmental concerns and have stronger pro-climate beliefs (Ballew et al. 2018). Proposed explanations for this gap include differences in gender-related value systems, perceptions of risk and vulnerability, and feminist beliefs such as

values of fairness and social justice (Ballew et al. 2018). It is noted that some of the largest gender differences in climate change belief are in areas where local problems pose health risks (Ballew et al. 2018). This could be because women are generally more vulnerable to a wider range of climate hazards due to their economic disadvantage relative to men (Pearson et al. 2017).

Additionally, it is found that women are less likely to support climate change denial beliefs than men (Pearson et al. 2017). It is thought that men have stronger tendency to support social and political institutions that may be under threat by climate change mitigation policies, which may fuel male resistance to these policies (Pearson et al. 2017). This supports the “White male effect”, which suggests white men (especially conservatives) have a greater tendency to report low or no concern for climate change than women and members of minority groups (Pearson et al. 2017). The so-called “White male effect” suggests that gender, race and political orientation can intersect and predict perceptions of climate change and policy support for climate change mitigation (Pearson et al. 2017). Some argue environmental beliefs, (such as climate change skepticism) can be a form of identity protection and work to protect the status awarded by being a member of that group (Pearson et al. 2017). All humans strive for a sense of closeness and belonging and receive this feeling through forming communities. Being a member of certain communities means one must subscribe to the ideologies of said group, and not conforming to those ideas can result in group exclusion.

Conclusion

In sum, it is evident that various groups perceive climate change in many ways and that climate change interpretation is based on a complex interaction of a multitude of factors that play a critical role in determining how individuals perceive, process, and respond to information surrounding environmental risks (Hine et al. 2016). These factors include (but are not limited to) political ideology, religious affiliation, gender, race, education, and income level. Therefore, it is crucial for climate change research to acknowledge that these factors have great influence over how one perceives information regarding climate change. Climate change communicators must then attempt

to create messages that will relate to the greatest number of people in order to aid in climate change mitigation and the overall pursuit of sustainability.

Climate change is a global challenge affecting humankind's ability to create an environmentally, economically, and socially 'sustainable' world. In order to promote overall global sustainability, climate change must be addressed to be effectively dealt with. This is not an easy challenge, and effectively addressing it will require a transdisciplinary approach and effective communication strategies. Climate change research is dominated by the physical sciences (Roscoe 2014), and the value of social science research on the various impacts, perceptions and interpretations of climate change is often overlooked. However, the incorporation of social science research into climate change science is crucial as it can and will provide insight into how and why people from various backgrounds/groups engage or disengage with different representations of climate and climate change (Hulme 2011). Additionally, social science research highlights the importance of understanding an audience and creating climate change messages that resonate with various groups. Incorporating both the physical and social sciences is crucial to develop effective communication strategies and aid in the creation of worldwide strategies to prepare for and mitigate the effects of human caused climate change. Acting against climate change is no longer a choice. Action is required at all scales to ensure the future of the planet and for the creation of an environmentally, socially, and economically 'sustainable' world.

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The Resilience of Immigrant Populations in the United States within the Food System

Julia Greer

Introduction

This paper examines the experience of immigrants within the food system in the United States through the lens of the resilience framework. A theoretical analysis using the intersectional approach is useful for identifying several factors that limit immigrant participation within the food system. This approach notes that while singular vulnerability factors are important to consider, it is the amalgamation of factors that influence the complexities of disadvantages faced by the immigrant community (Cole, 2009; Nuñez, 2014). These factors include, but are not limited to, poverty, language, race, and immigration status. To overcome this vulnerability, immigrants adopt several resilient behaviors and practices. This paper will highlight several of strategies that immigrants engage with in response to the challenges of the American food system. The first portion of this paper will present and highlight key aspects of the resilience framework. Then, this paper will discuss the food system as a representation of the socio-ecological system. Finally, I analyze three case studies that characterize the roles of immigrants within the food system in three separate locations within the United States.

The Resilience Framework

The resilience framework originates from ecological studies. The approaches that ecological studies have taken towards resilience are important for understanding and defining the framework. The basic definition of resilience refers to systems that can maintain their integrity despite disturbances. Gunderson (2000) discusses ecological resilience as the ability of an ecosystem to withstand change, without altering self-organized processes and structures. He also notes how some ecologists view resilience as the ability for systems to adjust back into a stable state. Further, Bollig (2014) describes

resilience in ecology by listing three definitions based on how resilience is employed in the natural sciences. First, he notes resilience is relative to the magnitude of disturbance that a system can absorb before a system changes its structure. Next, resiliency is the tendency for ecosystems to maintain their integrity in the event of a disturbance. Finally, resilience is achieved when changes occur within the system and the same functions can still be performed.

On the other hand, Brand and Jax (2007) contribute a more metaphorical definition of resilience, which simply states that resilient systems have the ability to be flexible over time. However, the system as a whole does not have to exhibit resilient behaviors, instead, as Stokols et al. (2013) observe, individuals and communities of actors within systems can exhibit resilience. Stokols et al.'s (2013) interpretation allow for resilient pathways to move across dimensions, time, scales and space, meaning that the integrity of the system is not entirely dependent on set relationships, but instead, resilience opens the door for variability within the system to meet the ultimate goal. Wilson (2017) further elaborates on the scale of resilient pathways by noting that both endogenous and exogenous influences may increase adaptive capacity within populations. Thus, it is possible for resilience to grow from outside stimuli or be nurtured from within the community itself. DeVerteuil and Golubchikov (2016) propose that the adoption of resilient behaviors may result from an evolutionary process that is action-driven in response to the environment. Whether through trial and error or through the development of knowledge, these learned behaviors make it possible to address multiple challenges with a singular adaptive action (Gunderson 2000). Yet it is essential to consider power dynamics (Boonstra 2016) in studies of resilience since power structures within systems have the ability to perpetuate roles

that can either further exacerbate vulnerability or create the opportunity for resilient pathways. Inequalities, particularly those faced by immigrant communities, are the product of historical legacies of racism, colonization, and neoliberalism. Power structures have played a critical role in the creation of discrimination within these ideologies and ways of framing the world. However, the resilience framework reveals that despite these power mechanisms within the food system, immigrants can combat oppression in order to thrive and overcome the obstacles that social, political, and economic structures have set before them.

The Food System

Food systems are socio-ecological systems composed of biophysical and social factors that are linked through feedback mechanisms, resulting in interdependent relationships that dictate consumption and production of food (Berkes et al. 2003; Ericksen 2008b). They comprise of activities involved in food production, including processing, packaging, distribution and retail, as well as consumption, which includes the preparation of foods (Ericksen 2008a). These activities encompass social, economic, political, institutional, and environmental processes and dimensions, which can be referred to as scales. The processes of food production and consumption play out at different levels or scales (Cash et al. 2006). To analyze the interactions of food system activities across scales and levels, a food system can be broadly conceived as including the determinants and outcomes of its activities. The determinants describe the biogeophysical as well as the social, economic and political environments that determine how food system activities are performed.

The activities that make up the food system leads to many social and environmental outcomes. One favorable outcome is food security, which is achieved when individuals and communities have access to sufficient amounts of safe and nutritious foods, according to the World Food Summit of 1996 (Pinstrup-Andersen 2009). Raheem (2018) characterizes food security and sovereignty as achievements of resilience within food systems. Therefore, the achievement of food security through adequate food access and availability is necessary for overcoming disturbances that lead to the successful consumption of safe and nutritious foods

(Clay 2002, Maxwell et al. 1992). Food sovereignty is defined as the political right to control and produce food products (Nicholson 2011), including the ownership of products and processes related to food, as well as the agency of actors within the food system.

Following the resilience framework, food sovereignty can be understood as the ability for actors within the food system to dictate their own mobility and pathways deemed necessary to overcome disruptions. Resilient factors may be present within certain aspects of the food system, making actors resilient to disturbances. However, a food system may be considered resilient when actors themselves inhibit resilient behaviors within aspects of the system. This paper adopts the term 'resilient food system' to denote a structure that exhibits aspects of resilience within its actors.

The food system is susceptible to various phenomena that would inhibit the ability of social groups to be resilient. First, ecologically the food system is susceptible to phenomena such as extreme weather or climatic changes that can create inhospitable agricultural conditions, thus yielding insufficient or low-quality crops. Second, the food system is susceptible to social, economic, and political disruptions specific to the community engaging with any given food system. These could include economic distress for communities under certain political climates that render many unable to access sufficient foods. Because food systems rely on social and ecological processes, there are several opportunities for disturbances to inject themselves into the production and consumption spheres.

In the case of immigrant populations within the United States, there are several disturbances within their food system. The experience of displacement represents both a physical relocation and a social transition. Spies (2018) notes these disruptions alter the ability for immigrants to engage within the food system, creating isolation and psychological distress. Relocation to the United States inserts immigrants into a system bounded by inequalities that subject immigrants to economic disparities, while racialization creates barriers to ownership and agency in the food system (Alkon and Agyeman 2011). Further, this isolation and racialization create shocks into the integration process. As immigrants adapt to their new physical and social environment, they are

oppressed by the systems of inequality created by the neoliberal and capitalist influences on the food system (Sbicca 2018).

Inequalities that specifically pertain to the immigrant community which affects the engagement of individuals and communities in the food system include racism, poverty, language barriers, and discrimination of immigration status. These factors are experienced at both micro and macro levels that influence the individual, the community, and the larger body of immigrants at a national level. For example, poverty contributes to several levels of inequality experienced by immigrant populations. Many immigrant families, particularly those who have recently arrived, maintain transnational ties (de Haas 2005). As such, remittances are made to family and friends to remain in the country of origin to support various expenses (DeSipio 2002). These regular distributions abroad can result in fewer resources for the family within the host country. Poor immigrants are less likely than the native-born poor to receive federal in-kind and antipoverty benefits like SNAP and Medicaid due to fear of deportation and insufficient information (Bitler & Hoynes 2011).

A second interacting factor that impacts immigrant food access is racialization, which refers to the opinions and issues that contribute to the divisions of racial groups. In the United States, there have been recurring waves of xenophobia, most recently targeting Muslims (Sirin & Fine, 2008), Latinos (Chavez, 2008), and Asians (Yip, Gee, & Takeuchi, 2008). These biases and prejudices are mobilized within the food system in which employers make decisions on race that oppress non-white community members either through lower wages or non-selection in employment.

A third factor that influences immigrant access to food and is also a cause of potential inequality is immigration status. Immigration status can include the legality of immigration and the circumstances that caused people to move to the United States. Undocumented status creates stress on families which not only brings about mental and physical manifestations of stress but also limits the employment options for workers (Yoshikawa 2011). Yoshikawa (2011) acknowledges that undocumented status produces

intergenerational stresses on immigrants and their children that can limit educational success and areas of daily life that inhibit successful integration into the United States. The differences between immigrants and refugees can further complicate the potential for inequality. Immigrants who are not forced to relocate and who are not given refugee status are subject to many financial obligations (Besteman 2016). Refugees are given more financial tools than immigrants who come voluntarily. In my own work, I have observed that funding opportunities for education and integration services are made more available to refugee populations than voluntary immigrants. Though refugees must meet American financial requirements for achieving gainful employment in order to maintain their status, they are often not required to make payments to lawyers or the US State Department to maintain their immigrant status.

Finally, language can hinder immigrant access to food. Language can limit gainful employment and the navigation of food pathways in the United States. Immigrants often do not have the language skills to participate effectively in the food selection process when making food purchases. Garcia (2014) notes that immigrants have voiced difficulties in food selection as they are unable to interpret nutritional information on packaging or unable to communicate with grocery store attendants or producers to make informed decisions when making purchases. Further, the United States has created disadvantages for bilingual or native language speakers (Garcia 2014, Lieberson 1981). For example, educational opportunities for non-English speakers are limited and as a result, further, impose disadvantages on non-English speakers when navigating the food system.

Case Studies

The following case studies examine the role of immigrants as producers and consumers within the American food system. I discuss how immigrants engage with the food system in particular ways as laborers, farmworkers, and consumers, highlighting the ways that immigrants develop resilience in these roles. The first case study illustrates how migrant labor has been an essential factor in shaping the gardens of California.

The second considers how migrant labor has shaped the dairy industry in Vermont. The third highlights how urban immigrant farmers in New York City have engaged in environmental education to create fruitful and empowering spaces.

Hondagneu-Sotelo (2014) illustrates a colorful narrative on the historical and contemporary influences of immigrant workers on the gardens of Southern California. The text traces trends in immigrant resettlement on the West coast, including Japanese, Chinese, Mexican, and Central American laborers. The author examines social inequality through the lens of political economy and argues immigration status hinders workers from creating ownership in their cultivation of the natural and manicured landscape. However, immigrant laborers have shared practices and knowledge systems that reimagine approaches to gardening and result in the empowerment of individuals within the community. Not only does the narrative highlight how immigrants create their own aesthetics of gardens, but it also points towards their ability to determine the utility of the gardens' resources. This reorganization of space creates ownership within the gardening process and is an expression of food sovereignty, which gives power to the immigrant community members to take charge of their engagement within the food system. This achievement of sovereignty has many social and psychological benefits that allow immigrant gardeners to negotiate their earnings more effectively and boosts individual confidence. The author also notes immigrants have had a drastic impact on the physical landscape, thereby shaping the ecological processes surrounding the gardening practices within the region. Immigrant workers have shared their practical knowledge to make appropriate species selections and introduce diversity.

The second case study captures the resilience of dairy workers and their families working in Vermont. Mares (2019) explores the intersection between structural vulnerability as a product of systematic inequality and the food insecurity experienced by migrant farmworkers. Through an ethnographic narrative, the author illustrates the struggles of Central and South American dairy workers as they face integration, oppressive immigration policy, and are left to navigate working in the agricultural industry of the

United States. Mares notes that engagement with the food production process creates ownership for the immigrant labor force. Though the laborers are not owners of the means of production, their engagement allows them to develop new skills and translate previously developed skills into an environment that encourages their input and innovation. The author also discusses the contributions of policy change and community partnerships in the achievement of resilience. Immigration policy within the United States has limited immigrant employment opportunities, however advocacy groups have stood to represent immigrants seeking to earn a living. Mares (2019) highlights that advocacy partnerships have made resilience possible for the immigrants working within the agricultural sector thus allowing them to thrive in their new location.

The final case study examines an ethnographic study of the resilience of immigrant farmers in New York. Within this narrative, communities draw upon reserves of traditional and newly gained agricultural knowledge within their local environments. Shava et al. (2009) note that the sharing of knowledge drives community resilience by enabling immigrants to take ownership of their food production. This achievement of food sovereignty improves the livelihoods and well-being of community members. Here, food sovereignty empowers immigrants to adapt to their displacement and promote healthy food consumption. This example captures how the ownership of space creates power. Yet despite the focus of the authors' study on the sharing of knowledge within the community, which furthers the ownership of immigrants within the food production process, this sharing of knowledge is facilitated by contributors exogenous to the immigrant community. Environmental education through local schools and outreach organizations are critical in providing resources to the immigrant community to build their resilience against food insecurity and insufficient sovereignty.

Discussion

These case studies demonstrate the different ways that immigrant communities have developed resilience within the American food system. One theme that carried through each example is the reliance on external parties to create resilient

pathways. Himanen et al. (2016) discuss that collaboration between stakeholders and outside resources is essential to resilient food systems. Through co-design, the authors noted each stakeholder can present information that reflects diverse knowledge systems. Himanen et al. (2016) argue the codesign also creates an environment for collaborators with different levels of power to reach across boundaries and respect the experiences of others in the design of resilient food systems. As previously discussed, the resilience framework should reflect the importance of networks in the creation of resilient pathways. In order for stakeholders to be more resilient to disturbances, collaboration and co-design are essential mechanisms for the innovations within systems to create resilient pathways.

Likewise, Shipanski et al. (2016) discuss the importance of integrating social justice projects within the development of resilient food systems. Through this integration, underrepresented or oppressed populations can achieve more food sovereignty within the food system. Environmental education projects (Shava et al. 2009), community collaborations (Hondagneu-Sotelo 2014), and policy change (Mares 2009) are all a part of social justice initiatives that lead to food sovereignty. Sbicca (2018) notes social justice projects are also an integral part of the food justice framework which seeks to overcome social inequality that creates the disturbance of the food system for vulnerable populations. As food security and sovereignty are goals of resilient food systems, I argue that the achievement of food justice is also an outcome of a resilient food system.

Conclusion

This paper has drawn upon the resilience framework to highlight the experience of immigrants within the food system. I have shown how aspects of the food system in the United States cultivate inequality and vulnerability for underrepresented communities, particularly immigrants. Through this framework, I have noted how immigrants are vulnerable not only in the consumption of food but also in the production of food at multiple scales. Still, immigrants are resilient actors within the American food system. Through various collaborations and the sharing of knowledge within their community, immigrants

have reclaimed ownership of their participation in the food system, both production and consumption scales. The examination of the immigrant experience through the resilience framework re-situates the vulnerable situation of immigrants, illustrating that despite the inequalities faced by the community, immigrants have made strides to better their situation and gain a footing within the food system.

Ultimately, food security and food sovereignty function as sources of resilience within the food system. A shift to focus on the resilience of the community and its individuals has the potential to change the way charitable organizations, government bodies, and community agencies view the actions and participation of immigrants within the food system. By shifting the lens to resilience, the strengths of the immigrant community can emerge, and immigrants can shift away from the vulnerable position towards a more empowered role in which they can co-design and co-create new ways of engaging in the food system.

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Vulnerability, Resilience, and Social Justice: Addressing Systemic Inequality in Disaster Recovery

Shadi Azadegan

The common understanding of the term ‘natural disaster’ suggests that when natural hazards strike human communities, their toll is out of our hands – an unfortunate yet inevitable consequence of living on planet Earth (Olson 2018). The literature on disaster anthropology, on the other hand, suggests that there is nothing natural about natural disasters. On the contrary, the materially destructive and socially disruptive impacts of natural disasters reveal the historical processes and present-day systemic inequities that place marginalized communities in harm’s way. The literature emphasizes the role that human practices have played in leaving some people more exposed to environmental risk than others, as disaster impacts run parallel to marginalization across lines of gender, race, class, and ethnicity (Barrios 2017; Browne 2015; Dawson 2016; Faas & Barrios 2015; Olson 2018).

Effective disaster response can only occur if institutions understand and explicitly address the structural barriers rooted in social injustice that leave disadvantaged communities vulnerable to disaster risk and struggling to improve their resilience in the face of future disasters. In this paper, I will use perspectives from the anthropology of disaster to discuss how vulnerability, resilience, and social justice manifest in contexts of post-disaster inequality. I will argue that disaster response initiatives lacking consideration for these concepts will fail to address gaps that render certain groups invisible and leave them at risk. On the other hand, consideration of these concepts can help disaster response initiatives keep people safe and reach those who have thus far fallen through the cracks. I will also argue that community-based organizations (CBOs) are particularly well-positioned to address these gaps in disaster response, making them key stakeholders in scaling official disaster response initiatives. Using the example of Texas Organizing

Project’s (TOP) post-Hurricane Harvey community organizing initiative in Houston, Texas, I will illustrate how CBOs can apply the concepts of vulnerability, resilience, and social justice in their work to better support disadvantaged communities in post-disaster contexts.

Vulnerability, resilience, and social justice: a disaster anthropology approach

Disasters can be defined as unexpected public events that cause traumatic damage. The complexity of contemporary human activity has increased the frequency, speed, scale, cost, and severity with which disasters affect populations (Matthewman 2015). The field of disaster anthropology centers on the convergence of the natural and the social, political, and economic realms that determine the human impacts of natural hazards (Oliver-Smith 2002; Wisner et al. 2004). The multidimensionality of disasters permeates every aspect of human life to reveal the factors that create and perpetuate conditions for vulnerability, whereby certain groups of people are systematically exposed to risk and denied the resources to cope with and recover from disaster impacts (Enarson et al. 2007; Oliver-Smith 2002; Wisner et al. 2004). A holistic anthropological approach highlights the social production of disasters to identify the root causes of vulnerability, what risks confront populations, who will be hardest hit, and who is at the center of decision-making and mitigation processes to support resilience and human well-being (Enarson et al. 2007; Matthewman 2015; Oliver-Smith 2002; Wisner et al. 2004).

Vulnerability refers to “the characteristics of a person or group and their situation that influence their capacity to anticipate, cope with, resist and recover from the impact of a natural hazard (Wisner et al. 2004, 11).” Some groups of people are more prone than others to damage, loss, and

suffering in the context of various hazards. These variations in vulnerability are due to factors such as differences in wealth and social class, occupation, ethnicity, gender, disability, health, age, and status. Furthermore, “vulnerability can be measured in terms of damage to future livelihoods, and not just as what happens to life and property at the time of the hazard event (Wisner et al. 2004, 12).” In other words, current decision-making processes will shape future patterns of vulnerability in a similar way that present-day vulnerabilities are often rooted in poor decisions of the past. Perspectives on vulnerability are also shifting from ‘vulnerable groups’ to ‘vulnerable situations’ that people move into and out of over time, viewing people as active participants that can act on their capacities to protect themselves rather than as passive victims of their environment limited by embodied vulnerabilities (Wisner et al. 2004). This shift emphasizes the adaptive capacities of individuals, human communities and larger societies in the face of adversity (Norris et al. 2008), encouraging a perspective that empowers people as agents of their own resilience.

Norris et al. (2008, 130) define resilience as “a process linking a set of adaptive capacities to a positive trajectory of functioning and adaptation after a disturbance,” enabling people to weather stresses and adapt to their aftermath in a way that allows them to retain their basic social structures and identities. In bringing this definition into practice, resilience must be understood as an ability or a process that is to be supported (rather than as a static goal that is to be achieved) by enabling a flexible process that allows people to link key resources and capacities to final adaptation outcomes.

The resources and capacities that enable a community to remain resilient in the face of adversity depend on the unique conditions of vulnerability that the community may be grappling with when disaster strikes. These vulnerabilities – as well as their variation from one community to another – are often determined by social, political, and economic inequalities that determine the resources and capacities that people have at their disposal to prepare for, cope with, and recover from the impacts of natural hazards. A social justice framework questions the systemic conditions that give unfair advantage to members of one group over

another, considering the patterns of disadvantage that characterize distinct groups as a result of limited choice rather than preference (Bankston 2010; Clingerman 2011; Nussbaum 2003). Social injustice further manifests as environmental injustice through the histories of institutionalized discrimination and the economic and sociopolitical drivers of industry and government decision-making that leave certain communities disproportionately exposed to environmental hazards and lacking the social and financial capital to demand environmental justice (Bullard & Wright 2012; Mohai et al. 2009). Social justice emphasizes the importance of advocacy and leadership in disaster recovery in order to shape policies and institutional structures that influence choice availability, capacity for action, and human well-being for disadvantaged communities (Bankston 2010; Browne 2015; Clingerman 2011; Nussbaum 2003).

Disaster anthropology on the ground: Houston’s Latinx communities post-Hurricane Harvey

An anthropological understanding of disaster sheds light on the social production of vulnerability rooted in social injustice. Viewing disaster through an anthropological lens also encourages us to consider people as agents of their own resilience, able to address their own conditions of vulnerability as long as we acknowledge and address the barriers rooted in social injustice which stand in the way of the key resources and capacities necessary to prepare for, withstand, and recover from disasters. In this section, I will discuss how Latinx communities in Houston, Texas have been put in harm’s way through a series of socially produced conditions of vulnerability that were heightened during Hurricane Harvey.

Historical inequalities, institutionalized discrimination, and economic and sociopolitical drivers of industry and government decision-making have led to poor minorities in the United States today being disproportionately exposed to environmental risks (Bullard 2000; Mohai et al. 2009; Mohai & Bryant 1992; Peterson & Maldonado 2016). In the case of Latinx communities, historical minority exclusion and institutionalized economic disadvantages have led to a higher risk of socioeconomic insecurity for this

segment of the population. Undocumented status can aggravate this insecurity by limiting access to formal employment, increasing workplace risk, and reducing access to benefits such as health insurance and other social services, with harmful effects on Latinx families' economic, physical, and mental well-being (Angel & Angel 2009; Dawson 2016; Peterson & Maldonado 2016).

On August 2017, Hurricane Harvey exacerbated longstanding social, political, economic, and environmental vulnerabilities that minority communities face in the city of Houston, Texas. Harvey's destructive winds and over 50 inches of rainfall caused damages estimated by government officials at \$125 billion (FEMA 2018). The floodwaters drained into the Houston Ship Channel (Hersher 2017), an area where low land prices, combined with Houston's lack of zoning regulations (Wallace Brown 2019), have historically attracted both low-income residents seeking affordable housing and industrial facilities seeking to minimize operational costs. As a result, the area's largely Latinx population is low-income (Mankad 2017) and lives within one mile of an industrial facility, including hazardous waste generators and treatment centers, and dischargers of known cancer-causing and neurotoxic substances (City of Houston 2003; UCS & t.e.j.a.s. 2016). Emergency shutdowns and subsequent startups of these industrial facilities during the storm caused the release of an estimated 4 million pounds of excess pollutants into the air and as toxin-laden wastewater (Schlanger 2017). After floodwaters drained, the contaminants they carried were likely left behind (Hersher 2017), further exposing portside communities along the ship channel.

Undocumented immigrant communities along the ship channel face additional challenges, including a lack of access to government assistance to rebuild their homes, obstacles in navigating aid bureaucracy, and being at increased risk of having their vulnerabilities exploited. The ongoing immigration enforcement legislation debate under Texas Senate Bill 4 and the cancellation of the Temporary Protected Status (TPS) immigration program creates an uncertain and hostile climate for minorities (Aguilar 2017; Ordonez 2018), while fear of deportation keeps undocumented families from leaving dangerous living conditions and

making use of official support mechanisms (Hauslohner 2017; Moreno 2018).

As the context of disaster recovery heightens the challenges that Latinx families contend with in their daily lives, it is crucial for disaster response and recovery organizations to identify and address the structural, socioeconomic, and cultural barriers that leave vulnerable populations to forge their own paths to recovery outside the reach of official channels (Angel & Angel 2009; Dawson 2016; Hauslohner 2017). In such circumstances, there is a risk that post-disaster response lacking cultural sensitivity and historical perspective will merely replicate and exacerbate existing patterns of disadvantage (Faas & Barrios 2015; Norris 2008).

In order to effectively address vulnerabilities and support the recovery and rebuilding of more resilient communities, disaster response initiatives must consider how the distribution of disaster impacts across lines of ethnicity and socioeconomic disadvantage determine the types of support that Houston's Latinx families need to recover from the impacts of Hurricane Harvey. CBOs are particularly well-positioned to address gaps in disaster response, making them key stakeholders in scaling official disaster response initiatives. Using the example of Texas Organizing Project's post-Hurricane Harvey community organizing initiative, I will illustrate how CBOs can apply the concepts of vulnerability, resilience, and social justice in their work to address root causes of vulnerability and support community resilience in post-disaster contexts.

Addressing vulnerability and building resilience through social justice: Texas Organizing Project

Texas Organizing Project (TOP) is a grassroots nonprofit membership organization that works toward social and economic equality for low-income black and Latinx communities in Texas through community and electoral organizing. Since its founding in 2009, TOP has encouraged neighborhoods to take collective ownership of the organization's agenda, strategy, and direction by using a participatory approach to address challenges at the community level. TOP's work revolves around six core campaigns: (i) criminal justice reform to address laws that lead to high incarceration rates for vulnerable and low-income

groups, to demand police accountability, and to seek justice for cases of civil rights violations and racial profiling by U.S. Immigration and Customs Enforcement (ICE); (ii) immigration reform to address the fragmentation of families due to deportation and to push for the creation of a path to citizenship and the acknowledgment of immigrants' contributions to the nation as workers, consumers, business owners and taxpayers; (iii) education programs aimed at school dropout prevention, college and job readiness, test score improvement, and quality instruction; (iv) neighborhood safety, infrastructure, and environmental regulation; (v) healthcare reform to support insurance enrollment for vulnerable groups, and educating the public about the need to improve health coverage and the link between health and economic growth; and (vi) voting and civic engagement, including raising community issues in decision-making spaces, encouraging and coaching neighborhoods to participate in their local decision-making processes, and endorsing political candidates that can support desired policy changes (Moreno 2018). TOP's work in Houston focuses on the Harris County neighborhoods of Acres Homes, Denver Harbor, East End, Fifth Ward, Kashmere Gardens, Near Northside, OST/South Union, Pasadena, and Sunnyside.

As the magnitude of the impacts of Hurricane Harvey became apparent in the weeks and months following the storm, TOP responded by establishing a focused campaign aimed at supporting portside community revitalization and hurricane recovery (Moreno 2018; Ordonez 2018). Conversations on March 2018 with Mary Moreno, TOP's communications director, and Mitzi Ordonez, TOP's Harvey campaign organizer, revealed how TOP responded to community residents' needs, as well as how the campaign fit into the broader themes of TOP's work. Moreno and Ordonez also discussed TOP's consideration of the systemic and root causes of local vulnerabilities, the variables that can influence vulnerability and resilience, and the elements of social justice that contribute to effective support mechanisms for community resilience.

Moreno explicitly acknowledged the correlations between disaster vulnerability and race-based historical disadvantages by emphasizing that TOP "[focuses] on organizing communities of

color, and right now, in Houston that means organizing people impacted by Harvey (Moreno 2018)." During the storm, as flooding prevented people from leaving their homes and neighborhoods, TOP staff coordinated a telephone outreach effort to ensure members were safe and to begin assessing the storm's impact. As floodwaters receded and neighborhood access was restored, TOP canvassers went door to door to speak with neighborhood residents in order to identify immediate needs and organize efforts to meet those needs. For instance, the organization helped to direct aid funds for affected residents to purchase food and other basic household items, organized community cleanup brigades, and provided guidance for households that faced information and language barriers while navigating aid bureaucracy (Moreno 2018; Ordonez 2018).

Hurricane Harvey's impacts were not uniform across neighborhoods; rather, they manifested in varying forms and degrees of severity within neighborhoods. In some cases, impacts varied between households on the same street. Ordonez commented on the need to transform community perceptions of storm impacts exclusively in terms of flooding – a perception that is arguably reinforced by official aid organizations' approach to property damage assessment and aid allocation based on flood water depth. TOP worked to raise awareness in affected neighborhoods regarding the various ways that Harvey could have impacted households, including livelihoods and lost income; structural damage to homes; expenses related to home repairs and replacement of damaged belongings; and stress on household physical and mental health and well-being (Ordonez 2018).

As TOP's Harvey campaign grew, the need to balance neighborhoods' immediate needs with long-term recovery objectives became a priority. This transition from short-term recovery to long-term development reflects TOP's grounding in a social justice framework that seeks to build community resilience by addressing the root causes of vulnerability. Ordonez explained that the organization's goal is to engage neighborhoods in a long-term process that looks beyond immediate solutions to "rebuild and reshape communities with [residents'] inputs, so that they become communities that truly work for [their residents]."

While this objective rests at the core of TOP's post-Harvey campaign, the organization acknowledges the challenge of engaging communities in long-term, future-facing efforts when many households are still struggling with unmet short-term needs months after the storm.

We're fighting for more permanent things, we want to fight for policies that will protect us in future storms. Just because your house didn't flood this time around, that doesn't mean it won't flood the next time. And that has been a great challenge, but we want to drive home that understanding. And some people say, "Yes, I want to be a part of that," but others explain that what they need right now, it's not what we're offering (Ordonez 2018).

In order to tackle this challenge and address immediate vulnerabilities while supporting community resilience to minimize future vulnerabilities, TOP has drawn on the network of relationships that the organization has built through its membership. Ordonez explained that these social networks have been a strength in two keyways. First, in areas where TOP had already established a presence and identified neighborhood leaders, the necessary relationships and structures were in place to support community needs during and immediately after the storm. Second, TOP members who were driven to new neighborhoods by storm impacts have continued to request TOP's guidance to address the individual and collective challenges they have encountered in their new communities. Additionally, TOP's participatory and holistic approach is a key part of their successful neighborhood initiatives. For instance, the organization's immigration advisor attends neighborhood meetings across all of TOP's core campaigns, addressing residents' immigration questions regardless of their direct relevance to the meeting's focus issue. This recognition of immigration concerns as all-encompassing challenges that cannot be compartmentalized reveals a deep understanding and respect for the complexities of communities' lived experiences of vulnerability.

TOP has also been closely following the struggle between community residents and urban

developers regarding the allocation of recovery aid funds. Moreno emphasized communities' fear of gentrification and detailed the systemic issues at the city level that shape housing challenges for both renters and homeowners. Houston's susceptibility to flooding, coupled with insufficient housing inspectors and poor enforcement of housing regulations, results in water damage from repeated flooding events that often goes unaddressed in rental complexes. At the same time, a lack of affordable housing in the city drives vulnerable groups to tolerate subpar living conditions and increases their risk of having their vulnerabilities exploited by their landlords. Moreno and Ordonez recounted various instances when TOP mediated conflicts involving landlords that refused to repair rental units that were rendered uninhabitable by the storm and used threats to keep tenants from breaking their lease. On the other hand, homeowners in poor Houston neighborhoods face increased flooding risk due to poor maintenance of clogged drainage ditches and crumbling infrastructure. Furthermore, homeowners risk losing their homes as a result of new building requirements that place the burden of flood mitigation on individual homeowners. Such a policy leaves families who cannot afford to raise their homes with little choice but to sell their damaged home and become renters in a new neighborhood.

TOP's approach to community organizing emphasizes the need to address vulnerabilities and support resilience by enabling community participation and choice during disaster recovery, as well as by holding decision-makers accountable for community recovery and revitalization in post-disaster contexts.

Any solution that the city comes up with has to put people at least in the same place they were before the storm. So if [people] owned [their] house outright, either you pay for the cost of raising the house, so [they] can stay there, or you help people find another suitable home where they're free and clear in the same financial conditions [as they were before]. One of our basic principles is that people should have the right to stay or the right to move, but it should be their choice, it shouldn't

be because they're forced out (Moreno 2018).

As the city is rebuilt and reimagined, Moreno and Ordonez expressed their concern for marginalized neighborhoods that have experienced "historic disinvestment (Moreno 2018)" and highlighted the importance of ensuring that these neighborhoods have a seat at the table. In order to achieve this, Ordonez also pointed to the need to meet transformations in bureaucratic aid and decision-making structures with community empowerment.

The idea is for [communities] to realize that they hold the power. It's what I like the most about my job, being able to empower communities, for them to realize that they can do it, that they are worthy, but that they need to stand up for their rights and to be a part of the process. To understand that they can be a part of the solution. As long as you live in this community, and as long as you live in Houston, this is relevant to you, because we're fighting for everyone, not just for a few individuals (Ordonez 2018).

Conclusion

TOP's participatory and holistic approach to community organization, rooted in principles of social justice and empowerment, reveals a deep understanding of the complexities of community disaster vulnerability and recovery as a lived experience. Other players in the post-disaster recovery context, including federal and state institutions and national-level NGOs, can learn valuable lessons from CBOs like TOP. TOP's understanding of the variables that shape the systemic root causes of vulnerability has informed an effective post-disaster campaign focused on responding to the needs of Houston's communities of color – including Latinx communities – that were impacted by Hurricane Harvey. While this campaign has sought to link neighborhoods to necessary resources and capacities to meet immediate disaster recovery needs, TOP's expertise in criminal justice reform, immigration reform, education, neighborhood organizing, healthcare reform, and civic engagement makes the

organization a powerful actor to support communities in the pursuit of long-term solutions that target the root causes of present vulnerabilities, reduce future vulnerabilities, and enable community resilience in the face of adversity.

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Rockport Residents and Life After Harvey: Results from the 2019: Colorado State University Ethnographic Field School Study

*Sarvis Anarella, Althaea Kress, Zoe Schutte, Julie Spawn, Sydney Vander Waerdt, Michelle Anderson, Charlotte Dorsey, and Amanda Kircher**

*With contributions from Maizie Anders, Frances Fedele, Elizabeth Shrewsbury, Madeline Stott, John Weinzell, graduate teaching assistants, Shadi Azadegan and Ned Molder, and Katherine E. Browne, PhD.

Introduction

Hurricanes and the Texas Gulf Coast

Scientists in recent years have escalated their projections about the growing risks of living in coastal areas. At the Geophysical Fluid Dynamics Laboratory (GFDL), a Princeton University research lab housed within the National Oceanic and Atmospheric Administration (NOAA), researchers stated that as a consequence of the warming climate and the increased water vapor in the atmosphere, increases in extreme precipitation are expected. They further stated that the “sea-level rise associated with future climate warming is expected to contribute toward increasing the risk of extreme coastal flooding events...”¹ In September 2019, the Intergovernmental Panel on Climate Change² issued their Special Report on the Ocean and Cryosphere in a Changing Climate that concurred with this assessment. The Special Report noted that because of climate change, extreme sea-level events that used to occur once in a century are projected to become at least annual events.

In light of these debates and the undeniable increase in the intensity of storms, the first year’s field school was created to research risk perception and its relation to how people felt attached to the coastal area in which they live. This research was designed to give voice to community residents who communicated how Harvey has changed life and how it has brought a new awareness of risk to a small Texas town on the Gulf of Mexico. The following analysis and discussion aim to provide value to emergency managers, planners, community groups, scholars, and residents.

Hurricane Harvey and Rockport, Texas

The town of Rockport, Texas, is located on the mid-Texas coast in the heart of the Coastal Bend, a geographic area named for the distinctive curve in the Texas coastline bordering the Gulf of Mexico. By the one-year anniversary of Harvey, disaster anthropologist Kate Browne was well into her National Science Foundation funded Harvey research project with a wide range of Texas residents. She realized a field school could be a great opportunity for students and considered different settings along the Harvey-impacted Texas coast. Browne appreciated the unsung importance of an ethnographic study in the small coastal towns of Rockport, Fulton, and Port Aransas where Harvey made landfall on August 17, 2017. Conducting a study in these areas was also important because the media had long since left to cover the story in more densely populated urban areas. These coastal towns suffered direct hits from Hurricane Harvey that brought terrifying winds and a storm surge that together ruined thousands of coastal homes and properties. Harvey’s impact spanned a diameter of 280 miles and 22 counties in Southeast Texas. In the two years since the storm, the cost of damage has reached \$125 billion, second only to Hurricane Katrina.

Methodology

There were three main focuses of our research:

1. Residents’ experience with Harvey – the storm, the aftermath, and long-term recovery.
2. Attachment to Rockport (place attachment, sense of place) – the things that make it home, and whether experiencing Harvey changed their relationship to Rockport.
3. Risk perception - which hazards local residents believe the area is prone to and

where they would locate these risks on maps.

Ethnographic methods and the social science approach

Within our research, we consulted published data, as mentioned throughout the report. However, the primary research involved the people who experienced Harvey themselves. Our findings are based on interviews conducted in June 2019 with people from 40 households in three areas of Rockport, each distinguished by socioeconomic status, types of properties, and ethnicity of residents. These three areas include South Rockport, Copano Cove, and Copano Ridge. Across these areas, there are several patterns that may be of interest to city officials and emergency managers. Nothing in this research is conclusive or final, but findings may offer guidance for future research.

By looking at disasters through a holistic social science lens, our team gained a better understanding of how disasters affect every aspect of human life and what factors shape who is most likely to be systematically exposed to risk and who is able to access resources to cope with and recover from disaster impacts. Knowledge from multiple disciplines and perspectives informs this work including anthropology, geography, sociology, political ecology, political economy, history, psychology, public health, and journalism. The research combined in-depth interviews with short surveys and risk mapping. The interviews gave us the chance to understand how people think about their community, their losses from Harvey, their affection for Rockport and their concerns about its future. The mapping exercise introduced a spatial perspective in which residents identified the locations of hazards the area is prone to. We then produced a “heat map” showing the distribution of these hazard-prone areas as identified by our respondents. These exercises helped us to learn how residents evaluate their post-Harvey lives and their sense of future risk. We also collected survey data from residents that provided an additional source of quantitative data for further analysis.

About Our Research in Rockport and Our Research Participants

Most respondents experienced significant damage or total loss of their homes. Those with adequate savings relied on their own funds to start

the rebuilding process almost immediately. Others with insurance, but little to no savings, waited for checks to arrive. Those without insurance struggled to rebuild. It is noteworthy that hundreds of low-income families were forced to leave Rockport after the storm because their modest housing was unlivable. As of June 2019, no affordable replacements had yet appeared to help them return to the area. A few low-income families we interviewed who had suffered a complete loss of their homes were able to qualify for a new home built by religious or volunteer organizations. Each of these respondents indicated that they now feel safer and more comfortable than they did before the storm. Across all our areas of study, respondents reported that their experience with Harvey has led them to an increase in awareness about the need for preparedness.

Fig. 1 Household income across our area of Rockport residents.

HOUSEHOLD INCOME: ALL RESPONDENTS

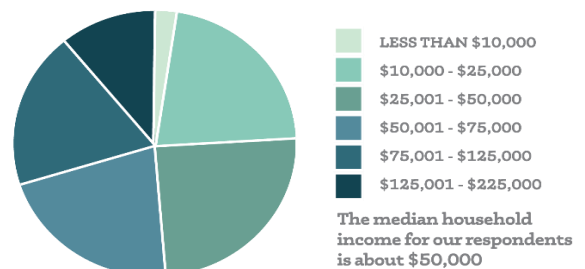
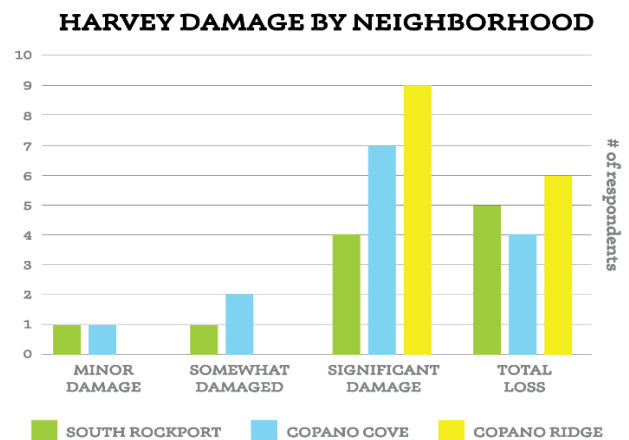


Fig. 2 Damage to homes of respondents during Hurricane Harvey.



Place Attachment, Social Vulnerability, and Recovery

Identification with a place, known as “place attachment” in the social sciences, is about people’s love for where they live, a “mutual caretaking bond between a person and a beloved place.”³ The affective bond of place attachment is constructed through physical, sociocultural, symbolic, and psychological components, which can take form through specific memories, buildings or relationships experienced in a place. Residents we interviewed expressed enjoyment of the natural world surrounding and defining their town. Local residents have a deep connection to the coastal lifestyle that Rockport provides. The wildlife and proximity to the water create a community with a strong attachment which also creates the tourist economy that Rockport relies on. In the context of disaster, there is a direct relationship between place attachment and risk perception. Risk perception refers to personal or communal interpretation of vulnerability to a hazard, a perception that can be influenced by one’s sense of place attachment. Environmental psychologists and others describe how individuals with a strong sense of place attachment tend to minimize their perception of risk related to that area.⁴ This insight helps explain some of the risk perceptions we captured among residents of Rockport as we will detail in a later section.

This beautiful coastal environment carries many risks such as hurricanes, storms and flooding. Hurricane Harvey also exposed a different kind of risk: the resource-related risk that makes some people less well positioned to recover from devastation, referred to as “social vulnerability.” Even if the devastation from a bad storm may seem to carry “equal opportunity” impacts, a closer look at research suggests that this assumption is often inaccurate. People who have few financial resources, have elderly family members or those with disabilities, or have experienced systematic discrimination based on their ethnicity or immigration status will have their current and post disaster challenges exacerbated by the same storm impacts as people without those circumstances. A disaster can impose outsized demands on a family’s time, income, and knowledge about how to navigate bureaucracies and outside organizations offering aid.⁵ In short, household level factors such

as race, ethnicity, age, health, and economic status compound risk by influencing where people live, their access to resources, and their realistic capacity to recover.⁶

Using the concept of “social vulnerability,” it is possible to discuss and explain how certain kinds of life circumstances combined with the upheaval of a disaster can translate into paralyzing problems for those already struggling. Our research shows that all people impacted by Harvey faced difficulties of one kind or another in reclaiming their lives. Still, the speed, quality, and extent of recovery for an individual household depended significantly on the specific mix of barriers imposed and assets available to overcome such barriers. Moreover, it became apparent that the experiences of vulnerability and resilience tended to resemble each other more within a given neighborhood than they resembled households across our study neighborhoods.

The contrasting levels of recovery success can be better understood by recognizing how social vulnerability shapes outcomes. Rebuilding from disaster relies most often on the free market, as it is important to have economic resources in order to recover fully. Many people in Rockport live on modest incomes, are rarely able to put money into savings, and in some cases do not have insurance on their homes. Without such personal resources, many are unable to begin the rebuilding process without some form of external aid. When people were both uninsured and did not meet FEMA qualifications for assistance, the financial burden of rebuilding became extremely challenging. Some families became dependent on help from non-profit aid groups to rebuild. Lack of resources is a key source of vulnerability that often remains invisible until something like a disaster occurs.

Vulnerability Based on Geography and Access to Resources

Every neighborhood in Rockport faces some degree of risk from storms and flooding, and all were exposed to and affected by Hurricane Harvey. And yet, although our respondents in South Rockport (the lower income neighborhood in our study) experienced less total property loss than residents in Copano Ridge (the highest income area in our study), they encountered much greater difficulties in their material recovery. Even in areas

that were exposed to the same kind of damage during the event, the wide variation in access to resources shaped the experience and speed of recovery.⁷

In Copano Cove (the moderate to middle-income area of our study), residents who could afford to buy new homes did so on higher land located along the canal system, while those living on lower land more at risk tended to live in manufactured homes or travel trailers. In the Cove, then, there was wide variation in vulnerability between residents. One low-income retired couple experienced multiple vulnerability factors: their advanced age and disability prevented them from evacuating, their low income made it difficult to properly prepare for storms despite their extensive knowledge and prior experience of disasters from living in other areas, and their location in the Cove was susceptible to flooding. Almost all respondents reported having trouble navigating bureaucracies and insurance.

Away from Copano Cove's canal waterfront homes that are tucked up close to the southern edge of Salt Lake, the other subarea of Copano Cove known as Rattlesnake Point lies quite spread out. In this southern portion of the Cove, respondents appeared to share a distinctive orientation we referred to as "independent outsiders," people who regard themselves as self-reliant. The independence and sense of self-reliance of these Rattlesnake Point area residents provided them with an asset that became visible through the home repairs they were determined to make on their own. When residents have fewer social ties to draw on, this life circumstance can become a source of vulnerability that compromises the chances of a full recovery.⁸

South Rockport is a low-lying area prone to flooding and has historically been home to people with low-to-moderate income. Within South Rockport, one respondent and her husband have been subsisting off of disability and social security after they both suffered severe health complications a decade ago. They have 20 grandchildren in the area, and six of them live in their home. As a large low-income family, protective storm impact measures such as insurance, savings, and home preparedness were unattainable. Their grandchildren evacuated to Austin, but the couple's disabilities and lack of savings forced the two of them to stay at home rather than evacuate for the

storm. They took shelter in a hallway. Luckily, the two endured no storm-related injuries, but they were faced with devastating challenges including a total loss of their home. Because of their financial situation, the family was eligible for a rebuild by a religious organization but faced a 13-month displacement during which they resided in a two-bedroom apartment with 10 other people. Households with members living with disabilities face unique barriers to coping with and recovering from disasters as well as during displacement. Such life circumstances were not uncommon for some of our respondents in South Rockport.

Copano Ridge, where most of our respondents suffered a total loss of their homes, was arguably the neighborhood with the greatest material damage from Harvey. Residents here were mostly retired, and nearly all were living in fully rebuilt homes at the time of this study. For these residents, access to time, resources, and instrumental social networks have proved major factors in their rapid recovery timeline. Many residents in these one or two-person households described how they drew on savings accounts while waiting for money from insurance. Residents were able to stay in apartments or hotels paid for by insurance, and some respondents had second homes where they were able to stay. For them, there was very little loss of income following the storm, unlike the residents in our other two study neighborhoods.

A Sense of Belonging in Rockport - Identification with place and connections to risk perception

Many of our respondents have called Rockport home for many generations. Nearly every long-term resident interviewee indicated that because of their historical and family ties to the area, they would never move. Newer residents shared a similar appreciation for the attractions of the area, but they were much less likely to feel a strong sense of place attachment to Rockport, and so indicated they would likely leave in the event of another storm.

Bethie, a resident in Copano Ridge, currently lives in the house she grew up in. After the storm, her pier was destroyed and so were the trees that provided shade for family gatherings. She felt a great loss for those parts of her home. In the

context of disaster, there is a direct relationship between place attachment and risk perception. Risk perception refers to personal or communal interpretation of vulnerability to a hazard, a perception that can be influenced by one's sense of place attachment. Environmental psychologists describe how individuals with a strong sense of place attachment tend to minimize their perception of risk related to that area.⁹

People with a strong degree of place attachment are less likely to relocate after a disaster because their identification with a place outweighs their perceived risk for a future disastrous event. Findings from our research support this pattern. The life-long residents of Rockport stated they had no intention of ever leaving Rockport, even as they considered the prospect of another disaster.

These lifelong residents often have large families in the area which contributes to an even stronger feeling of attachment to place. For example, one resident continues to live in a home with persisting mold damage as a result of the storm, but refuses to vacate the property because it was built by her father in the 1960's. By contrast, people who had lived in Rockport for less than 10 years or so indicated that they would relocate if another storm were to hit the area. The couple Shawn and Carlie have lived in Copano Ridge for less than five years. Though they love the charm of Rockport, they have already decided to leave that behind in the event of another storm. Furthermore, an individual's place attachment is linked to both emotional (e.g. attachment, belonging) and mental (e.g. coherence, agency, reflection) components.

Place attachment for communities as a whole can also be impacted by disaster. The destruction of the community space, Paws & Taws Convention Center, in Fulton was mentioned across neighborhoods as a particular loss. The facility was a common place where people gathered to dance, hold wedding receptions and proms, and meet with each other. One respondent who had a close relationship to the facility mentioned that he had recently returned to the spot for its official re-groundbreaking. Though they were reconstructing the actual building, he felt that it would never be the same. This relationship to Paws & Taws is an example of what scholars call "solastalgia,"¹⁰ or missing a place that is lost. Solastalgia can produce

significant mental distress during a disaster, which is sometimes amplified by the rebuilding process.

Disruption of one's daily routine following a disaster can also be disorienting. An employee of the Aransas National Wildlife Refuge explained to us how her job changed completely after the storm. In the immediate weeks after Harvey, the Refuge was overseen by the National Fish and Wildlife service, and employees were asked to stay home and focus on their personal recovery. Laura described how her absence from work added to the emotional stress and left her with no escape from the damage to her own home. When a disaster dramatically affects both a person's home and professional worlds, it is especially trying.

Risk Perception and Past Experiences

On the Texas Coast, residents are well accustomed to the threat of extreme weather events. Harvey was the first major storm in almost fifty years, and it blew up from a tropical storm to a Category 4 hurricane in under 48 hours. The long lull between these two major events, paired with the rapid intensification of Hurricane Harvey, resulted in a rushed response from officials of Rockport and from local residents themselves. Previous experience with hurricanes (or the lack thereof) influenced how prepared individuals were for Harvey. Additionally, the lull between major disasters impacted how residents viewed risk.

Our respondents who lived through hurricanes as children noted how different it was to be an adult during Harvey. Brenda, who experienced Hurricane Celia, stated that "It's very different when you are taken care of... when you have an adult holding your hand, taking you wherever you've got to go." On the other hand, our interviewees who had experienced major storms as adults were more equipped to respond adequately to the disaster. Overall, any past experience had a positive impact on a person's preparation for and response to Harvey.

Another finding from our research showed how past experiences with warnings that do not materialize can numb people to the actual risk and leave them unprepared for a serious event. The routine familiarity of warnings and missed projections of a storm's path lead many people to underappreciate the actual risk. As the tropical

storm in the Gulf became Hurricane Harvey, people waited for Category level 3 or 4 to react, but by then, it was very late. Victoria, a respondent from South Rockport, explained how she was not planning to evacuate at all until the morning of Hurricane Harvey when she realized that Harvey had intensified to a Category 4 with 130 mph winds. By then, she only had a couple of hours to prepare her home and family for the storm before she evacuated.

Preparation and Response

Because of the rapid intensification of Harvey, there was a generally rushed response in Rockport from the public as well as officials. Many evacuated the day before or even as late as the morning of the day Harvey made landfall. Twenty-five percent of our sample did not leave the Rockport area despite the mandatory evacuation posted by city officials.

There are many reasons that people chose not to evacuate before Harvey, including, as mentioned above, their past experience with storm warnings that did not materialize, as well as factors such as the limited amount of time, limited funds, decreased mobility due to disabled members within a household, fear of losing property, and lack of transportation. Those who did leave were left with the task of finding an effective evacuation route as well as accommodations.

Another challenge of a disaster hitting a small coastal town such as Rockport was the lack of resources. Sara Williams, the Emergency Management Coordinator (EMC) for San Patricio County, stated that Rockport and surrounding areas were understaffed for such a large catastrophe. Most of the disaster plans prior to Harvey focused on response without considering recovery. The chaos of attending to the lack of necessary resources combined with the disconnect between federal and local governments proved to be a daunting challenge for public officials in the aftermath of Harvey.

All those affected by Harvey did the best that they could with the given circumstances and limited timeframe, but rapid intensification events can be expected and have happened in the Coastal Bend (Brett, 1999 and Celia, 1970 for example). Clearly, there is room for improvement in local preparedness.

Adapting After Disaster

Following the destruction from Hurricane Harvey, the risk perception of many Rockport residents increased. Many people stated that they planned to improve their methods of preparedness though some were left with feelings of increased apathy. The psychological and emotional impacts of Harvey are still widespread in Rockport. The continuous mental impacts on the Rockport community may relate to the prevalence of “optimistic bias” before the storm. Previous research has shown that “people have an optimistic bias concerning personal risk; when it comes to potential harm, such as disease or catastrophe, people think that others are more likely to be affected than themselves.”¹¹ The phenomenon of optimistic bias leads to both more confidence in success and prosperity, as well as increased levels of risk-taking or even reckless behaviors. Phrases such as “my neighbor had it worse” and that Harvey was a “once in a fifty-year storm” (suggesting that Rockport will not be hit by another major storm for another fifty years) were common examples of optimistic bias heard in interviews. However, following Hurricane Harvey, optimistic bias has generally lowered, and more residents see the risk of another major storm arriving sooner rather than later.

In many ways, Hurricane Harvey resulted in people having an increased perception of the risks that exist within the area. As a result, many people expressed distinct plans to improve preparation efforts for future hurricane seasons. One respondent reported avoiding travel and medical procedures during hurricane season. Some even stated that they would permanently leave Rockport if they were hit by another major hurricane. Overall, the attitude that Rockport residents have towards potential storms has definitely shifted following Harvey.

Mapping Risk Perception, Part I

The following graphics are the results of the risk perception mapping exercises conducted with respondents in 40 households. The results are presented by type of risk starting with flooding from rain, and by community, starting with South Rockport.

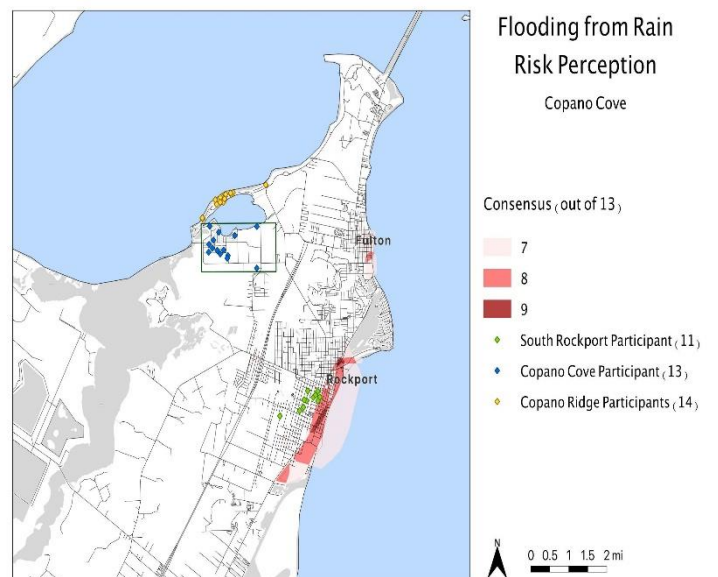
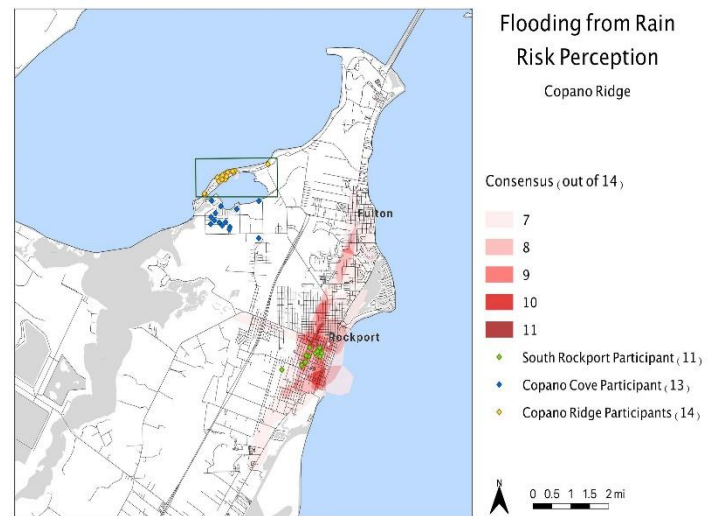
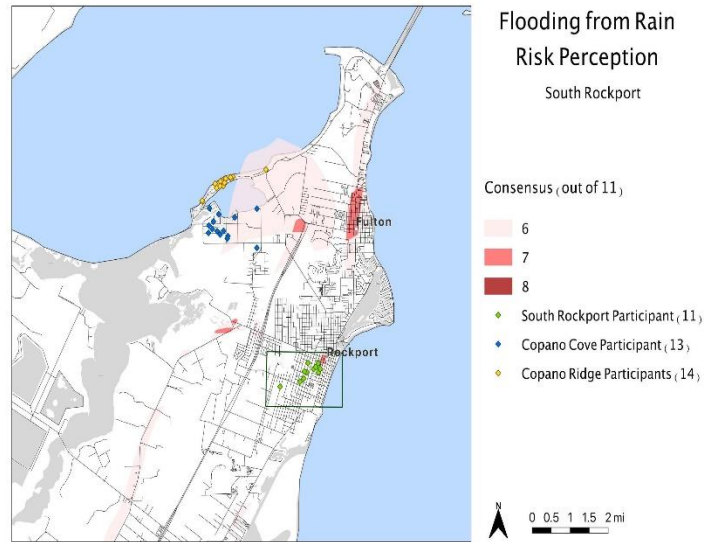
Respondents identified different categories of risks on maps at all three scales—neighborhood,

community, and regional. This participatory mapping supplements theoretically based flood map data with lived experiences. The most interesting comparisons occur across neighborhoods with the community-level map where everyone marked the types and locations of risks they perceived to exist. This scale encompasses the full area of Rockport and Fulton including all three neighborhoods and Copano Bay, as well as portions of Aransas Pass and Port Aransas. First, we present our findings about flooding from rain, one of the most frequently cited risks by all groups. The comparative maps show how, for a given neighborhood, the respondents pointed to areas at risk of flooding from rain. Each of the three maps conveys residents' perceptions about where risk of flooding from rain is located. They also integrate 2016 FEMA flood maps for the same area, a layer represented as diagonal lines on each map.

Results of our risk perception exercise with respondents revealed interesting relationships between risk perception and place attachment. Specifically, our respondents in both Copano Ridge and Copano Cove identified the risk of flooding from rain in the waterfront areas of Rockport and Fulton where FEMA maps also identify an important floodplain. In contrast, South Rockport respondents who live in these designated flood-prone areas of central Rockport did not identify the risk of flooding from rain in their own area or nearby town center. Instead, they located most risk of flooding from rain some distance away, in the general Copano Bay area, the area north of Rockport called Fulton, along FM 1069, along Market Street, and especially around the cross-streets of Church and Market.

What is striking about these differences is that in Copano Cove and Copano Ridge, the extensive risk identified by a majority of residents aligns well with FEMA floodplain maps. These overlapping maps of risk perception and actual risk are also apparent in the ethnographic stories about people's experiences with flooding in central Rockport and Fulton.

Why did people in South Rockport, with their proximity to these waterfront floodplain areas, not identify them as at-risk areas? In the literature about risk perception, researchers have found that in areas where people feel a strong sense



of place attachment, people may unconsciously minimize their recognition of risk and consequent preparedness in that place.¹² This finding suggests to us that the places we are attached to emotionally or cognitively become important to us and we may be less likely to acknowledge the risks that exist in these places. Knowing one's environment and its fluctuations so well may thus create a sense of familiarity that effectively normalizes risks that others less familiar with the area recognize better. Our research points to the need for further investigation into the potential role of place attachment on risk perception.

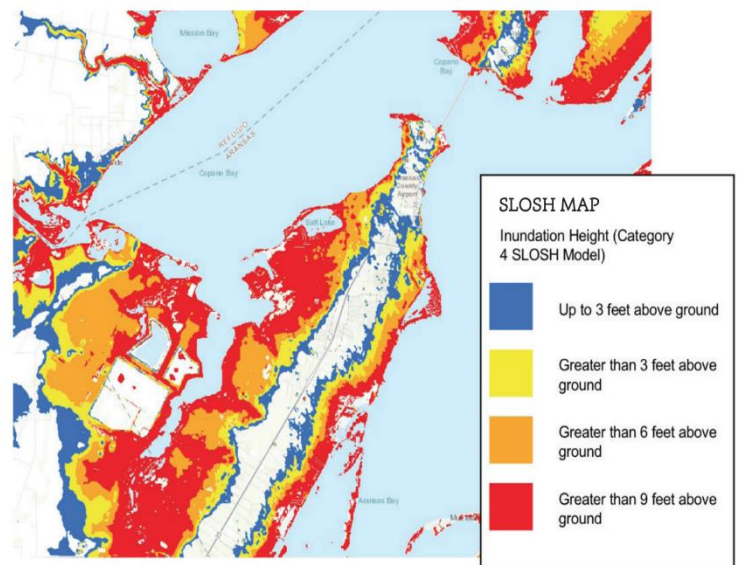
The ethnographic interviews indeed revealed that South Rockport residents display a strong sense of place attachment to their local environment and to Rockport generally. Several reasons help make this attachment clear. First, the majority of South Rockport residents interviewed are lifelong residents of the area, a finding not shared by our sample in the other two neighborhoods. Second, more than half of these residents, who are Latino or African American, maintain large families in the immediate area. And third, these large families depend on each other and effectively provide support for each other. In addition, they can insulate their members from risk of all kinds. In short, the majority of people interviewed in South Rockport seem to exhibit many reasons for their deeper sense of connectedness to place and, consequently, don't appear to consider those areas that are in their immediate proximity as at-risk for flooding from rain in the way that others do who do not live there.

Mapping Risk Perception, Part 2

The next set of figures compares the three neighborhoods' perceptions of surge-flooding risk with the National Weather Service's "SLOSH" maps. The map below depicts potential storm surge heights estimated by the National Weather Service's (NWS) "Sea, Lake, and Overland Surges from Hurricanes" (SLOSH) model for a Category 4 hurricane. The SLOSH model estimates a "worst-case scenario" for flooding from surge that could result from a hurricane of a certain strength in the area.¹³

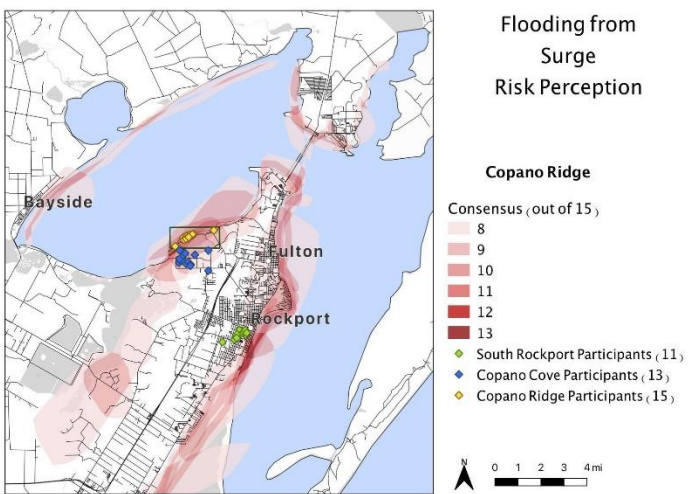
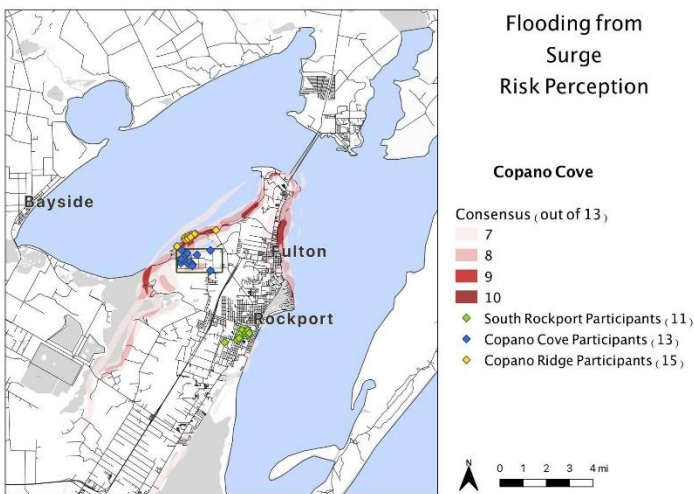
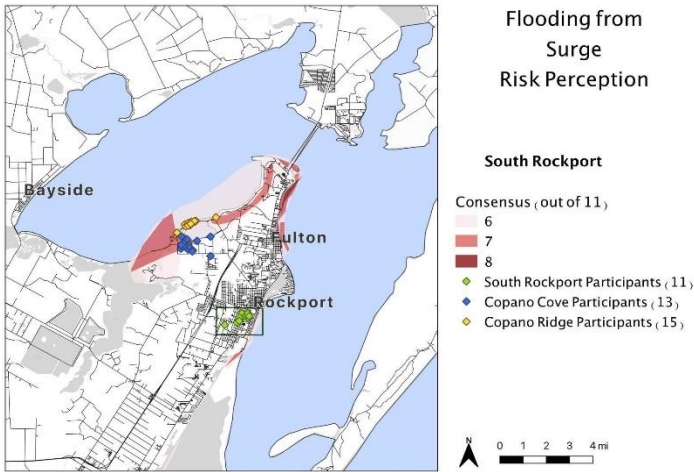
As was clear in Hurricane Harvey, not all areas of the Rockport-Fulton community highlighted in the SLOSH map were affected by

storm surge, but many were. In particular, the low-lying areas south of Salt Lake experienced significant damage from storm surge, which aligns with the SLOSH model's identification of at-risk areas.¹⁴



The differences in patterns of risk perception for flooding from storm surge between neighborhoods suggests another possible relationship between place attachment and the perception of risk, as identified in the earlier risk perceptions of flooding from rain. South Rockport respondents identified risk for storm surge along Copano Ridge and the northwest and northeast sides of the peninsula, as well as along the coast to the west of Copano Cove. They also pointed to risk of flooding from surge along the coast to the south of the Rockport city center, though almost no risk in the town center.

Copano Cove residents similarly identified risk along the northern edges of the peninsula and south of Rockport, but, in addition, they identified risk of flooding from surge along Key Allegro and further south into Port Bay and in their own neighborhood. Copano Ridge residents identified risk along the entire coastline of the peninsula visible in our community maps, across Copano Bay toward the town of Bayside, and across the northern channel around the town of Lamar. Most strikingly, The Ridge respondents identified a high degree of risk near the town center of Rockport, a pattern absent from the risk perception maps of South Rockport and Copano Cove residents in our



study. The areas of risk with most consensus (darkest on the map) appear along Key Allegro, along the coast of south Rockport, and in their own neighborhood of Copano Ridge.

These differences may be explained using a similar framework as the risk perceptions of flooding from rain. As mentioned earlier, South Rockport residents that we interviewed show a high degree of place attachment. Most of the Copano Ridge residents in our study, by contrast, are relative newcomers to the area. Their sense of place attachment is considerably weaker than that of the South Rockport residents. It is likely that this variance in the strength of place attachment between Copano Ridge and South Rockport residents explains the differences in the surge-flooding risk perception maps.

Each group of respondents identified areas of storm surge risk that align with the SLOSH model to varying degrees. South Rockport residents primarily identified risk in the Copano Cove and Copano Ridge areas, as did Copano Cove residents. Residents of The Ridge and The Cove identified similar risk in the South Rockport area, while Copano Ridge residents identified a much larger area of risk overall.

The risk perception map of Copano Ridge residents aligns more closely with all at-risk areas on the SLOSH map, possibly suggesting that Copano Ridge residents' experience with storm surge in Hurricane Harvey influenced their understanding of risk in the greater Rockport-Fulton community. Both Copano Ridge and Copano Cove experienced significant damage from storm surge during hurricane Harvey, but 80 percent of Copano Ridge residents interviewed experienced total loss of their properties as well as the contents of their homes. This direct experience with storm surge and its destructive force undoubtedly shaped the risk perceptions about flooding from surge for Copano Ridge residents who also identify such risk beyond their own neighborhood. The fact that both South Rockport and Copano Cove residents minimized storm surge risk along the east side of the peninsula where the SLOSH map does identify risk also speaks to the fact that the storm surge from Harvey did not affect these areas nearly as much as the Copano Ridge and Copano Cove areas. It seems that Copano Cove and South Rockport residents' perception of risk was

shaped primarily by the damaging effects of Harvey, leaving unidentified the at-risk areas that were not affected by Harvey's storm surge. Prior experience with a storm's devastation can cause those who experienced it to shift their perceptions about risk.

Conclusions

The different challenges of social vulnerability. Apart from the physical exposure to risk, there are many forms of social vulnerability that shape a family's capacity for a speedy or a full recovery. Many people discussed the hardship of having to dip into savings set aside for other priorities in order to rebuild. Some had no savings at all. Some households have elderly family members who are not mobile or people with disabilities. Life circumstances that are already rooted in hardship create additional suffering in the aftermath of disaster that can be difficult to overcome.

Problems with bureaucracies. Significant frustrations with insurance companies and government organizations are common and occurred irrespective of socioeconomic status. Most respondents also criticized the endless requirements for navigating unfamiliar paperwork and forms, as well as the lack of a caseworker assigned to help them.

Place attachment. Many people with a strong sense of place attachment are likely to want to stay no matter what the future brings. Big families interviewed are lifelong residents and share a strong connection to Rockport. They live in close proximity and can be resources for each other, buffering the emotional weight of dealing with recovery and a lack of adequate resources. They can also perpetuate perceptions about risk. In our research, these families represented lifelong residents and share the conviction that, irrespective of future hurricanes or risk, they will continue to live in Rockport.

Risk perception and models. Place attachment and experience with Harvey and other storms impacts individuals' perception of risk associated with future coastal weather events. Often, however, the experience of a major disaster can outweigh place attachment and cause people to evaluate risk more realistically.

Preparedness. Preparation for storms is more likely after one has experienced a serious storm, and less likely if storm warnings do not eventuate in a serious disaster.

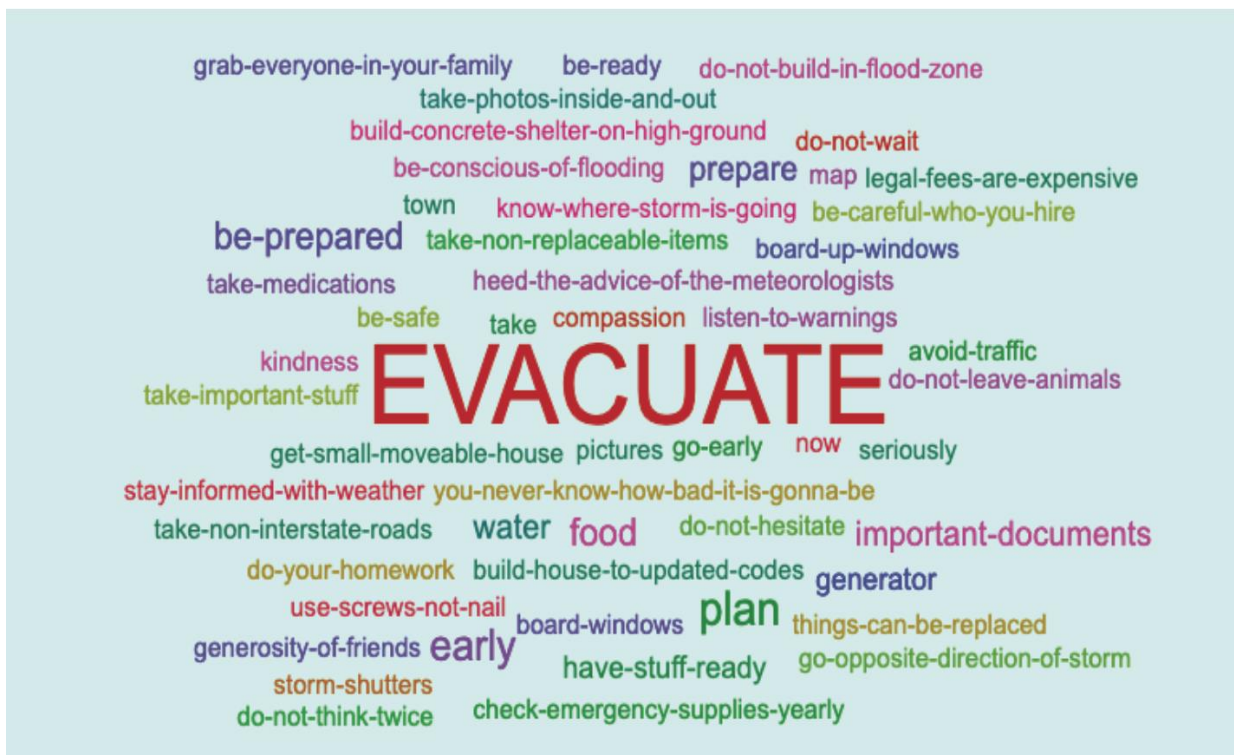
Concern about Rockport's future. Quite a few residents feel concerned about the plans to "overdevelop" Rockport as a tourist destination in ways that would encourage the building of more tourist vacation rental properties, displace even more low-income populations, and imperil the beloved, easy-going residential atmosphere.

One of the interesting things we learned during our interviews was the advice that our respondents provided when we asked them what they would say to people they don't know who become impacted by a disaster like Harvey. We typed all the advice and put it into a word cloud, which is an image composed of text contributed, in this case, from people in the 40 households where we conducted interviews. The more often a specific word pops up in response to our question, the bigger and bolder it appears in the word cloud. As you can see, there was one word that got repeated far more times than other words people used: evacuate. Other advice that people offered strangers was to leave early, grab important documents, be stocked up on food and water, and to take seriously the need to prepare for future storms and disasters.

Notes:

1. NOAA—GFDL: <https://www.gfdl.noaa.gov/extremes/> (accessed 11/24/19).
2. IPCC 2019: <https://www.ipcc.ch/srocc/chapter/summary-for-policymakers/> (accessed 11/24/19). The IPCC is the United Nations body for assessing the science related to climate change.
3. Mindy Fullilove, "Psychiatric Implications of Displacement: Contributions from the Psychology of Place," *American Journal of Psychiatry* 153 (1996): 1516-1523.
4. Marino Bonaiuto, Susana Alves, Stefano de Dominicis, Irene Petrucelli, "Place attachment and natural hazard risk: Research review and agenda," *Journal of Environmental Psychology* 48 (2016): 33-53.
5. Katherine E. Browne, "Standing in the Need: Communication Failures that Increased

- Suffering After Katrina.” *Anthropology Now* 5 (March 2013): 54-66
6. Ben Wisner, Piers Blaikie, Terry Cannon, Ian Davis, *At Risk: Natural Hazards, People’s Vulnerability and Disasters*, Second Edition, (Abingdon-on-Thames, UK: Routledge Press, 2003); A.J. Faas, “Disaster Vulnerability in Anthropological Perspective,” *Annals of Anthropological Practice* 40 (Vol 1, 2016): 14-27.
 7. Katherine E. Browne, *Standing in the Need: Culture, Comfort, and Coming Home After Katrina*, (Austin: University of Texas Press, 2015); Fass 2016
 8. Browne, 2015; Daniel Aldrich, *Building Resilience: Social Capital in Post-Disaster Recovery*. (Chicago: University of Chicago Press, 2012).
 9. Marino Bonaiuto, Susana Alves, Stefano De Dominicis, Irene Petrucelli, “Place attachment and natural hazard risk: Research review and agenda,” *Journal of Environmental Psychology* 48 (2016): 33-53.
 10. Knez et al., 2018
 11. Neil D. Weinstein, “Optimistic biases about personal risks,” *Science* 246 (No. 4935, 1989): 1232. GaleOneFile: Health and Medicine, Accessed January 5 2020. For more recent work investigating the relationship between optimistic bias and risk perception, see Craig Trumbo, Michelle A. Meyer, Holly Marlatt, Lori Peek, Bridget Morrissey, ““An Assessment of Change in Risk Perception and Optimistic Bias for Hurricanes Among Gulf Coast Residents” *Risk Analysis* 34 (No. 6, June 2014): 1013-1024
 12. S. Mishra, S. Mazumdar, D. Suar. “Place attachment and flood preparedness”, *Journal of Environmental Psychology* 30 (2, 2010): 187-197.
 13. As the SLOSH model is not a state-of-the-art hydrodynamic model, its predictions should be considered approximate. But SLOSH has the advantage of being computationally very efficient compared to more recent models allowing for the thousands of runs necessary to capture hurricanes of all strengths and paths. These maps are also readily available from NOAA. The lower accuracy of the SLOSH predictions, as compared to state-of-the-art hydrodynamic models, e.g. ADCRIC, is unlikely to be significant for this study.
 14. Research Report: Rockport Residents and Life After Harvey - Results from the 2019 Colorado State University Ethnographic Field School



Generated by the 2019 Ethnographic Field School for Risk and Disaster based on interviews with Rockport residents in June 2019.

Cultural Forests of Amazonia: A Historical Ecological Analysis of Forest Management in Amazonia

Grace Ellis

Introduction

Amazonian forests are typically perceived as wild, untouched or pristine. This perception of Amazonian forests as “untouched” is beginning to change into what Amazonian archaeologists are calling a cultural mosaic: a complex landscape created by natural and cultural processes that have been in motion since human colonization of Amazonia around 16,000 BP. Tropical rainforests are the material manifestations of sophisticated systems of knowledge and ancient management practices (Neves 2016). Therefore, it is impossible to understand the life history of trees without understanding the life history of people in Amazonia. Evidence of forest management exists in numerous places across Amazonia, Brazil nut stands (*Bertholletia excelsa*) and palms (*Arecaceae*) in particular, which suggests it was a widely practiced activity in the past and remains so today (Balée 1994; Clement and Junqueira 2010; Shepard 2011; Erickson 2010; Balée 2013; Stahl 2015; Neves 2016; Watling et al. 2017). This paper uses a historical ecology framework to explore the deep history of forest management in Amazonia in order to understand the complex human-environment interactions that contributed to the formation of anthropogenic forests in Amazonia from pre-Columbian times to the present. A brief review of historical ecology will be followed by a discussion of the types of anthropogenic forests common in Amazonia, including fallows, orchards, door and house gardens, and forest islands. The evidence supporting anthropogenic forest formation in Amazonia, including the persistence of megafaunal fruits, the hyperdominance of economically useful tree species, and the association and observation of specific tree species with human activity in the archaeological and ethnological record, will also be examined. Finally, two case will be assessed to illuminate the deep history of forest management practices in Amazonia and demonstrate the

complex human-environment processes involved in anthropogenic forest formation.

Historical Ecology

Historical ecology is an effect way to study the management history of forests because it acknowledges the unique historical trajectories and individual agents that contribute to ecosystem change across deep temporal scales and offers insights, models, and ideas for sustainable futures of contemporary forests based on a comprehensive understanding of past complex human-environment interactions. Historical ecology is the study of the temporal and spatial dimensions of human-environment interactions and places emphasis on historical events and individuals, not evolutionary processes, as agents of ecosystem change (Balée 1998). Acknowledging human agency in historical trajectories and ecosystem processes is especially important in Amazonia where human-environment interactions have largely been understood through evolutionary and adaptationist lenses. Additionally, historical ecology is particularly useful for understanding the biodiversity of Amazonian forests, which can largely be explained through anthropogenic activities and historical processes. The next section highlights some of the most abundant and widely distributed types of anthropogenic forests associated with human management practices in Amazonia.

Types of Anthropogenic Forest

Anthropogenic forests in Amazonia primarily occur in stands, groves, fallows, orchards, house and door gardens, and forest islands. Amazonian archaeologists (Levis et al. 2012; Stahl 2015; Arroyo-Kalin 2016) have hypothesized that the formation of cultural forests began with the repeated discard of fruit seeds at reoccupied campsites and along trail sides. Eventually, these

fruit tree stands became protected and preserved around old campsites and settlements and dispersed around the region by humans. Regular management of anthropogenic and natural fruit tree stands of economic and symbolic value led to deliberate agroforestry practices, which persist today (Stahl 2015; Arroyo-Kalin 2016). Today, different forms of indigenous agroforestry are pervasive throughout forested neotropical lowlands (Stahl 2015).

Fallows are a type of anthropogenic forest that refers to areas previously maintained as orchards or modified for cultivation purposes by people in the past (Balée 1994; Neves 2016). Fallows contain higher biodiversity and more economically useful tree species than surrounding forested areas (Balée 1994). The presence of ceramics, charcoal, and anthropogenic soils is also a common feature of fallows, which further supports their ancient association with human occupation and activity. The location of fallows is typically well known among contemporary communities who exploit and manage forest resources in these areas in similar ways as people did in the past (Neves 2016).

House and door gardens have also been identified as sources of anthropogenic forests. Door gardens and house gardens are common across Amazonia. They occupy the space immediately surrounding the house where trees, food crops, and rare species are planted, protected, encouraged, and continuously weeded and maintained, typically by women (Balée 1994; Erickson 2010). Balée (1994) has suggested that house gardens and door gardens could have been laboratories for experimentation and domestication. Once abandoned, house and door gardens become almost indistinguishable from ancient fallows (Balée 1994).

The last type of anthropogenic forest is the forest island. Forest islands are found primarily in the savannas and grasslands along the southern periphery of Amazonia. They are formed through a combination of geomorphological and anthropogenic activities (Erickson 2010). Forest islands are situated on low levees along active river channels as well as in slightly elevated areas far away from major rivers. They provide refuge and shelter for animals and people in the region and harbor high densities of edible and useful plants (Clement and Junqueira 2010; Erickson 2010). Archaeological evidence suggests that like fallow

forests, forest islands were centers of domestication (Walker 2018). Contemporary ethnographic evidence reveals that forest islands are purposely planted and maintained by the Kayapó who occupy the Xingu river basin (Balée 2013). Forest islands persist as important features on the landscape that continue to have significant impact on local environments and biodiversity (Walker 2018).

Anthropogenic forests in Amazonia, including stands, groves, fallows, orchards, house and door gardens, and forest islands, represent biotic legacies that continue to provide benefits and resources to contemporary human and animal populations (Clement and Junqueira 2010). The evidence for anthropogenic activity and processes of cultural forest formation is reviewed in greater detail below.

Evidence of Anthropogenic Forests

Anthropogenic forests, Brazil nut stands (*Bertholletia excelsa*) and palms (*Arecaceae*) in particular, have been documented in association with past and present human activity and settlements across Amazonia (Clement and Junqueira 2010; Shepard 2011; Erickson 2010; Balée 2013; Stahl 2015; Neves 2016; Watling et al. 2017). Other economically and symbolically useful tree species that have been associated with pre-Columbian and contemporary forest management practices include hog plum, kapok, ochoo, genipapo, bamboo, pequí, araucaria, cacao, patawa, bacaba açu, açai, bacuri, babaçu, guava, inajá, moriche, tucumã, mucajá, caiaué and other species of palm (Balée 1994, 2013; Erickson 2010; Neves 2016; Watling et al. 2017; Neves and Heckenberger 2019). These trees species were and still are critical features of productive landscapes providing organic architectural materials, food, fuel, tools, adornment, medicine and ritual items (Stahl 2015; Neves and Heckenberger 2019). This evidence suggests that managed forests have persisted as integral parts of Amazonian resource management systems since early human occupation of Amazonia. Several archaeologists (Levis et al. 2012; Neves and Heckenberger 2019) have argued that traditional practices and knowledge systems that unfold over millennia, such as forest management in Amazonia, could potentially inform on contemporary problems, such as food security, deforestation, and climate change.

Dominant models explaining the biodiversity of forests and the current distribution of tree species in Amazonia in relation to anthropogenic activity include megafaunal dispersal syndrome and species hyperdominance. Forest biodiversity and tree distribution due to human activity is also supported by the archaeological and ethnological record. These models and the archaeological and ethnographic evidence will be reviewed before examining two case studies focusing on indigenous management systems and anthropogenic forest formation in Amazonia in greater detail.

Megafaunal dispersal syndrome refers to attributes of fruits that developed to attract megafauna species that existed in South America until the end of the Pleistocene around 12,000 BP. Seed dispersal anachronisms have been identified in a number of Amazonian tree species, including Brazil nut (*Bertholletia excelsa*), calabash (*Lagenaria siceraria*), cacao (*Theobroma cacao*), biribá (*Rollinia deliciosa*), soursop (*Annona muricata*), and pequí (*Caryocar Brasiliense*) (Neves 2016; Neves and Heckenberger 2019). Characteristic traits of megafaunal fruit can only be explained by interactions with extinct megafauna species (Janzen and Martin 1982; Neves 2016). However, the fact that these megafaunal traits have persisted 12,000 years after the extinction of megafauna species means that some other species has been managing their seed extraction and dispersal. Most scholars believe humans replaced extinct megafauna in the extraction and dispersal of seeds over the last 12,000 years because no other species, except a few species introduced with European contact such as the tapir, can remove the seeds of megafaunal fruit (Shepard and Ramirez 2011; Neves 2016; Neves and Heckenberger 2019). This means that megafaunal fruit trees that exist today have likely been distributed, intentionally or not, by humans since around 12,000 BP. Although there is little archaeological evidence for how megafaunal fruit trees were distributed by humans early on, the extensive geographic range coupled with the low genetic diversity that is common in many megafaunal fruit trees in Amazonia, particularly the Brazil nut tree, suggests a rapid and rather recent dispersal that could only have been achieved through human activity and disturbance (Shepard and Ramirez 2011; Neves 2016).

Species hyperdominance also supports anthropogenic disturbance of Amazonian forests. Out of around 16,000 tree species that have been identified in lowland Amazonia, 227 species (1.4% of the total) account for half of the species (Neves 2016). These hyperdominant species represent a disproportionate number of individuals from families of palms (*Arecaceae*) and Brazil nut (*Bertholletia excelsa*). Additionally, six of the ten most abundant tree species in Amazonia are economically and symbolically useful palms (Arroyo-Kalin 2016; Neves 2016; Neves and Heckenberger 2019). This evidence suggests that the hyperdominant pattern of tree distribution in Amazonia is largely the result of human management in the past (Arroyo-Kalin 2016; Neves and Heckenberger 2019; Andrade et al. 2019).

Finally, archaeological and ethnological evidence also support anthropogenic forest formation in Amazonia from pre-Columbian to contemporary times. Archaeological evidence suggests that humans have been managing the forest since their arrival in Amazonia around 16,000 BP (Schaan 2011). Some of the earliest evidence of anthropogenic forest and landscape modification in Amazonia comes from Caverna da Pedra Pintada (Roosevelt et al. 1996), which is situated on the north side of the Lower Amazon River across from Taperinha in Monte Alegre. Stylized rock paintings date roughly to 11,000 BP and include red and yellow geometric motifs, anthropomorphic figures, animals, and adult and children handprints. Archaeobotanical remains, such as Brazil nut (*Bertholletia excelsa*), jutaí (*Hymenaea cf. parvifolia* and *oblongifolia*), achua (*Sacoglottis guianensis*), pitomba (*Talisia esculenta*), muruci da mata (*Byrsonima crispa*), apiranga (*Mouriri apiranga*), tarumã (*Vitex cf. cymosa*), sacurí, (*Attalea microcarpa*), tucumã (*Astrocaryum vulgare*), and curuá (*Attalea spectabilis*) were also recovered from the site suggesting inhabitants were highly adapted to humid tropical forest environments and subsisted heavily on forest and floodplain resources (Roosevelt et al. 1996). Many of the tree species harvested by paleoindians at Caverna da Pedra Pintada are still found and managed in the tropical forests of Monte Alegre, which has led some scholars to believe paleoindians were altering and managing the forest (Roosevelt et al. 1996; Schaan 2011; Stahl 2015). The evidence

from sites like Caverna da Pedra Pintada demonstrates paleoindians were utilizing a broad range of forest resources and possibly modifying landscapes during the late Pleistocene in Amazonia.

According to the pollen and phytolith evidence from the archaeological record, forest management intensified across Amazonia around 4,000 BP and persisted until European contact when intensity of forest management practices decreased (Neves 2016; Watling et al. 2017; Walker 2018; Watling et al. 2018). Pollen and phytolith evidence can provide valuable paleoecological data, including tree species type, distribution, frequency, and forest canopy characteristics, that can be linked to human management practices, such as forest clearing and agroforestry, making them crucial sources of information for understanding the unique historical trajectories of ancient forests. The pollen and phytolith data from numerous archaeological sites across Amazonia indicate that around 4,000 BP widespread forest clearance occurred followed by an increase in canopy cover of certain economically and symbolically useful tree species, particularly palms (Watling et al. 2017; Walker 2018; Watling et al. 2018). This trend persists until European contact when there is a massive spike in arboreal pollen suggesting indigenous forest management practices were largely abandoned and managed stands and open clearings became overgrown (Walker 2018). Additional archaeological evidence supporting intensive anthropogenic forest management around 4,000 BP to contact include the presence of human engineered soils, earthworks, ceramics and charcoal in association with particular tree species and forest stands (Clement and Junqueira 2010; Levis et al. 2012; Arroyo-Kalin 2016; Watling et al. 2017; Walker 2018; Watling et al. 2018; Neves and Heckenberger 2019). These archaeological findings point to sophisticated knowledge systems and ancient management practices that materially manifested in the soils, forests, and landscapes of Amazonia.

Forest management practices still persist today as evidenced in numerous ethnographic accounts from across Amazonia. Ethnographic evidence from the Ka'apor in central and eastern Amazonia reveals linguistic distinctions between anthropogenic forests and primary forests (Balée 2013). Balée (2013) has also observed that the

traditional knowledge of the Ka'apor of Amazonia in reference to the domain of trees shows recognition of pre-existing phenotypic diversity. The traditional knowledge of anthropogenic forests among the Ka'apor reflects the long-term presence of humans in Amazonia and the impacts on floral and faunal diversity and distribution. Although some scholars (Piperno et al. 2019) have argued that human occupation of tropical forests can result in decreased biodiversity, most research shows that the hyperdiversity of Amazonian forests is largely related to indigenous knowledge systems and ancient management practices (Balée 1994; Clement and Junqueira 2010; Shepard and Ramirez 2011; Arroyo-Kalin 2016; Neves and Heckenberger 2019). Ancient and contemporary indigenous knowledge systems and forest management practices have shaped both short-term and long-term species richness and hyperdiversity in Amazonia. Indigenous subsistence strategies and forest management practices in Amazonia are composed of mixed and diversified cultivation systems that are based on non-domesticated tree arboriculture and root crops and domesticated cereals and legumes (Neves and Heckenberger 2019). Cultivated root crops, such as manihot, calathea, and xanthosoma, have contributed to short-term species diversity, while managed trees, such as palms, pequi, açai, and Brazil nut, have contributed to long-term species richness and hyperdiversity (Neves and Heckenberger 2019). The rich mosaic of species hyperdiversity evidenced in Amazonia is largely the result of indigenous forest management and cultivation practices that convert forest to forest, not forest to open area as is common in other areas of the world.

The archaeological and ethnographic record and the models of megafaunal dispersal syndrome and hyperdominant species provide lines of evidence of forest formation directly and indirectly linked to human disturbances and activities beginning with human colonization of Amazonia and persisting until contemporary times. Two case studies will be reviewed to demonstrate the deep temporal history of anthropogenic forests in Amazonia and reveal the complex human-environment interactions and indigenous management practices involved in the creation of cultural forests and landscape legacies. The first case study will focus on forest islands of south

western Amazonian savannas and grasslands of Bolivia. The second case study will examine fallows, orchards, and door gardens of the Ka'apor in central and eastern Amazonia.

Case Study I: Forest Islands of the Bolivian Amazon

This study is based off the work of John Walker (2018), who has identified over 2,000 forest islands in the west central Llanos de Mojos of the Bolivian Amazon. This region is characterized by savannas, grasslands, and gallery forests that line major and tributary rivers. Forest islands are typically situated away from main rivers on slightly elevated land, which rules out deposition due to river channel meandering, and are composed of closed canopy and little to no grass. Walker has documented nearly 8,000 years of human history and engagement with forest management in this region.

Around 8,000 BP, human occupation is evidenced in the area in the form of ceramics. Between 3,000 BP to 1,300 BP, raised fields were constructed and used for agriculture, gallery forests along main rivers and tributaries were cleared, and there is evidence of extensive use of fire related to forest and agricultural management practices. Forest island construction and habitation occurs around 1,300 BP, along with more intensive agricultural practices in larger raised fields. From 1,000 BP until contact, anthropogenic soils are evidenced in forest islands and there is an increased reliance on forest resources, especially palms, rather than agricultural products from raised fields. After contact, there is less evidence of fire use to manage the landscape and an increase in arboreal pollen, which suggests forest islands were abandoned and overgrown with closed canopy tree species.

Today, forest islands persist as prominent places of local knowledge that harbor useful plant species and valuable hunting grounds, provide refuge for livestock and wild animals, and represent local landmarks. This case study demonstrates the long temporal scale of human-environment interactions and ancient management practices that contributed to the creation of forest islands in the Bolivian Amazon.

Case Study II: Fallows, Orchards and Door Gardens of Eastern Amazonia

This study is based on William Balée's (1994, 2013) ethnographic work among the Ka'apor of eastern Amazonia where evidence of forest management persists among contemporary indigenous Ka'apor horticulturalists. Linguistic evidence suggests knowledge of plant management spans at least 2,000 years. However, Balée believes indigenous knowledge systems and ancient management practices surrounding agroforestry go back even further in this region of Amazonia. In pre-Columbian times, the population density was greater and forest management was more intensive, as evidenced in fallows which are ancient orchards that were maintained around pre-Columbian settlements. Fallows in this region of Amazonia have very high species diversity, which is absent in surrounding forests and contemporary monocultural rice fields and cattle farms, suggesting that ancient indigenous activity enhanced regional biodiversity.

Today, plant management is associated with birth, expansion, and decay of agricultural settlements. Once resources are exhausted, the Ka'apor move and create new swiddens, which are areas of land that have been cleared of vegetation for crop cultivation, and eventually establish new settlements. The Ka'apor typically do not fell fallow forests for swiddens because they harbor many useful palm species and fruit groves. Although swidden agriculture is practiced today, indigenous Ka'apor claim their ancestors did not practice swidden agriculture.

Along with managing ancient fallow forests and swiddens, contemporary Ka'apor also manage trees along rivers and creeks to attract fish with the fruit to hunt them and manage door gardens where a variety of local and non-local species are maintained. Balée (1994) has hypothesized that door gardens could be possible locus of experimentation and domestication. After abandonment, door gardens can become indistinguishable from fallow forests unlike swiddens that are temporary and short lived. This case study demonstrates the deep history of forest management practices among the Ka'apor and reveals how indigenous knowledge systems increase biodiversity in eastern Amazonia, unlike other contemporary practices of monocrop production and cattle ranching that lead to deforestation and lower biodiversity.

Conclusion

This paper illuminates the long history of forest management practices in Amazonia, which challenges traditional perceptions of Amazonian forests and landscapes as wild, pristine, and untouched. Amazonian forests are the result of complex, long-term human-environment processes that have been in motion since pre-Columbian times and that have contributed to the rich biodiversity evidenced in the contemporary landscape. Contemporary forest management practices among indigenous Amazonians represent models based on indigenous knowledge and ancient management practices that build resilience into food production systems and maintenance of biodiversity (Clement and Junqueira 2010). Additionally, this paper demonstrates the importance and usefulness of historical ecology, especially for research in Amazonia, because it acknowledges historical processes and individual agency in the creation of landscape and ecosystem formation.

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Traditional Ecological Knowledge and the National Environmental Policy Act: Integrating Indigenous Perspectives, Sustainable Resource Stewardship, and Environmental Impacts Analysis

Paul Buckner

Introduction

The National Environmental Policy Act (NEPA) of 1969 is the landmark legislation guiding environmental policy in the United States. NEPA requires federal agencies to identify environmental impacts likely to result from a proposed action and consider alternatives which may minimize or reduce environmental impacts. Since its enactment 50 years ago, NEPA has fundamentally changed how federal agencies approach environmental issues and evaluate the impacts of their actions. While it has been successful in establishing processes for evaluating environmental impacts, serious criticisms have been levied against NEPA due to its failure to adequately consider indigenous perspectives in environmental reviews. The most serious criticisms have cast NEPA as “silencing [...] Native American worldviews” in environmental management and enabling the “...perpetuation of colonialist attitudes towards Native peoples” (Dongoske et al. 2015: 36). These critiques constitute a serious indictment of an otherwise lauded policy achievement and shed light on the increasingly contentious issue of indigenous rights in management of public lands. In recent years, a list of highly publicized legal battles between tribes and the federal government has continued to grow, and these discourses have placed the issue at the forefront of the national consciousness. Particularly as the United States continues to wrestle with its historical disenfranchisement of Native Americans, federal policy towards indigenous peoples and land management is subject to growing scrutiny. While federal agencies regularly seek tribal consultation under the joint provisions of the National Historic Preservation Act (NHPA) of 1966 and NEPA, consultation is often cursory and tribes are left with

the impression that they are an “obstacle” to be overcome, rather than a true collaborative partner (ACHP 2017: 8). Recent controversies over the Dakota Access Pipeline, reduction of Bears Ears National Monument, and energy development adjacent to Chaco Canyon National Historic Park, all reinforce the need for a more socially conscious and indigenous-inclusive NEPA. Particularly because the statutory text of NEPA requires agencies to utilize an “interdisciplinary approach” which considers the “integrated use of the natural and social sciences”, NEPA practitioners must make greater use of social and cultural knowledge to create a more collaborative and holistic decision-making process (Boggs 1990; NEPA 1970: § 4332(a)).

One of the most effective ways environmental planners could improve collaboration with indigenous populations, legitimize Native American worldviews, and promote sustainable management, is through consideration of traditional ecological knowledge (TEK) in the NEPA decision-making process. Archaeological and ethnographic evidence increasingly demonstrates what indigenous populations have long contended, that thousands of years of indigenous management of the environment has left an “indelible imprint” on the North American landscape which has persisted to the present day (Anderson 2005: 4). Indigenous peoples’ role in fire regimes, forest composition, and even floodplain development are just a few examples of the dynamic ways the North American landscape is fundamentally managed and altered (Roos et al. 2018; Stinchcomb et al. 2011; Tulowiecki and Larsen 2015). Accordingly, natural resource managers increasingly recognize TEK, or

the “cumulative body of knowledge, belief, and practice” which guides interactions between “traditional groups and [...] their environment”, for its potential to promote sustainable management practices (Berkes 1993). Though TEK and Western Science have been erroneously cast as antithetical, they offer diverse ways of interpreting observations and approaching human interactions with the environment from multiple beneficial perspectives (Hatfield et al. 2018). Particularly in the social and natural context of NEPA, indigenous knowledge offers a “philosophy that sees humans’ role in the environment as one of stewardship”, a perspective which is ever more necessary in the age of climate change (Anderson 2005: 364). Collectively, it is increasingly clear that land managers must evaluate environmental issues in social, cultural, and natural dimensions, an approach which will allow agencies to better comply with the original spirit of NEPA (Hatfield et al. 2018). In this way, TEK and Western Science are mutually complementary, rather than competing, epistemologies which can cooperatively benefit NEPA analyses.

Though consideration of TEK in NEPA promises to improve collaboration with stakeholders and offer a more holistic interdisciplinary and multidimensional approach to sustainable management, obstacles and questions remain. NEPA is a procedural statute, and inclusion of TEK could potentially breach the rigid confines of the decision-making process imposed on agencies by NEPA (Moffa 2016). The application of TEK has likewise been compared to adaptive management, a management methodology based on responding to uncertainty, which has become famously difficult to implement in compliance with the strict procedural provisions of NEPA (Berkes et al. 2000; Schultz and Nie 2012). These considerations pose the questions, is TEK procedurally compatible with environmental impacts analysis under NEPA? To what extent is indigenous knowledge currently applied by federal agencies in public lands management? And, what opportunities for integration of TEK exist in contemporary NEPA practice? Through an analysis of the NEPA decision-making process, contemporary engagement between federal agencies and indigenous peoples in environmental policy, and current applications of TEK in management, this analysis will present the rationale

for greater implementation of TEK in NEPA environmental impacts analysis.

Decision-Making under the National Environmental Policy Act: A Review

NEPA constitutes one of the most significant environmental policy initiatives in United States history, leading environmentalists to describe the statute as the “Magna Carta of environmental law” (Luther 2005: 2). Signed into law on January 1, 1970, Congress enacted NEPA with the intent of creating a nationwide environmental policy which would “prevent or eliminate damage to the environment” and establish an “enjoyable harmony” between the nation’s needs and its environmental resources (NEPA 1970: § 4321). Despite these lofty conservationist goals, NEPA is a procedural statute which outlines only the *process* through which agencies must weigh probable environmental impacts and their alternatives. The courts have consistently reiterated that the law does not impose *substantive* requirements on agencies, meaning that NEPA’s aspirational objective to “prevent or eliminate damage to the environment” is not inherently enforceable in itself (Luther 2005:9; NEPA 1970: §4321). Accordingly, agencies are under no legal obligation to choose the least environmentally detrimental course of action, nor is there a mandate to limit environmental impacts. Rather, the spirit of NEPA is in consultation and public participation; agencies collaborate with stakeholders to consider impacts and arrive at an outcome which best fulfills agency needs while minimizing the environmental cost.

NEPA decision-making, as currently practiced by federal agencies, is contingent on a series of evaluations which determine the scope of the ultimate analyses. First, an agency must determine if potential effects are likely to have *significant* impacts on the environment (CEQ 2005). In cases where an agency is completing a routine task such as regular maintenance, where no reasonably foreseeable impacts will occur, the agency can omit the action from NEPA analysis as a categorical exclusion (CE). In cases where effects are uncertain, agencies prepare an environmental assessment (EA) to evaluate whether an action is likely to have a significant environmental impact. If the agency identifies no significant impacts,

following completion of an EA, a Finding of No Significant Impact (FONSI) is issued. If an EA determines a significant impact is likely to occur, the agency must complete an Environmental Impact Statement (EIS). EIS reviews are the most intensive level of analysis under NEPA. In preparing an EIS, agencies must analyze direct, indirect, and cumulative impacts of a project, seek public comment, and develop alternatives which minimize the likely environmental impacts (CEQ 2005). Once the agency has taken a 'hard look' at environmental impacts and possible alternatives, and considered public comments, the agency may select the course of action which best fits their project needs (Luther 2005).

Applications of Traditional Ecological Knowledge in Natural Resource Management

TEK and indigenous ways of knowing have been the subject of expanding interest in natural resource management since their "rediscovery" in the 1980's and early 1990's (Berkes et al. 2000:1259; Inglis 1993; Moffa 2016). As a highly place-based knowledge system, and the long-term body of knowledge curated and passed-down by indigenous peoples, TEK retains a high potential to contribute to many of the most critical issues currently facing natural resource management. Though indigenous knowledge systems and Western Science were once portrayed as incompatible and competing knowledge systems, they have been steadily more accepted as complimentary ways of understanding complex issues in multiple physical, social, and cultural dimensions (Hatfield et al. 2018). Recent studies have emphasized potential contributions of TEK to some of the most complex issues in natural resource management today, including climate change adaptation and response, fire management, and protection of endangered species (USFS 2013; Ray et al. 2012; Robson et al. 2010). Particularly when challenges facing environmental managers are increasingly social, as well as natural, TEK is seen as bridging the gap between these inherently interconnected human and environmental systems (USFS 2013).

Though perspectives on TEK have shifted, and Western scholars have acknowledged its contributions to promoting sustainable land use, indigenous knowledge is not monolithic. One

obstacle which has limited incorporation of TEK in management is that TEK is not necessarily a static form of knowledge. Rather, TEK is best represented as a process through which observations are interpreted (Berkes 2009: 153). In many ways, misperceptions of TEK can erroneously feed into pervasive stereotypes towards indigenous populations and their connections with the natural world. Such stereotypes, such as the long-standing perception of indigenous peoples as living in effortless harmony with nature, are fallacious and advance harmful mischaracterizations and prejudices which limit the real potential of TEK in natural resource planning (Briggs et al. 2006; Johannes 1993). When incorporating TEK into the NEPA process, it is important for practitioners to recognize these misrepresentations and avoid misuses which could comprise TEK's potential applications to environmental impacts analysis.

TEK and Environmental Policy in the United States

Just as TEK is increasingly recognized in the natural resource management field, there is some precedent for the application of TEK in existing environmental policy in the United States. The statutory text of NEPA mandates consideration of social and cultural knowledge in decision-making, and regulations for implementation of the NEPA process consequently require tribal consultation under certain circumstances (Boggs 1990; CEQ 2005; NEPA 1970). The Council on Environmental Quality (2005) regulations require NEPA planners to consult with tribes early in the process (§1501.2(d)), invite tribes to participate in scoping (§1501.7(a)(1)), consider conflicts between agencies' proposed actions and tribal management policies (§1502.16(c)), and include tribes in decision-making when effects may impact reservations (§1503.1(a)(2), §1506.6(b)(3)(ii)) (FWS 2018). In many cases, however, these requirements do not go far enough. Tribal consultation under NEPA is often undertaken alongside laws such as the National Historic Preservation Act (NHPA) of 1966 or the American Indian Religious Freedom Act (AIRFA) of 1978. As consultation is largely conducted under these statutes, which emphasize coordination with tribes on archaeological resource management rather than cooperative environmental management, indigenous perspectives are

effectively curtailed to discussions of cultural resources in NEPA documents (Dongoske et al. 2015). Subsequently, there is a perception among tribal groups that they are viewed as “obstacles” or as a “check the box” step of the NEPA process (ACHP 2017: 8). Given the codification of social knowledge considerations in the statutory text of NEPA, contemporary consultation practices do not sufficiently utilize tribal knowledge. Particularly as NEPA consultation is often undertaken concurrently with NHPA consultation, a distinct consultation process is needed to allow for transmission and sharing of TEK in tribal consultation.

The conceptual groundwork for wider implementation of TEK in NEPA already exists in federal land management planning and rulemaking. Under Section 110 and 119 of the Marine Mammal Protection Act (MMPA), for example, Alaska Native organizations are given co-management rights and agencies may consider traditional knowledge alongside “best available scientific information” (MMPA 1972 as amended through 2018, Section 110(d)(2)(1) and Section 119). As a legal term, best available science refers to the highest quality data readily available from the scientific community, and the inclusion of traditional knowledge under this standard is a significant milestone towards wider recognition of TEK (Moffa 2016). In 1997, the Secretary of the Interior issued an order reinforcing the government-to-government nature of tribal consultations and compelling federal agencies within the Department of the Interior to make due consideration of “...the value that tribal traditional knowledge provides to [...] land management decision-making...” (Secretarial Order 3206 1997). Within the last decade, the Obama administration also made strides in representation of indigenous perspectives in land management and environmental policy. Leading into the 2010’s, agencies increasingly recognized TEK as a powerful tool in land management, and as complementary to Western Science in developing sustainable management plans (USGS 2010). Especially with the projected threat of climate change impacts, TEK was recognized by Obama-era agency leadership as an important component of climate change response (USFS 2012). The 2012 Forest Service Planning rule, for example, requires officials

to seek information on indigenous knowledge and land ethics in developing long-term plans for the National Forest System (USFS 2012: §219.4(a)(3)). In 2016, the National Park Service (NPS) recognized the right of tribal groups to perform traditional cultural practices, such as gathering plants, in National Parks (NPS 2016). This rule opened doors for greater collaboration and transmission of knowledge between tribal groups and the agency, while building mutual trust between indigenous groups and the federal government. A significant breakthrough came in 2017, when the Bureau of Land Management (BLM) published its Resource Management Planning Rule which considered TEK as “high quality information” alongside Western Science (BLM 2017a). The 2017 rule recognized the potential for TEK to inform the preparation of sustainable resource management plans, under the condition that rigorous ethnographic research methods were employed in documenting relevant indigenous knowledge (BLM 2017a). The effectiveness of TEK in the BLM’s resource management is unclear, however, as the newly inaugurated Trump administration revoked the rule before it could be fully implemented (BLM 2017b). Though the final rule was a casualty of the Trump administration’s wider deregulation priorities, it demonstrates changing paradigms in land management and the role of indigenous peoples in shaping agency decision-making.

Discussion of TEK in existing case law is light, making it difficult to identify a body of state or federal judicial precedent guiding use of TEK in land management. In cases where TEK is discussed by the court, it is often tangential. For example, in *Elkutna v. Anchorage* (2000) the Alaska Supreme Court considered arguments that a gravel mine permit was issued without sufficient consideration given to the cultural significance of the area to indigenous peoples. The argument offered by the Native Alaskan village of Elkutna persuaded the court, partly due to expert testimony which faulted a cursory archaeological assessment for failure to incorporate indigenous knowledge into the permitting process. In federal cases, legal consideration of TEK has largely been limited to litigation surrounding the Endangered Species Act (ESA). For example, the United States District Court for the District of Columbia (D.D.C.) issued a

memorandum opinion in reference to several lawsuits against the United States Fish and Wildlife Service (FWS) over the listing of polar bears as ‘threatened’ species under the ESA (D.D.C. 2011). In their opinion, the D.D.C. cited TEK as an accepted form of evidence and a “formally-recognized body of knowledge” applied by the FWS in their decision. Another such example comes from *Center for Biological Diversity (CBD) v. Salazar* (2011). In this case, tribal members challenged a FWS determination identifying the desert bald eagle as a distinct population segment, which would not qualify for the statutory protection afforded to bald eagles under the ESA. In their argument, the tribe successfully argued that the failure of the FWS to consider TEK in their decision violated its obligation to “consult meaningfully” with designated tribes (*CBD v. Salazar* 2011). The court decided in favor of the tribe and ordered the FWS to reevaluate its decision with adequate consideration given to TEK. Though *CBD v. Salazar* (2011) offers a strong precedent for incorporation of TEK in decision-making under the ESA, no direct case law exists to clarify the role of TEK under NEPA.

The Canadian Example

Though there are some examples of TEK applications in current United States’ environmental policy, TEK remains a tangential consideration in many ways. To evaluate the potential for widespread application of TEK as a keystone of environmental impacts analysis, it is useful to evaluate TEK’s equivalent application in policy abroad. The Canadian Environmental Assessment Acts (CEAA) of 1992 and 2012 offer an excellent opportunity to understand how TEK can be actualized in environmental impacts analysis (CEAA 1992; CEAA 2012). The CEAA was the Canadian equivalent of NEPA, and the law imposed many of the same requirements and processes on Canadian federal agencies as NEPA does in the United States. The CEAA was first passed in 1992, and replaced with modification in 2012 in a conservative effort to deregulate. The CEAA of 2012 remained in force until 2019, when repealed and replaced by the significantly more forceful Impact Assessment Act (IAA 2019). All three acts regulate governmental agencies and their proposed “physical activities”, in much the same way NEPA establishes

a process for assessing environmental impacts from federal actions (CEAA 1992; CEAA 2012; IAA 2019). While NEPA took effect in 1970, before TEK was common in natural resource management and environmental policy discourses, the 1992 CEAA was first passed during a period of intensive discussion of TEK applications (Inglis 1993; Johannes 1993). In contrast to NEPA, and likely due to this contemporaneity with increased recognition of TEK in the early-1990’s, the CEAA of 1992 made direct mention of traditional knowledge in impacts analysis. Under the CEAA, environmental planners were not required to consider TEK in every case, however the law identified “aboriginal traditional knowledge” as an important resource which could be considered in reviews (CEAA 1992: Section 16.1). Despite a lack of a direct mandate for inclusion of TEK, its codification resulted in a marked increase in applications of TEK in environmental decision-making (Robson et al. 2010). As Canadian land management agencies began to implement TEK in environmental reviews, however, a number of problems affected the process. No explicit directives or guidelines on how to integrate TEK were available for either the 1992 or 2012 CEAA (1992) (Usher 2000). Similarly, observers noted problematic power imbalances in the consideration of TEK and Western perspectives, as well as tensions between opposing indigenous and policy aspirations (Ellis 2005; Paci et al. 2002). The CEAA of 2012 did little to alleviate the issues affecting inclusion of TEK in environmental assessments since 1992. Under the 2012 CEAA, agencies were required to evaluate impacts on traditional land use and indigenous resource use, however consideration of TEK was still left to agency discretion (CEAA 2012, Section 19(3)).

Significant changes occurred in 2019, with the repeal of the CEAA of 2012 and passage of the Impact Assessment Act (IAA). The IAA of 2019 reflects a monumental progression in the consideration of TEK in environmental policy. Under the new law agencies should “ensure impact assessments take into account scientific info, indigenous knowledge, and community knowledge” (IAA 2019: Section 6(1)(a)). Additionally, indigenous knowledge is among the “factors” agencies *must* consider when assessing impacts (IAA 2019: Section 22(1)(g)). Environmental assessments prepared under the IAA of 2019 must

likewise report how agencies applied indigenous knowledge for the given project, and the Minister of the Environment is required to review reports to ensure agencies adequately made use of indigenous knowledge (IAA 2019: Section 28(3.1), Section 33(2.1)). Section 119 of the IAA is dedicated entirely to the use of indigenous knowledge, and outlines considerations for its inclusion in agency reviews. Importantly, in alleviating the TEK issues found in the CEEA of 1992 and CEEA of 2012, the IAA describes proper implementation of indigenous knowledge in relation to confidentiality (Section 119(1)), consultation (Section 119(2.1)), and further disclosure (Section 119(3)). Under the IAA, TEK is kept confidential, unless already publicly available, and informants must give consent prior to any disclosure of information. This is a crucial tenant of the law, as privacy and preservation of propriety community knowledge is often a primary concern of indigenous groups (Ellis 2015; Johannes 1993). Collectively, Canadian environmental policy demonstrates that TEK can be successfully considered by agencies as part of environmental planning. While there are obstacles to implementing TEK, such as inherent tensions between contrasting interests and ‘ways of knowing’, it has great potential for building meaningful collaborative relationships and developing more sustainable land management programs. The enactment of the IAA in 2019 constitutes a significant advancement in the recognition of TEK as a necessary consideration in sustainable resource management.

Contemporary Application of TEK in NEPA: A Survey of Environmental Impact Statements

Given that the groundwork for TEK in environmental policy is already present in federal statutory and administrative law, and there is an increasing academic and policy dialogue surrounding TEK in natural resource management in the United States and Canada, it is important to likewise evaluate the current application of TEK under NEPA. As there is no direct discussion of TEK in the statutory language of NEPA, nor in administrative rules or case law, it is then necessary to identify if TEK is being considered independently by planners and NEPA practitioners at the project level. To evaluate the level of application of TEK in NEPA practice, a database

survey of 28,694 full-text NEPA documents was undertaken. The sample of documents is primarily comprised of EIS reviews prepared by federal agencies, which constitute the most extensive level of environmental impact analysis under NEPA. Documents were searched using specific terms related to indigenous peoples broadly, as well as specific terms pertaining to concepts of traditional knowledge. Though the database survey provides only a coarse level of analysis, representative only of the presence or absence of the term, study of the frequency of their use allows for a useful evaluation of the current level of engagement with TEK under current NEPA practice.

A total of eight thematic search terms were selected for the EIS analysis. These terms were designed to inform a broader understanding of the current level of engagement between NEPA practitioners and indigenous groups across multiple scales (Table 6). The broadest terms included variants of “tribal” or “Native American”, which are likely to reflect discussion of tribal consultation in NEPA documents. These terms helped to establish a general baseline understanding of the relative frequency of projects which involve any kind of interface with tribal governments. Terms such as “ethnography” were also searched and were designed to capture examples of projects which integrated anthropological or cultural analyses into environmental reviews. The frequency of the terms “ethnography” or “ethnographic” also act as a proxy for the *analytical* consideration of culture in environmental impact analyses, beyond more procedural considerations such as tribal consultation. Finally, terms representing TEK and its variants (e.g. indigenous knowledge, traditional knowledge, etc.) were also searched. The frequency of these terms was then used to estimate the current level of engagement with TEK in environmental decision-making. Once searches were completed, and relative frequencies were evaluated, a selection of the same database queries were used to evaluate change over time. The available sample covers a 19-year period, from 1993 to 2012, and selected terms were plotted based on their frequency in EIS documents over four-year periods (**Error! Reference source not found.**) .

The results of the EIS survey reveal that federal agencies are not making substantive

Exact Search Term(s)	NEPA Documents Containing Term	Percentage of Total Sample
“Tribe” OR “Tribal”	8,871	30.9 %
“Native American” OR “American Indian”	7,131	24.9 %
“Ethnographic” OR “Ethnography”	1,751	6.1 %
“Indigenous people” OR “Indigenous Peoples”	432	1.5 %
“Traditional Knowledge”	231	0.8 %
“Traditional Ecological Knowledge” OR “TEK”	125	0.4%
“Indigenous Knowledge”	32	0.1 %
“Native Knowledge”	30	0.1 %

Table 6. Database survey of the relative frequency of TEK related terms in a sample (n = 28,694) of NEPA documents prepared from 1993 to 2012. The frequency of terms can be used to estimate the consideration of TEK concepts in NEPA decision-making. The results indicate that fewer than 1% of NEPA documents reference TEK or associated terms. Approximately 1/3 of documents include language related to tribes or Native Americans collectively, likely due to discussion of consultation mandates.

Frequency of Terms in NEPA Documents, 1993 - 2012

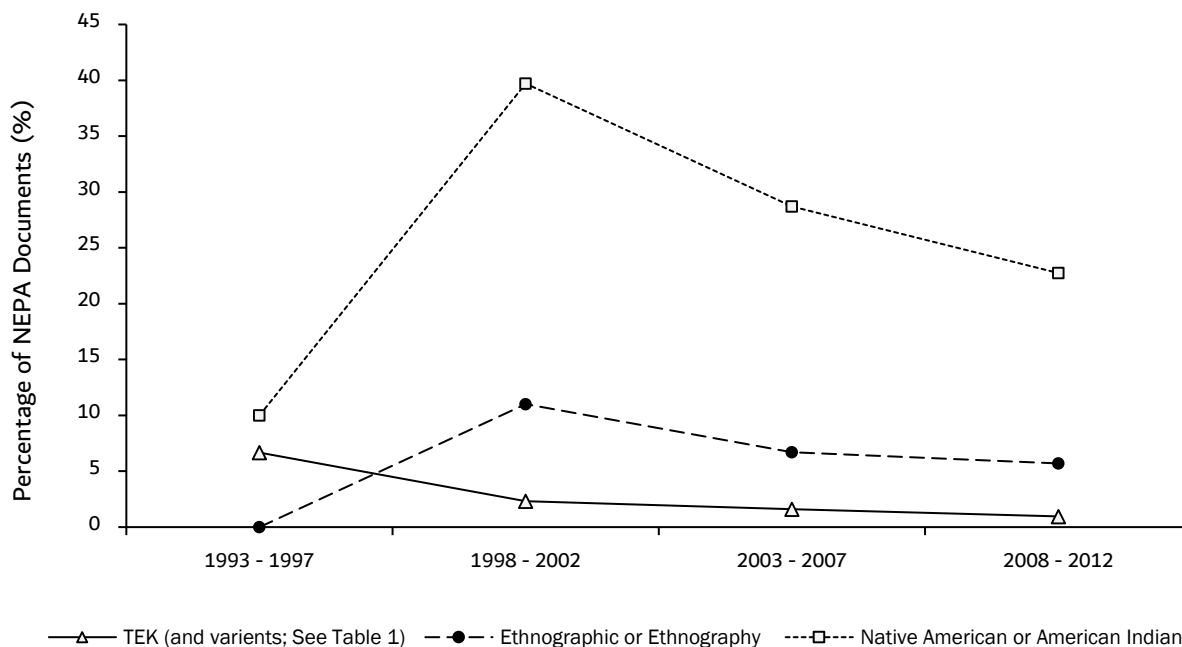


Figure 1. Percentage of NEPA documents (per four-year period) containing search terms relevant to TEK and indigenous involvement in the NEPA process. The data indicate that discussion of TEK has remained relatively consistent, although infrequent, throughout the sample period. Higher frequency mention of “Native American” or “American Indian” in NEPA documents likely represents discussion of consultation with tribal groups. The increase in such mentions from 1998 to 2002 is likely attributable to President Clinton’s “Consultation and Coordination with Indian Tribal Governments” directive to federal agencies (Executive Order No. 13175, 2000). Discussion of “ethnographic” or “ethnography”, used here as a proxy for analytical discussion of culture in NEPA documents, similarly peaks between 1998 and 2000. The results seem to indicate that consideration of indigenous peoples in NEPA analyses peaked ca. 2000 and has since been in slow decline.

consideration of TEK in NEPA decision-making (Table 6). While broad terms, such as “tribe” or “Native American” occur in approximately one-quarter to one-third of NEPA documents, TEK and its variants occur in fewer than 1% of NEPA reviews. These results indicate that while agencies are recognizing the conventional consulting role of tribes NEPA reviews, there is no serious systematic consideration of TEK in the NEPA process. Similarly, evaluation of the frequency of the term through time shows that TEK has consistently remained infrequently discussed in EIS documents (Error! Reference source not found.). A slight increase in the recognition of TEK from 1993 to 1997 may be attributable to heightened discussion of indigenous knowledge following a UN declaration in 1992¹⁷, but the term has remained infrequently used throughout the analysis period. In contrast, the use of terms such as “American Indian” and “Native American” see a significant increase from 1997 to 2002. This increase likely reflects a surge in tribal consultations following the Clinton administration’s “Consultation and Coordination with Indian Tribal Governments” directive in 2000 (Executive Order No.13175 2000). The terms “ethnographic” or “ethnography” increase during this same period, and then enter a slow decline. The use of these terms suggest that agencies are making use of anthropological literature and making more analytical considerations of culture in their NEPA documents, however the lack of a concomitant increase in discussion of TEK is conspicuous.

Similarly, the increase in tribal consultation and discussion of indigenous populations, without a corresponding increase in TEK, is worthy of discussion. Substantive and effective consultation on environmental projects should lead to incorporation of some degree of traditional knowledge when relevant, and the absence of this may reveal a flaw in the current practice of tribal consultation. Tribal consultation is often conducted by archaeologists employed by federal agencies, rather than environmental planners. While it is important for agencies to consult on cultural resource matters, this results in ineffective consultation on other resource and management issues and inhibits indigenous contributions to

environmental planning itself (Dongoske et al. 2015). Improvements in consultation, including dedicated discussion of environmental planning and land management goals beyond cultural resources, are necessary to make TEK more accessible to agency planners and alleviate the problematic “check the box” nature of contemporary tribal consultation (ACHP 2017).

Traditional Ecological Knowledge and the National Environmental Policy Act

A review of the contemporary applications of TEK in natural resource management, and in the environmental policy of the United States and Canada, demonstrates the many opportunities which TEK offers for sustainable and socially conscious environmental decision-making. Despite this potential, implementation of TEK in NEPA faces a number of obstacles. When applied to management, TEK has been likened to adaptive management, as both methods place similar emphases on assessment and evaluation of uncertainty (Berkes et al. 2000). Implementation of adaptive management, wherein agencies monitor changing environmental conditions to inform a dynamic management decision-making process, has proven problematic under the strict procedural provisions of NEPA (Schultz and Nie 2012). Given similarities with the idealized use of TEK in environmental planning, such issues are likely to also afflict the application of indigenous knowledge in the decision-making process. For example, the objective of adaptive management is “to promote learning” while managing the “inherent uncertainty” of natural resource management (Schultz and Nie: 1138). Similarly, TEK is not the transfer of static knowledge, but a dynamic process of observation and interpretation focused on “feedback learning” (Berkes et al. 2000; Berkes 2009: 153). While adaptive management is seeing widespread application despite the challenges of implementing it in coordination with NEPA, an analysis of current applications of TEK in NEPA documents indicates that federal agencies are not capitalizing on traditional knowledge in the same way. Though traditional knowledge may face similar legal obstacles to adaptive management,

¹⁷ The 1992 United Nations Conference on Environment and Development (UNCED), or Earth Summit, issued the

‘Rio Declaration’ which named TEK as critical to a more environmentally sustainable future (Ingilis 1993, vi)

efforts to apply adaptive management under NEPA are a useful model for the similar application of TEK. Given these contrasts, it is critical to evaluate the legal and procedural rationale for greater consideration of TEK under NEPA, as well as opportunities and obstacles for integration of indigenous knowledge in the NEPA process.

Prior to the wide-spread integration of TEK in NEPA analyses, the compatibility of TEK with the procedural mandates of NEPA must be fully evaluated. The basis for the legal implementation of TEK in the NEPA process is in the statutory language of the law itself. As enacted by Congress, NEPA requires agencies to make consideration of social impacts alongside natural impacts, and to obtain relevant social and cultural knowledge for analysis of these impacts (Boggs 1990). NEPA's explicit discussion of the integrated analysis of social and natural sciences likewise reinforces this point (NEPA 1970: § 4332). Namely, given these interdisciplinary aspects of NEPA's mandate to agencies, does the agency fail to fulfill their NEPA obligations if relevant indigenous knowledge is ignored? The Administrative Procedure Act (APA) of 1946 empowers members of the public to challenge agency decisions if they are determined to be 'arbitrary and capricious'. Under this judicial standard, if an agency fails to consider relevant aspects of decision in a 'good faith' review, the agency may be found to have acted arbitrarily and capriciously and could become subject to judicial action (Czarnecki 2006). Given this standard, can an agency act arbitrarily and capriciously by *not* integrating TEK in analyses? Moffa (2016) predicts that agencies may someday face such a legal challenge and argues the unjustified exclusion of TEK could be grounds for litigation under the 'arbitrary and capricious' standard. In his analysis of TEK in agency rulemaking in *Stanford Environmental Law Journal*, Moffa (2016) addressed the legal viability of TEK under the legal standards of environmental policy in the United States. Though Moffa (2016) did not focus explicitly on NEPA, his analysis has a wide degree of applicability across environmental policy. Notably, Moffa's (2016) analysis of TEK alongside administrative rulemaking determined that there are legal grounds for codification of TEK in regulation and formalized decision-making processes. Moffa (2016) concluded that agencies

could apply TEK in environmental reviews, and successfully defended their decision in court, if adequately documented and justified. Frameworks for implementing TEK in NEPA are likewise already present in rulemaking. For example, the 2012 Planning Rule for the United States Forest Service (USFS) and Bureau of Land Management's (BLM) 2017 Resource Management Planning Rule are both examples of finalized rules which integrate TEK as a form of inquiry in decision-making (USFS 2012; BLM 2017a). Under the BLM's (2017a) Obama-era rule, TEK was considered "high quality information" alongside best available scientific information. TEK's potential to inform the preparation, amendment, and maintenance of resource management plans was recognized explicitly in the rule text. The BLM (2017a) likewise outlined a methodological focus on ethnographic research designed to maintain accuracy and reliability, and avoid bias, in TEK applications. Though the BLM's 2017 rule was ultimately revoked, the contention over the rule was political in nature, rather than any judicial grievance or illegality, and the rule could eventually be restored under a new administration.

Analyses by Moffa (2016) and others indicate that there are sufficient legal grounds for integration of TEK to survive judicial challenges. Given that federal agencies *can* legally implement TEK into decision-making, and TEK can survive judicial scrutiny, how should agencies implement TEK into environmental planning? TEK has enormous potential for application towards NEPA analyses, from determination of environmental baselines to development of sustainable project plans, and it is important to identify frameworks for applying TEK in a substantive way (Berkes 2009). One of the most effective ways TEK could be integrated into contemporary NEPA analysis is alongside conventional Western Science in impacts analysis. CEQ regulations for the NEPA process require agencies to make use of "high quality" information in their decision-making (CEQ 2005: §1500.1(a)). While this is typically considered as 'best available science', there can be significant gaps in available scientific data for some project areas. Application of TEK alongside Western Science could help fill these gaps, where data is limited, and decision-makers are forced to rely on coarser-scaled data (Moffa 2016). In this sense, TEK may actually

constitute the highest quality information for a specific area. Particularly since TEK is highly localized and “place-based wisdom”, there is significant potential for its application in these contexts (USFS 2013). TEK and Western Science should similarly be synthesized to cooperatively identify likely environmental impacts. Given that current NEPA practice is criticized for ignoring indigenous ‘ways of knowing’, addressing this discrepancy can strengthen the breadth and quality of NEPA reviews (Dongoske et al. 2015). Notably, TEK and ‘best available science’ should not be presented as competing ways of interpreting empirical data, but complementary means of interpreting complex information on multiple scales of analysis. While Western Science provides hypothesis testing and experimentation on a (relative) short-term scale, TEK contributes a long-term perspective of localized wisdom (USFS 2013). Where Western science yields quantitative data, TEK provides the concomitant qualitative information which is necessary to adequately interpret such data (Berkes et al. 2000). TEK, alongside Western Science, can likewise enable agencies to better define important cultural interpretations of social and natural impacts, which may not be immediately apparent from a conventional NEPA analysis (Hatfield et al. 2018). Ultimately, TEK’s application of unique community knowledge adds an important element of ‘place-based’ cultural analysis to traditional NEPA reviews (Robson et al. 2010).

Though there is a demonstrated potential for improved NEPA reviews with TEK, and legal analyses indicate responsible implementation of TEK would comply with NEPA’s procedural provisions, there remain serious obstacles to its implementation. The most pressing obstacle is a lack of awareness and cohesive understanding of TEK among the policymakers and the public. Though TEK has long been a focus of ecology-minded anthropologists and anthropology-minded ecologists, the general public has less exposure to TEK as a concept. This has manifested itself in confusion over naming conventions and misunderstanding of what TEK actually entails (Moffa 2016; Usher 2000). For example, many of the public comments on the BLM’s use of the term TEK in their 2017 Resource Management Planning Rule were centered around clarifying the meaning

and intent of TEK in the rule (BLM 2017a: 89645). An additional problematic aspect of TEK is developing testable evaluations of provided knowledge. It is well established that TEK should be *testable* in some manner, and that observations provided through TEK systems should be critically evaluated (Usher 2000). Testing TEK for management purposes, however, can be impractical given short-time frames and highly-place specific contexts (Johannes 1993). Collaboration among interdisciplinary specialists in federal agencies is also a potential obstacle to successful implementation of TEK in NEPA. Expertise from both social scientists and natural scientists is required to fully implement TEK into a management program, but such collaborations can be rare in agency contexts (Johannes 1993). In the case of TEK, this level of collaboration is necessary due to the specialized skills required to acquire and interpret TEK into actionable data for an agency EIS. For example, documenting TEK requires expert skills in ethnographic research methods, while natural scientists and resource managers are needed to contextualize information with Western Science and management objectives. Ultimately, however, the most significant obstacle to the systematic application of TEK to environmental impact analysis is trust. Federal agencies and indigenous representative must contend with the “troubled history” of indigenous peoples in the United States, and historical disenfranchisement by the United States government can make trust difficult to establish in the consultation process (Moffa 2016: 131). Given the challenges of communicating across cultures, effective knowledge exchange between agencies and indigenous groups requires a dedicated collaborative effort on behalf of each party. This communication is made more difficult by indigenous peoples’ right to retain knowledge internally. Tribal knowledge is an important component of community and identity, and many groups may prefer to keep this information proprietary (Johannes 1993). Historic trust issues likewise incentivize indigenous peoples to refrain from imparting valuable indigenous knowledge (USFS 2013). The problem is further worsened by mishandling of TEK by governments. In cases, power imbalances can arise in co-management and TEK can be misappropriated and misinterpreted by

environmental planners, further aggravating trust issues (Ellis 2005).

Though serious challenges exist in implementing TEK under NEPA, a dedicated effort by agency decision-makers can diminish such obstacles. First, to alleviate public confusion over TEK and the implications of its use, agencies simply need to begin making greater use of TEK in their reviews. In this case, the problem is solved through more frequent application. Moffa's (2016) analysis suggests that greater use of TEK in rulemaking will lead to its overall 'clarification', and more frequent consideration of TEK will create public discourses which will improve understandings of traditional knowledge concepts. While agencies will need to address public comments seeking clarification of TEK used in analysis, agencies should be able to provide adequate documentation and justification of their applications of TEK. Collaboration between social scientists, natural scientists, and indigenous groups can also be resolved if agencies are willing to take serious steps to integrate TEK in their analyses. Currently, tribal consultation is often left to archaeologists who are principally employed to manage agency compliance with legislation governing archaeological and historic resources (Dongoske et al. 2015). Though archaeologists regularly consult and collaborate with tribes, they are rarely trained in ethnographic research methods. To resolve this issue, agencies should explore hiring ethnographically trained anthropologists to advise on TEK acquisition and facilitate collaborations with natural scientists. Dedicated anthropological staff at the unit or regional level could build lasting relationships with tribal contacts and assist in developing formal guidance for the use of TEK. This investment would concomitantly demonstrate to tribes that federal agencies are committed to giving due consideration to indigenous perspectives, alleviating some of the trust issues which exist between tribes and agencies. Ultimately, agencies will be required to demonstrate their good faith in seeking consultations with tribes to develop management plans with TEK components.

Conclusion

The increased implementation of TEK in environmental impacts analysis offers a powerful opportunity to extend the breadth and scope of

NEPA as it enters its second half-century.

Particularly with the growing emphasis on TEK as a tool for addressing the impacts of climate change, consideration of TEK in NEPA is more crucial than any time before. Wider implementation of TEK in environmental planning can likewise contribute to more environmentally sustainable and socially conscious management decisions. Particularly given NEPA's objective of preserving the "cultural [...] and natural aspects of our national heritage", TEK offers a comprehensive source of high-quality information which can help to better comply with the original intent of NEPA (NEPA 1970: §4331(b)(4)). Wider consideration of TEK is likewise necessary to restore indigenous stewardship of public lands and create environmental reviews which fully consider the environmental and social impacts of an action. Similarly, the place-based knowledge offered by traditional knowledge systems is an essential component of impacts analysis and the acquisition of high-quality information to minimize or reduce these impacts. Though the potential benefits of integrating TEK into environmental reviews are numerous, there are initial obstacles which agencies will be required to overcome. Notably, a history of removal, oppression, and social inequity underscores the need for the development of truly collaborative relationships in land management. While current tribal consultation is primarily oriented towards cultural resource management, a systematic expansion of tribal consultation to encompass broader land management issues is needed. With a dedicated good faith effort to implement TEK in coordination with indigenous consultants, many of these obstacles can be alleviated. Similarly, though questions have arisen surrounding TEK's compliance with the procedural provisions of NEPA, analysis of TEK in current environmental policy suggests is likely to survive judicial review if its inclusion is adequately justified (Moffa 2016). Given these determinations, with sufficient staff training and trust building with indigenous partners, agencies can develop guidance and best practices for acquisition and implementation of TEK in their NEPA reviews.

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Curbing Disease, Building a System: Partners in Health's Response to the West African Ebola Epidemic

Julia Reedy

Possibly the most far-reaching take-away from my work in the Ebola epidemic was that paying too little attention to the local culture more than likely contributed to a protracted outbreak in all three countries [Guinea, Liberia, Sierra Leone]. Contrary to popular belief, the people of West Africa didn't have strange customs. We, the expatriates and international respondents did. Until late into the epidemic, ambulances and police showed up unannounced in villages where sick people had been reported, dressed in scary moon suits, masks and goggles. Unrecognizable as human beings, they whisked sick loved ones away, often never to be seen or heard from again. We doused infected houses with acrid-smelling chlorine and burned precious belongings. We sprayed the dead with chlorine and disposed of them in white plastic bags. For a long time, more people came out of Ebola Treatment Units in plastic bags than alive. Yet when communities hid their sick and their dead, when they threw stones at the ambulances, when they ran away, we labeled them resistant, distrustful, non-compliant. We forcibly quarantined them for days on end. We fined villages for not reporting possible cases of Ebola; we even jailed a few individuals.

Karin Huster March 27, 2016

Introduction

In December of 2013, the first confirmed cases of Ebola were documented in Guinea, jumpstarting the devastating outbreak in West Africa. As cases multiplied within Guinea, new cases crossed the porous and arbitrarily defined colonial borders with Sierra Leone and Liberia. The West African Ebola Epidemic reached unprecedented magnitude because of the pervasive fears surrounding this untreatable, invisible killer. Local fears of political corruption forced inoculation of Ebola, and men in "moon suits" led many to flee, hide, and care for loved ones in secret, furthering the spread of Ebola (Huster 2016). Ill equipped to handle an Ebola outbreak, international NGOs and emergency relief organizations feared for the safety of their novice staff in handling a threat of this magnitude. This fear permeated response efforts and dictated the mechanisms and initiatives implemented by humanitarian organizations. Lastly, fear of the realities taking place in Guinea, Liberia, and Sierra Leone and an ignorance to the cries for help early in the epidemic led to a significantly delayed international response. When the call for aid was eventually heeded, many international governments provided support in the form of military troops

which only served to exacerbate local fears on the ground.

The West African Ebola epidemic which lasted from 2013-2016 was faced with a protracted response effort from international humanitarian and aid organizations. Often blaming the spread of disease on local cultures, NGOs failed to acknowledge and address the root causes of the outbreak. This negligence of local histories, neoliberal relationships, and native belief systems creates a narrow view of the Ebola epidemic that masks the underlying origins of outbreak. Often working alone, many organizations fulfilled their missions of emergency relief with a focus on stemming the spread of Ebola. This epidemiological focus led to excessive quarantines and isolation, mistrust from local communities, and in some instances, outbreaks of violence. However, with positive epidemiological statistics viewed as a success, many of these efforts were praised regardless of the quality of care provided to suffering and grieving patients. With the threat contained in 2016, many organizations pulled out of West Africa, their missions complete. However, their absence, especially in the wake of a devastating number of physician and health worker deaths, left the region less prepared and less stable than before the epidemic.

In contrast to those NGOs that had narrowly defined their mission and thus left early, Partner's in Health, a Boston-based non-profit organization, serves a mission of improving access to healthcare, bolstering health systems and providing a "preferential option for the poor" (PIH 2018). Far from serving as an emergency relief organization, Partners in Health has had experience in disaster relief through their work in Haiti after the 2010 earthquake that struck the capital city of Port-au-Prince. By agreeing to join the international fray working to halt the Ebola epidemic, Partners in Health made a long-term commitment to the region. Not only would they work to minimize transmission and treat those suffering from Ebola but they would also provide care for other health needs often overshadowed by the epidemic threat; they would partner with local organizations and governments to stimulate community trust, provide local employment, and strengthen the public sector; they would hire Ebola survivors to improve communication about the reality of the disease and encourage community members to seek treatment; and most importantly, after emergency relief organizations had packed up and left to tackle the new and emerging threat of Zika, they would stay to continue delivering quality health care to those who need it.

The Outbreak

While many point to the infection of patient zero (a young boy who most likely became infected by a fruit bat in Guinea in December 2013) as the beginning of the West African Ebola epidemic, the root causes of the outbreak had been insidiously simmering below the surface for centuries. Colonization, political turmoil, and the implementation of neoliberal policies led to the severe underdevelopment of West Africa's health systems and bred mistrust from local communities. British colonial rule in West Africa lasted for more than a century with many of the former colonies created as a means of repatriation for former slaves (Richardson et al. 2015). This colonial history created political unrest, economic dependency, and extractive post-colonial relationships in the region (Miller 2016). Independence led to power struggles over the valuable diamond and timber resources and contributed to the funding of the Revolutionary United Front (RUF), a rebel group

in Sierra Leone known for abducting and enlisting child soldiers (Richardson et al. 2015). The brutal civil war between the RUF and the Sierra Leonean government was further fueled by ongoing violence across the border in Liberia during this same period (Huff 2015).

To stimulate economic development, all three countries had received loans from the International Monetary Fund (IMF) and were under structural adjustment programs at the time of the Ebola outbreak (Kentikelenis et al. 2014). The implementation and expansion of neoliberal policies within Guinea, Sierra Leone and Liberia led to "land grabs" which sold off the most valuable tracts of land to foreign investors that implemented large-scale mining, timber, and agricultural industries (Huff 2015). With neoliberal development ideologies focusing on short-term economic objectives, little attention had been paid to the investment in health, education, or governmental stability (Kentikelenis et al. 2014). Prioritizing debt repayment and integration into foreign markets and free market capitalism, the IMF created a legacy of social and economic inequity that manifested as pockets of vulnerability off of which Ebola thrived (Huff 2015; Kentikelenis et al. 2014). These historical complexities and corrupt political and economic power structures created distrust of political authority which was only aggravated by the Ebola outbreak (Dhillon and Kelly 2015).

At the time of the Ebola epidemic, Sierra Leone, Liberia, and Guinea were among the worst prepared for an outbreak of any magnitude, let alone one this immense (Cancedda et al. 2016). The combination of "political instability, budget limitations and restrictions in fiscal space" created a neglected public health sector characterized by the degradation of health facilities, fractured supply chains, insufficient health staff and medical supplies, poor wages, and difficult working conditions (Cancedda et al. 2016; Hofman and Au 2017: 104; Kentikelenis et al. 2014). Ranking among the lowest in public health expenditures, these three countries in West Africa had very few physicians before the Ebola outbreak and the few healthcare resources that were available were often limited to major urban centers (Cancedda et al. 2016; Richardson et al. 2015). Physical infrastructure further limited the efficacy of

healthcare in West Africa with minimal road maintenance and inconsistent access to transportation (Gates 2015). The decentralization of the healthcare system under the structural adjustment policies of the IMF made it increasingly difficult to generate a coordinated, central response when the Ebola epidemic began (Kentikelenis et al. 2014). The fractured healthcare systems within Guinea, Sierra Leone, and Liberia were not only insufficient to deal with patient care but created the “fault lines along which the Ebola epidemic exploded” (Cancedda et al. 2016: S153). Deficient in protective supplies, and formal training regarding infection prevention, education, and control, hospitals became ground zero for death and widespread infection (Cancedda et al. 2016).

Ebola Virus Disease was discovered in 1976 in present day Democratic Republic of the Congo and has caused a number of outbreaks in African countries throughout the latter decades of the twentieth century (CDC 2017). Each previous Ebola outbreak was comparatively contained and short lived; so why was the outbreak that occurred in West Africa able to gain such traction and reach an unprecedented magnitude (Miller 2016)? Richardson and colleagues break down the West African Ebola epidemic into three causal phases that led to the sustained outbreak. The first of these is increased human interaction with zoonotic reservoirs, likely fruit bats. This interface has been linked to a number of emerging phenomena. Increasing wealth disparities push poor populations to forest fringes and less desirable land (Fallah et al. 2015); industrial agricultural production of palm oil replaces naturally occurring forests and puts humans and bats in more frequent contact; and lastly climate change may be changing the fruiting patterns of West African flora, concentrating zoonotic reservoir species near human populations (Richardson et al. 2015). While the zoonotic origins of Ebola are an important area of future research, of the 28,000+ confirmed cases of Ebola only one, patient zero, is believed to have contracted it from an animal reservoir. Therefore, it is the human to human interactions that fueled the outbreak and merit further inquiry. The second causal phase of the Ebola outbreak is linked to the dysfunctional health system previously discussed with these three West African countries. The understaffed and undersupplied facilities lacked the

necessary tools to treat, contain, and curb the further spread of Ebola. Lastly, Richardson and colleagues point to the poorly resourced governments of these countries as roadblocks to containment efforts (Richardson et al. 2015).

What this three-tiered cascade ignores in its model are the local perceptions of Ebola and the significant role these played in the spread of the disease. Many local communities subscribed to a “witch doctor state” explanation for the Ebola outbreak (Hofman and Au 2017: 68). Viewed as a “white” post-colonial conspiracy, this explanation stated that the Ebola outbreak was intentionally introduced by the government to control the population. This control was exercised through the use of Ebola to win elections and legitimize the use of armed forces, whether police or international military, to suppress the people (Hofman and Au 2017). The belief that people were being forcibly inoculated with the Ebola virus largely explains the widespread fear of Ebola treatment centers and healthcare personnel (Hofman and Au 2017; Huster 2016; Richards 2015). With the “witch doctor state” as a common belief, and minimal work on the part of humanitarian aid to assuage these fears, the presence of health workers donned in full protective gear led many to hide the ill and respond with violence to what was perceived to be abduction and murder (Dhillon and Kelly 2015). The prevention of funerary rituals, implemented to limit exposure to the dead teeming with Ebola virus, was perceived as psychological warfare (Dhillon and Kelly 2015; Richards 2015). Those who were forcibly taken to hospitals, believed they were being taken away to die (Huster 2016). Greeted at the hospital by the bright red fences surrounding the high-risk zones, they were reminded of the “red cloths rebels had attached to their weapons during live battle” (Richardson et al. 2015). In war, the face of the enemy was clear, but in this war, the war against Ebola, people were fighting an enemy that could not be seen, an enemy that targeted the heart and soul of the West African people.

Unlike other diseases, Ebola is spread through love. Heartbreakingly, the chain of infection follows the caregivers. It is through the love and care of an infected family member or the treatment by a health care worker that people get sick (Cancedda et al. 2016; Patterson 2015; Richards 2015). It is along these “webs of care” that Ebola travels (Patterson

2015). Those infected while caring for a family member will go on to infect those who care for them as they fall ill; they will go on to infect the doctors who put themselves at risk with limited protective supplies (Cancedda et al. 2015). It is the complex webs of care, social connectivity, and dependence on family and community that allowed the epidemic to blossom and grow, transforming their communal strength into an Achilles heel.

The Response

The international response to the West African Ebola epidemic was slow. With governmental authorities in Guinea and Sierra Leone downplaying the severity of the epidemic, the Ebola outbreak drew little attention on the global stage (MSF 2014). Despite calls for attention from the humanitarian aid and emergency relief organization Médecins Sans Frontières (MSF) already working in the region, the international aid community failed to respond (Huster 2016). This failure to act early in the epidemic has been blamed on the ignorance of the World Health Organization (WHO) and the internal organizational changes that left this branch of the United Nations blind to the growing threat in Western Africa. Originally accusing MSF of causing unnecessary panic, the WHO believed the threat to be localized and under control (MSF 2014). It wasn't until Ebola "became an international security threat, and no longer a humanitarian crisis affecting a handful of poor countries in West Africa, [that] finally the world began to wake up" (MSF 2014:11). The atmosphere of fear surrounding Ebola, often called the zombie virus, led to a "cowardly" response from international humanitarian aid and emergency relief organizations that perceiving the risk of working with Ebola to be too high (Huster 2016; MSF 2014). The fear of the unknown and the chronic lack of experience in working with Ebola paralyzed many aid agencies and potential donors. With such little preparation for an epidemic of this magnitude, "the world lost time in trying to answer basic questions about combating Ebola" (Gates 2015). The bureaucratization of the aid process and the misinformation and miscommunications coming from the WHO led to confusion and further hindered the emergency response efforts (Cancedda et al. 2016; Hofman and Au 2017; MSF 2014). By the time international intervention hit full stride in

West Africa, months after the outbreak began, the number of Ebola cases in Liberia had already begun to decline without the world's support (Onishi 2015).

The vast majority of the international response to the Ebola epidemic in West Africa was from emergency relief organizations whose primary goals were to halt the transmission of the Ebola virus (Cancedda et al. 2016). This focus on prevention relative to care aligned with the short term goals of attempting to manage and inhibit the further spread of disease (Cancedda et al. 2016). Specializing in acute response, MSF and other emergency relief organizations prioritized isolation, disease surveillance, contact-tracing, awareness raising, treatment and care, and safe burials to curb the Ebola outbreak (Fink 2015; MSF 2014). The epidemiological approach towards treating Ebola and preventing further outbreak focuses on the biological and social factors leading to the spread of disease; therefore, primary interventions focused on educating local communities, changing dangerous traditional burial practices, and implementing quarantines, isolations, and observations to eliminate or limit social contact (Miller 2016; Richardson et al. 2015)

Perceived to be the greatest threat from an epidemiological standpoint, cities were the target of international aid because high concentrations of people led to potentially catastrophic transmission rates (Freyer 2014). The focus of aid organizations in cities created rural pockets that received limited health care support and intervention. Distance from rural communities created frustrations for authorities who struggled to impose quarantines, isolations, and safe burial practices (Richards et al. 2015). This geographical separation and correspondingly limited involvement created new incubation periods for localized outbreaks which were able to spread unchecked (Richards et al. 2015).

Often functioning in silos, many international aid organizations prefer to work alone with access to their own supply warehouses and donor funds (Fink 2015). This independence allows for full control over their operations and increased efficiency in implementing initiatives and interventions. "Stubbornly prefer[ing] to do everything [themselves]," MSF works alone and rarely works collaboratively with other

organizations (Hofman and Au 2017: 52). However, at the start of the epidemic, MSF did work closely with Samaritan's Purse as the only two international humanitarian organizations tackling Ebola in the region at the time (Hofman and Au 2017; Rasco 2017). The desires to work alone had a number of implications for community engagement. Included in most international humanitarian mission rhetoric is the idea of "community engagement." In regards to the response in West Africa, the idea of community was created on a localized level and became a catch-all term to acknowledge non-aid populations, beliefs, and cultural practices ignoring the nuances in variations between different communities (Hofman and Au 2017). Engagement in this context was often conflated as 'educating' the local people about proper practices that would minimize health risks but disregarded local burial customs and beliefs about health, disease, and death (Hofman and Au 2017).

The United States Government provided support in the form of military troops stationed, ironically, at West Point, the largest slum just outside the Liberian capital city of Monrovia (Onishi 2015). Spending hundreds of millions of dollars to construct 11 Ebola Treatment Units (ETU), the United States' response was far from effective or cost efficient. At the time of their commitment to provide aid, ETUs were desperately needed as Guinea, Liberia, and Sierra Leone desperately lacked the space and structural capacity to handle the massive infection rates. However, the extended time spent constructing ETUs (instead of repurposing existing space) meant that needs had changed upon their completion. By April 2015, months after the completion of these ETUs, only 28 patients had been treated at the military facility (Onishi 2015). In addition, the deployment of U.S. soldiers to enforce quarantine and isolation led to fear and rioting from the West Point slum resulting in the death of a 15 year old boy (Onishi 2015).

Fear played an immense role in the international response efforts to the West African Ebola epidemic. Despite facing similar transmission risks with HIV, cholera, and tuberculosis, fear of Ebola significantly impacted the quality of clinical services provided to patients (Huster 2016; Lamontagne et al. 2014). While a lack of supplies,

staff, and space certainly contributed to high fatality rates and poor health outcomes for those who fell ill, Karin Huster posits "what if it was most of all the mediocrity of care out of fear" that created such devastating outcomes (Huster 2016). Fear compromised the ethical duties of humanitarian aid organizations causing them to pull out of West Africa because of what they perceived to be unacceptably high levels of risk (Huster 2016).

The Failures

While the international response significantly helped to end the Ebola epidemic and is thus widely considered a success, there were a number of failures within the response efforts that can be used as lessons in addressing future outbreaks. Emergency relief organizations function on a short-term residence within countries of need. While essential for treating patients and minimizing infection during the Ebola epidemic, these short-term projects ignore the root causes of outbreak leaving West Africa in an equally vulnerable position to future outbreaks (Patterson 2015; Parshley 2016). After the epidemic, 30-40 percent of the Liberian population still lacked access to healthcare, percentages that are comparable to access rates before the epidemic occurred (Parshley 2016). The many efforts by organizations to treat Ebola "did great work, but the whole point is the building of the infrastructure" to improve future health outcomes and prevent future epidemics (Patterson 2015). According to Cancedda and colleagues, it is not enough to simply respond to epidemics, but it is the responsibility of the international community to increase local resiliencies and create health care systems that are able to quickly and effectively identify, contain and treat future outbreaks of Ebola or other infectious pathologies (Cancedda et al. 2016).

Another aspect of the international response that could be improved lies in the distribution and designation of donor funds for these international efforts. The exceptionalism that surrounds infectious disease epidemics serves as a stimulant for donor contributions. The unfortunate downside of this exceptionalism is that these financial donations are funneled towards the immediate mitigation of exceptional conditions

reorienting the “donor gaze from strengthening health systems in general to mopping up preventable pandemics” (Richardson et al. 2015: 7). With millions of dollars exclusively designated for emergency purposes such as the construction of ETUs, a small portion of donations were put towards supporting the health care systems responsible for maintaining long term positive health outcomes (McKay 2015). Aid budgets provided by international governments were often allocated to international NGOs with limited experience in the region bypassing the national and local governments and health authorities (Cancedda et al. 2016). The money donated to emergency relief organizations, as previously mentioned, were often spent on immediate needs that had little long-term benefit or lasting effect within Guinea, Liberia and Sierra Leone. In addition, as aid organizations moved on to the next emergency, such as Zika, they brought with them the extra funds not spent as part of their relief efforts in West Africa (Parshley 2016). Had funding mechanisms and donor spending designations been more flexible, financial support could have been used to bolster health systems, improve transportation infrastructure, and foster community resilience instead of “focusing on treatment centers that would be scarcely used” (Cancedda et al. 2016; Fallah et al. 2015; Onishi 2015:np). While strict donor intentions limited the use of financial resources, there were also questions regarding the distribution of funds within organizations. Brand new cars purchased by UN agencies and parked at health centers provide a stark contrast with the underpaid or unpaid health workers within these facilities working towards the same goals (Hofman and Au 2017).

Among international aid organizations, a lack of focus on local culture or effective community engagement led to a gap between local realities and implemented programs, furthering mistrust between these entities (Dhillon and Kelly 2015; Huster 2016). By ignoring local concerns and beliefs regarding Ebola, aid organizations delivered uninformed initiatives prolonging the epidemic, and in some cases further worsening health situations. Instead of forced hospitalization, quarantine, and ‘safe burial,’ attention should have been focused on local perceptions of the ‘witch doctor state’ and working to build trust within

local communities (Hofman and Au 2017; Huster 2016). In building these lines of trust, organizations are able to make hospitalization and treatment an attractive option while also educating families on how to protect themselves when caring for sick loved ones (Richards et al. 2015). In addition, fears and the belief that an Ebola diagnosis is a guaranteed death sentence could be mediated by making survivors more visible and using their experience as evidence that survival is possible (Richards et al. 2015).

Significant discrepancies between popular and biomedical perceptions of the Ebola outbreak have helped to mask the political and economic factors that led to the epidemic and subsequent poor health outcomes (Hofman and Au 2017; Richardson et al. 2015). Aid organizations, with their focus on epidemiology, ignore the true pathologies of underdevelopment and “trans-hemispheric relations of inequality” that caused the devastation of the Ebola outbreak (Richardson et al. 2015: 8). The fetishization of epidemiological statistics such as number of ETUs constructed, patients treated, and samples processed obscures the root cause of poverty. The focus on Ebola as a biological entity minimizes and hides its existence as a complex social phenomenon (Richardson et al. 2015).

During the epidemic, humanitarian aid organization’s exclusive focus on Ebola created or ignored additional crises in West Africa. With health centers overrun with Ebola patients and many closing due to issues of safety and staffing, there were very few resources available to treat the ongoing issues of malaria, women’s health, and malnutrition (Freyer 2014; Hofman and Au 2017; Huster 2016). The specific focus on ETUs as part of the emergency response created specialized clinics that neglected patients seeking care for the aforementioned malaria, tuberculosis, heart disease, HIV, and pregnancy complications (McKay 2015). Of particular importance are women with pregnancy complications that often present with fever and bleeding, commonly assumed to be the result of Ebola infection. These women were isolated and left to their own devices for fear of Ebola transmission (Hofman and Au 2017; Huster 2016; McKay 2015). During the outbreak, many HIV positive patients were unable to obtain their medications due to clinic closures and failures of

the medical supply chain. Without consistent medication, patients became resistant to drug therapies and their viral load increased to transmissible levels (Hofman and Au 2017). Another area of concern is the decrease in vaccination rates during the Ebola epidemic. Many people avoided vaccination campaigns due to ongoing fears of mass health initiatives leading to spikes in measles incidence (Hofman and Au 2017).

The international focus on quarantines presented a number of immediate and long-term dangers to the health and wellbeing of communities. Many quarantined families did not receive adequate food or water and therefore broke quarantine protocols making them susceptible to fines invoked by state and NGO authorities (Huster 2016). Quarantines also limited communal growing which created food shortages in the region leading to widespread hunger, malnutrition and economic instability (Parshley 2016; Stone 2014). Lastly, the widespread quarantines shut down schools all over Guinea, Liberia, and Sierra Leone leaving children without childcare and exposing them to risks of violence, rape, and exposure to Ebola (Hofman and Au 2017; Miller 2016). In Sierra Leone, all schools were closed between June 2014 and April 2015 which has been linked to a notable rise in teen pregnancies for which these young women were not receiving adequate prenatal care (Miller 2016; Richardson et al. 2015). The death toll of confirmed Ebola patients reached upwards of 11,000 with many more undiagnosed cases suspected. However, it is likely that more people died from Ebola, without ever having contracted the disease. These neglected deaths are the result of limited access to healthcare, poor maternal and child health during the outbreak, malaria, a lack of surgical capabilities, poverty, violence, and starvation.

The Solution

Partners in Health (PIH), a Boston-based non-profit organization working globally to provide healthcare access to the destitute poor, heeded the call from the Sierra Leonean and Liberian governments to join the international response to the Ebola epidemic in late 2014. While not a humanitarian aid or emergency relief organization, PIH felt a moral obligation to respond to the ongoing crises in West Africa. Drawing on their experiences working in Rwanda, Malawi, and

Lesotho in Sub-Saharan Africa and Haiti after the 2010 earthquake, PIH created an integrated and comprehensive plan for their response in West Africa (Cancedda et al. 2016; McKay 2015; Patterson 2015). Unlike many of the emergency relief organizations, PIH made a commitment to stay in Liberia and Sierra Leone to bolster health systems, strengthen the public sector, and provide quality care to those who continue suffering from ill health long after the threat of Ebola had waned (Fink 2015; Patterson 2015).

While other organizations responding to the Ebola crisis preferred to work alone, Partners in Health focuses on collaboration and partnership to achieve their goals (McKay 2015). Partnering with the Wellbody Alliance in Sierra Leone, and with The Last Mile in Liberia, PIH built relationships with these established organizations (Patterson 2015). Working with local NGOs helped to build trust in the region, employ local community health workers, and provided an intimate insight into local perceptions of the Ebola outbreak. The creation of these partnerships serves the long-term goal of providing education, skills training, and surveillance and monitoring capabilities to improve long term health outcomes for people in the region. Through the operation of clinics and creation of mobile clinics in conjunction with these NGOs, PIH is able to employ community health workers who conduct home visits, connect with and reach out to local communities, and build trust in the health system where previously there was none (PIH 2016). Of particular importance was the employment of Ebola survivors as community health workers to provide evidence that treatment and care is possible. Having experienced the devastating loss many communities face, survivors are uniquely positioned to relate to and build trust within communities, provide psychosocial support and counselling, and educate communities about Ebola (Cancedda et al. 2016; Patterson 2015; PIH 2016). Without fostering these important relationships with local communities, many organizations were faced with violence and fear inhibiting their containment efforts and fueling further mistrust in the healthcare system (PIH 2016).

In addition to partnering with local NGOs, PIH also works with local health ministries and governmental health authorities in an attempt to

strengthen healthcare infrastructure for the future (Cancedda et al. 2016; Patterson 2015). Working with national governments, PIH hopes to support the public sector, either geographically or programmatically, where the need is greatest (Cancedda et al. 2016; Fink 2015). Combatting Ebola alongside the Ministry of Health and Sanitation and the National Ebola Response center in Sierra Leone, PIH acted as a flexible partner “tailoring its activities to address evolving local needs” (Cancedda et al. 2016). These needs, while not always aligned with the treatment and community health specialization of the organization, filled the gaps not addressed by the rigid response approaches of other organizations. Most needed in minimizing the epidemic were the four S’s: staff- well trained doctors, nurses, and community health workers, stuff- medical equipment, space- clean and sanitary places to treat patients, and systems- infrastructural and logistical (Ajam 2016). These issues were targeted with a three-pronged approach to improving and building capacity among the public sector. PIH supported public sector health facilities through the provision of medical supplies and physicians to combat the Ebola crisis. This accompanying approach to providing healthcare allowed for the improvement and development of new policies and procedures to improve care delivery while also leveraging existing resources to serve the needs of the people (Cancedda et al. 2016). This often included refurbishing existing space to function as health facilities or Ebola Treatment Units, or repairing the fractures in the medical supply chain systems to ensure a continuous and efficient flow of ‘stuff’ into West Africa (Fink 2015).

While most international humanitarian aid and emergency relief organizations were located in cities in the affected countries, Partners in Health set up ETUs in the rural countryside where the majority of the population lives. For these communities, prior to the arrival of PIH, the journey to any health facility was an 8 hour walk or more and upon arrival many found health centers to be closed or abandoned (Freyer 2014). Many aid organizations focused on the roles of containment and prevention of further outbreak in targeting the Ebola epidemic; this approach however often deemphasized the role of treatment for those who were sick. According to PIH, it is not enough to

find and contain the virus, but it is equally important to provide care to the humans who house the deadly disease (Cancedda et al. 2016; Miller 2016). The significant loss of bodily fluids when infected with Ebola, primarily through vomiting and diarrhea (contrary to popular beliefs of excessive bleeding although this does occur in approximately 20% of patients), is what kills most patients (Farmer 2015). While many emergency response organizations administered oral rehydration in lieu of intravenous fluid rehydration because of fears of contamination, Partners in Health believes that the widespread use of IV fluids, done for HIV/AIDS patients regularly, would have significantly reduced the case fatality of the Ebola epidemic (Cancedda et al. 2016). Increased access to intravenous fluids, treatments, and quality care could have saved hundreds of lives. Paul Farmer, co-founder of Partners in Health believes that all response efforts could have done better, including Partners in Health, to improve the health and survival of the West African people (Farmer 2015). While part of PIH’s response included the treatment of Ebola, they were also focused on health more broadly. They addressed the neglected illnesses, injuries, and ailments that occurred alongside Ebola recognizing that the care of these were equally important as the treatment for patients suffering from Ebola (Patterson 2015; PIH 2016).

Another success of Partners in Health is their integration of research programs into their clinical delivery platform which bridges the gap between research and practice. Given the importance of data collection during an epidemic of this magnitude, PIH monitored and evaluated the efficacy of its programs from the outset of their engagements in Liberia and Sierra Leone (Cancedda et al. 2016). Collecting ethnographic information from Ebola survivors, PIH listened to the stories of those most affected and worked to understand the complex social dynamics at play that contributed to the spread of Ebola (Miller 2016). Using analytical tools from anthropology to gain information regarding the ‘big picture’ to tools from epidemiology which focus on the molecular specifics, PIH worked to create a comprehensive understanding of the epidemic which could then be used to help end it (Miller 2016). This integration of research and public practice does not end in West

Africa however. Across the United States, local chapters of PIH Engage work to “build the right to health movement” (PIH Engage 2014). PIH Engage works to educate and inform the public regarding ongoing PIH programs and the existence of international and national health abuses. By organizing strong collaborative teams, educating the public, generating resources, advocating for health rights policies, and coming together to demand improved healthcare for people everywhere, PIH Engage engages local communities towards the larger mission of Partners in Health whose goal is to provide quality healthcare to all (PIH Engage 2014).

Conclusion

Despite the success of ending the West African Ebola epidemic, with hindsight we can see the many missteps in the international response to the outbreak. These failures, when acknowledged, provide lessons for future interventions in similar outbreak situations. Highlighting the need for increased community engagement and understanding has been the largest take-away from the Ebola epidemic. Organizations focusing on infection prevention, quarantines, ‘abduction’ of bodies, and isolation further ostracized communities and increased mistrust and fear of health authorities. Quality care and engagement of communities during times of crisis, as demonstrated by Partners in Health, is a more efficient and productive way of achieving the same goal of prevention. Instead of implementing quarantines, local community health workers made targeted efforts to understand the fears and concerns of the people, build trust, and instill faith in the healthcare systems. Another area for improvement in future outbreaks is the concurrent treatment of other health conditions. While the primary concern was focused on Ebola, many responders were ill prepared to diagnose, treat, and care for patients suffering from other illnesses such as HIV, malaria, and complications from pregnancy. A focus on this integrated care can be achieved through donor and organizational flexibility that adapt to meet the emerging needs in an emergency situation.

Due to the nature of these organizations, many aid and emergency relief responses are based on short-term goals that deal with an immediate

crisis. These short-term goals however can still be used to enact long term support. Funneling resources through governmental channels, repurposing existing infrastructure, using national supply chains, and hiring local community members on the ground all target the root issues of outbreak based in structural instability and poverty. Addressed in the primary goals of Partners in Health, the key to preventing future outbreaks lies in the support of the public sphere and healthcare systems that are the first line of defense when the next epidemic strikes. In an outbreak fueled and perpetuated by fear, Partners in Health worked to provide comfort and build trust. They continue to accompany the poor and suffering in West Africa providing long term support in strengthening the healthcare infrastructure, bolstering community engagement and resilience, and most importantly, providing healthcare to those who need it most.

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The Role of Public Libraries in Community Health

Sheri McCaskill

Public libraries can play a big role in the health of community members. The goal of this project was to find out how library staff views the role of public libraries in the health of its community members, and if it has changed significantly in recent years. Additionally, it asks what type of resources and services are currently available within public libraries. Ethnographic observation was utilized at local libraries, and public library employees from throughout the United States were surveyed. In-depth interviews were conducted with select survey respondents to gather further qualitative information relevant to the project's focus.

Mental health, homelessness and addiction are prominent concerns related to the social conditions in a community, and they are issues that public library employees deal with on a regular basis. These are pressing issues for those in the industry as well as those who regularly visit the public library. It is a topic that needs to be at the forefront of our conversations about mental health, community health and public library policy. This study aims to shed some much needed light on this important topic.

Libraries have recently been reaching more diverse populations and providing services that had previously been unavailable to many. That has been the goal of the American Library Association (ALA) since the 1970s, specifically, "...to use the power of libraries to solve critical social problems" (Raber 2007, 683). In order to attain these goals, the services that are most needed to reach underserved populations within a community should be clearly defined. The following report will discuss the many variations on potential services and solutions for adding them to a library's offerings. It will also explore the many opinions and thoughts library staff have about community health in their own libraries.

Methodology

A survey was sent via Google Forms to public library employees recruited first from the

authors' personal network, then with snowball recruitment, totaling to 17 respondents from libraries throughout the United States.

Respondents were all currently employed in public libraries in various roles. From the respondents, 41% identified as library technicians, assistants or associates while 35% identified as librarians. The remaining respondents said they occupied various other roles in the library. Work experience within the library was also varied, with most respondents having been employed at a public library either 2-5 years or more than 10 years. Most respondents identified their library as being in suburban locations in various regions throughout the country. Answers were collected over two weeks at the end of November 2019 (See Appendix A for visualizations of the data collected).

Interviews with library employees took place in December 2019. Three public library employees who had responded to the initial survey were interviewed more in depth about their thoughts, opinions and experiences of community health in their libraries. After careful ethnographic observation, several public library patrons were approached and briefly spoken to about their library usage habits or library activities. All names will remain anonymous for this study.

The State of Community Health in Libraries

A definition of what is meant by community health is necessary in order to understand what libraries can contribute to it. For the purposes of this study, community health concerns the wellbeing and equal access to services that contribute to the social, emotional and physical health of community members. For example, physical health programs could include offering flu shots, exercise classes or cooking classes. Emotional health programs might include suicide risk awareness for teens or meditation classes. Social health programs might range from social meet-up groups to job skills training. Each of these examples are programs that have been observed in public libraries as a part of this study.

There are already many programs and collaborations being offered in public libraries that influence the health of community members. In the course of this study various programs were observed. For example, mental health outreach workers setting up in meeting rooms in a midsized urban library, health education classes on healthy eating and cooking taking place in a small rural library, regular meetings for seniors to make lasting friendships with others, and even a language exchange for native Spanish and English speakers to practice their language skills. These programs, among others, contribute to overall community health in different ways.

Public Perception of the Library's Role in the Health of the Community

When broaching the topic of health in the library people are often taken aback. What could the library have to offer for public health? Many people do not immediately think of the library as a community health resource, even those who use the library regularly. In 1990, the American Library Association again realized the need for libraries to focus more on the needs of homeless and low-income patrons, resulting in the adoption of Policy 61 which advocates for adding services for these populations (Giesler 2019). The public may be unaware of the need and desire of libraries to offer health related services, but awareness among librarians, of the need to do something, seems to be an ongoing trend. What actions are being taken to fill these needs?

According to Bradley Wade Bishop in a 2013 study on the library's role in natural disasters, multiple disaster related studies have been done showing the value of library services in public well-being. Public libraries serve people of all walks of life in many different difficult situations. To quote one library employee surveyed, "libraries serve high-risk populations, including very young children, seniors, teens and people who are homeless, have disabilities, or have an addiction. It's a safe non-judgmental place to seek help and information."

"I can think of a few ways the library can help, but I am interested in hearing more about what you mean," said a library patron interviewed. After talking with him further, he went on to say, "yes, I had thought about books and offering access to healthcare resources online, but I really didn't

think beyond that. Now that you explain it, I understand how libraries could play a big role in health with other programs." This shows that there could be great potential in promoting current health themed offerings to public library users. Many are not aware of the available offerings, so do not think to turn to the public library for community health information or services. Public education is key to success in these types of programs. When library employees were asked if they knew of people using the library specifically as a health resource, the results were mostly negative or unsure (see Appendix A). This indicates a great potential for expanding programming and public perception of library offerings, both for staff and patrons.

Educating the public in the many ways in which the library positively impacts their lives and overall well-being ensures the future of public libraries. If the public understands how the library can benefit their lives, they will continue to support their library and vote for funding measures for libraries. One librarian surveyed said that the role of libraries in public health is "very important. Libraries play a key role as a social determinant of public health." It appears that librarians know the value of their contribution to community health but know that there is room for improvement. Another said "the public library is an essential component in creating a robust, resilient community. We provide information, connection, opportunities for sharing and relationship building, access to essential resources, and we provide social acceptance and respect to everyone in our community."

The Importance of Focusing on Community Health in Public Libraries

Libraries aim to be a welcoming place for all. In order to meet the needs of all community members, a variety of services must be offered. On a daily basis, a librarian might encounter a homeless patron, a young adult wanting to "come out" (reveal a non-hetero sexual orientation) to their friends, a young mother with a new baby, an elderly patron, an addict, or a mentally disabled patron. These same patrons might be visiting the library for temporary shelter and warmth, advice on resources for contacting LGBTQ+ communities, information on early childhood development, companionship, addiction treatment resources, or simply just a

friendly face. This only scratches the surface of the diversity of library patrons and their many unique needs. The public library can provide these things for all of these people and so much more. In an interview one librarian said, “we are concerned, especially with winter, about the safety and overall health of patrons who we know lack a permanent residence, lack a job, lack adequate nutrition and lack access to medical care, especially preventative.” This quote clearly demonstrates many of the needed services that could be offered. Most libraries already offer some services concerning these needs, but not all. There is much more that could be done in many libraries.

As a solution to providing more of the needed services, some experts suggest adding social workers to the library (Schencker 2018). “I sometimes worry about the lines blurring too much between librarians and social workers,” said a survey respondent. The role of librarians has changed, and as the expected services may not be offered, patrons are turning to librarians for the service that might be best offered by social workers. Most believe that social services should be available in libraries in some way, but the two roles are distinctly different. Librarians are trained information specialists and are not trained to do the work social workers do. Having social workers in libraries can help to bridge the gap in access to resources. In discussing community health initiatives in public libraries, one survey participant said, “the current political climate has pushed this topic to the forefront of discussion about the role of a library within the community.” Librarians know of the need to expand health services, but believe that others do as well, and that it is a conversation we need to be having. “Overall, I think libraries should take the growing step at either providing a social worker to their patrons or be working very closely with local agencies for situations where patrons come to us in dire need, instead of having them take one more additional step to get assistance,” said one suburban librarian.

Steps Being Taken to Improve Community Health Services

Policy varies greatly in libraries throughout the United States. Many libraries are experimenting with adding more health-based programming, and some have been doing them for

some time now. Discussing the changing role of public libraries, one library employee told me:

When I first started my library assistant position, in 2009, there wasn't a large push [for health services]. Libraries, that I knew of, would provide reference materials but that was about it. Now public libraries are advocating, reaching out to health organizations, hosting seminars, etc. My current library has partnered with the local hospital network to provide free flu shots. We also partner with food banks and will soon be offering classes on super-simple healthy cooking you can make with that food; we'll be providing recipe cards with pictures so literacy and language issues can be minimized.

These changes are exciting. Libraries are discovering how important a role they can play in the health of their own communities, and we must encourage this shift in services. For example, more and more urban libraries, like the Denver Public Library, are training their staff on how to deal with opioid overdose and equipping them with emergency overdose treatments like Narcan. Every library is unique depending on its local situation, and the needs of each community can be vastly different. Therefore, there is no “one size fits all” way of creating policy for public libraries.

Though funding for these types of services can be a challenge, there are ways to incorporate changes that can fit into any library budget. There are some state level funding cuts, but despite popular belief, public library funding is strong. In 2018 the funding for the Institute of Museum and Library Services (IMLS) was renewed and even increased by \$11 million dollars (The State of American Libraries 2019). Local funding is up as well. One study reported by The Library Journal found that 77% of libraries who responded to a 2018 survey reported an increase in operating budgets from 2016 to 2019.

A variety of alternative funding options are available to public libraries as well, including partnerships with outside organizations and a wide variety of grants. In order to virtually eliminate the cost of having health outreach programs in libraries, an option exists to collaborate with many of the

non-profit organizations that are already active and can present avenues to engage with the public. However, planning is critical aspect of this work. Knowing which resources are available in different situations can help libraries determine the need for in house social workers or collaboration. A participant in the survey stated that, “public libraries should be stepping up to partner with other organizations to disseminate information, connect the public with resources, and have updated materials on hand.”

Suggestions for Implementing Health Services

Adding social workers to the library staff, as mentioned, could be a solution to adding better services that reach more people. Though this would affect library budgets, it could be the best option for many communities. In 2018, 85% of public libraries reported an increase in personnel budgets (Peet 2018), which indicates that adding staff is viable as an option. From the survey participants, 82% said that they agreed public libraries should have trained social workers on staff, while 76.5% said that they felt like they had the proper training to handle patrons in crisis situations. A social worker is not a librarian, just as a librarian is not a social worker. There could be a need for both in many libraries. The 2019 ALA report *The State of American Libraries* find that “Americans go to public libraries (1.35 billion visits) more often than they go to the movies (1.24 billion admissions).” Later in the same report, it is stated that homelessness and addiction are among the most prominent problems facing libraries today and that,

“homeless people rely on the public library for books, computer and internet access, and warmth. Staff at public libraries interact with almost as many homeless individuals as those at shelters do.”

Conclusion

The number of people using the library is steadily increasing and library jobs are mostly secure. However, the number of library users who need more help than what staff can provide is also increasing. Importantly, a social worker could be the person who coordinates between the library staff and the community members to help plan programming that best meets the needs of the community.

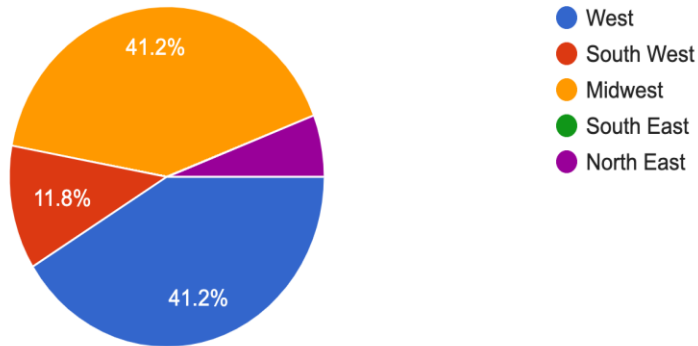
To restate, libraries play an extremely important role in the health of a community. Many people rely on the library to live productive and enjoyable lives. Libraries offer materials and services that make a real and critical impact on the community. It is vital that we begin to shift perceptions of what a library is and what it can provide to include more health-related services. Library staff perceive their own libraries as an important resource for the community and should be either educated and trained to deal with health crises and provide health resources or should employ trained healthcare professionals in their libraries. In the words of librarian, author and professor of information studies, R. David Lankes, “Bad libraries build collections, good libraries build services, great libraries build communities.” Let’s build our communities.

Appendix A

Questionnaire Responses

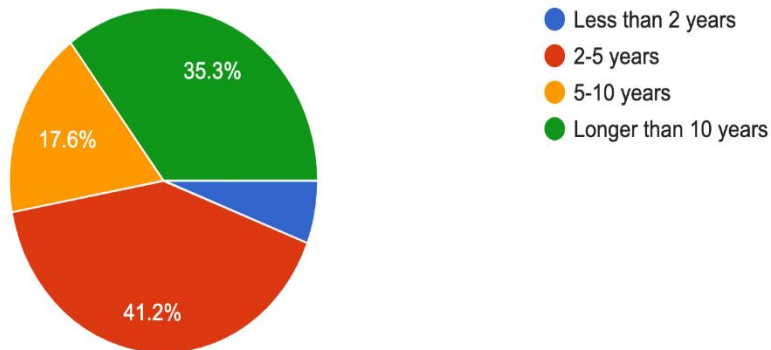
What region of the United States are you located in?

17 responses



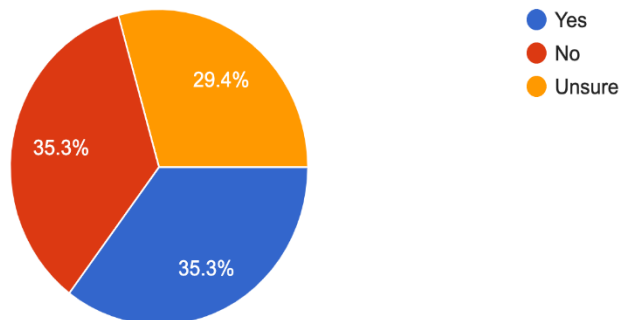
How long have you worked in public libraries?

17 responses



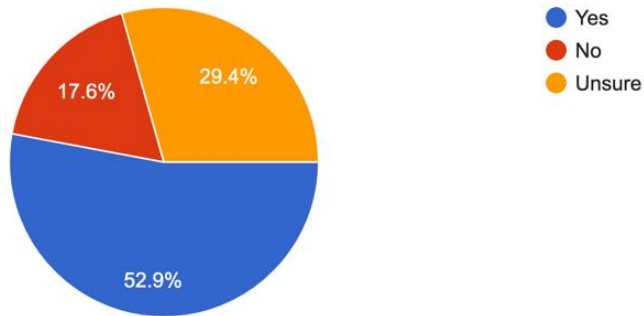
Are you aware of patrons who use the library specifically as a health resource?

17 responses



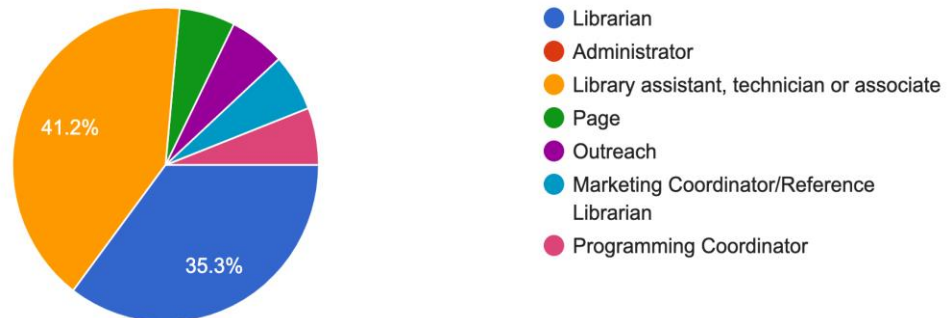
Does your library have a comprehensive plan for dealing with patrons in crises?

17 responses



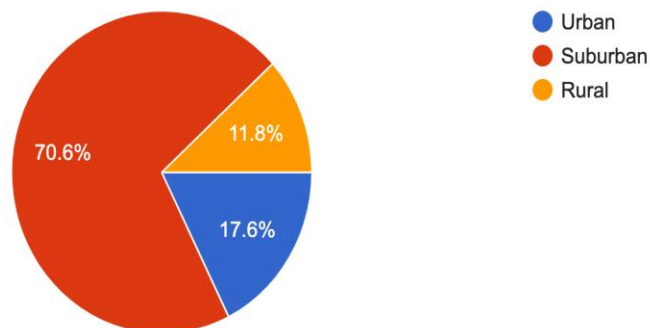
What is your role in the public library?

17 responses

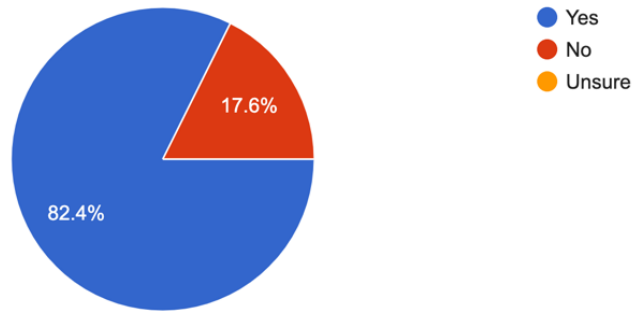


Would you consider your library...

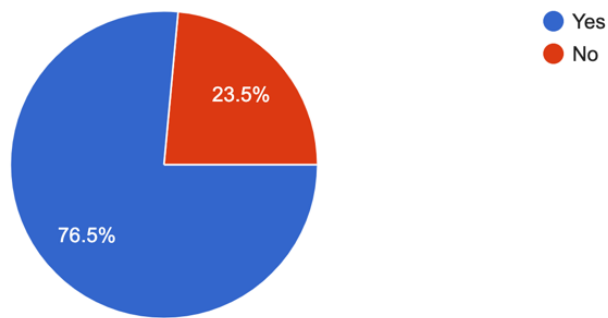
17 responses



Do you think libraries should employ social workers in addition to professional library staff?
17 responses



Do you feel you have the training necessary to deal with crises situations?
17 responses



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An Epidemic Crisis: The Disastrous HIV Infections Among Rural Blood Donors in China

Yan Xue

The 1980s economic reform led to an ever-increasing income gap between Chinese urban and rural residents, and farmers in agricultural provinces like Henan, Hubei, Anhui, and Shaanxi gradually fell into a financial crisis (Shao 2006). In the 1990s, the outbreak of HIV infections started among the rural poor who sold their blood in an unregulated plasma collection industry in which small commercial collection stations acted as a bridge between rural blood donors and urban medical institutions (Beyrer & Joanne 2003). Personnel working in these stations did not perform according to the standard plasma collecting procedures. Instead, they reused collection equipment without sanitization, pooling blood and then reinfusing red blood cells of the compatible blood types into donors so that donors would not become anemic and could donate more frequently (Qian et al. 2005). This practice was how bloodborne diseases such as HIV/AIDS started transmitting among rural areas in China. Due to a lack of correct education, none of rural blood donors were aware of the potentially catastrophic consequences in which such plasma collecting practices could result. According to the local and central governments' public communications, HIV/AIDS was a capitalist/Western disease caused by immoral behaviors like drug abuse or homosexual conduct (Shao 2006).

Although HIV infections through paid blood donations had come to light by 1995, information was suppressed, and no systematic census was done until 2004 (Parry 2012). In 2005, following a vast official tracing exercise among Henan's 100 million inhabitants, the Chinese Ministry of Health registered 29,337 cases of HIV, 90 percent of whom were former blood donors and 98 percent were peasants (Rollet 2009). In order to control this unprecedented epidemic crisis, a series of legislative and administrative actions were taken. In 2005, 147 illegal blood collection centers were closed, and 86 blood collection agencies were

punished (Erwin 2006). Personnel who in charge of and worked at the illegal commercial plasma collection stations were arrested, and the contaminated blood stocks were destroyed. A 2.25 billion yuan budget was assigned by central government to local governments to rebuild standardized plasma collection stations, and since the pass of "Blood Station Management Law" in 2006, the power to supervise and control local plasma collections was gradually delegated from central government to state governments (Rollet 2009). In this process, the powerful government institutions in China were able to create what Foucault calls as "discourse", or a system of knowledge, attitudes, and beliefs (Lock & Vinh-Kim 2018), about who should be blamed and what were the roots of this crisis. It was not local or central government's fault. The responsibilities were on individuals and illegal commercial plasma collection institutions whose behaviors were predicted by their immorality and interests-maximum thinking. And the crux was not about market mechanisms, nor about the problematic rural economic and health infrastructures, but the outdated biotechnologies. By making such discourses permeated into the whole society, the government institutions reoriented public attention away from themselves to other scapegoats, away from embodied experiences of rural donors to numbers and statistics, away from humanistic aids to administrative measures. There were no apologies from government institutions, no reforms of rural economic and health structures, and no effective compensatory system for rural residents.

In this paper, I apply medical anthropology theory to try to reexamine this crisis from four aspects. In the first part, I use the critical biocultural anthropology approach to examine how the political economy changes in China played a determinant role in shaping rural residents' experiences of health, disease, and illness. The critical biocultural anthropology approach is about

studying human biology within social and cultural contexts and examining structures of inequality that constrain human agency and rights to stay healthy (Thomas & Morgan 2017). In the second part, drawing on Paul Farmer's work, I argue this crisis was not simply caused by medical negligence or interest-centered individualism but also by forms of structural violence. In the third part, I address the Blood Donation Law of 1998 that was issued for restituting social panic and health damages. Drawing on Foucault's definitions of governmentality, I try to reveal the ideological underpinnings that were transmitted and the sociocultural influences that were generated. In the fourth part, I discuss Richard Titmuss's *The Gift Relationship* and propose reconsiderations for situations under which monetary rewards will lead to "crowding out" effects, as well as further discussions on whether or not there should be monetary rewards for blood donations.

Part One

The transition from a planned economy to a market economy fundamentally shook up Chinese rural economic and health structures, and it was during this period blood donation began to be commodified. Bellow, I will first address how economic and health policies were reformed, then I will elaborate on how they linked to rural residents' risky behavioral patterns as well as their experiences of disease and illness.

In the late 1970s, the previous collective system of production that dominated the agriculture sector was replaced by a household responsibility system. This new system was meant to improve rural productivities by assigning every family a quota of goods to produce, and families were compensated accordingly (Shao 2006). At the initial stage this policy indeed achieved some successes, but that was partly because of governmental compensations. In 1985, Chinese central government decided to further liberalize and decentralize the agricultural sector by allowing the market to regulate the prices, withdrawing significant subsidies from agriculture and reinvesting them into industrial developments (Shao 2006). China never acknowledged this move as a surrender to capitalism but claimed it to be a socialist market economy reform- a reform that adopted postmodern neoliberal ideals including

enlarging the rule of the free market, cutting public expenditure for social services, deregulation, and privatization (Keshavjee 2014). This neoliberal economic reform in China profoundly disrupted rural residents' financial capabilities, increased the gap of incomes between urban and rural residents, and resulted in the instabilities of rural economic structures. From one aspect, without the subsidies, farmers had to pay for chemical fertilizers, and the cost of production increased greatly (Shao 2006). From another aspect, because farmers only had vague ideas about the market and they didn't possess professional knowledge about how market mechanisms work, oftentimes they were not able to make the best decisions to produce the desired or most profitable products at the right times, which resulted in their incomes becoming unpredictable.

As for the previous rural health infrastructure, 90% of the rural population were covered by the Cooperative Medical System (CMS) (Liu, Yuanli et al. 1999). Not only did CMS have three tiers of protection for farmers (barefoot doctors, township health centers and county hospitals), its financing relied on a pre-payment plan which included farmers' premium contributions, Village Collective Welfare Fund, and subsidies from the government (Liu, Yuanli et al. 1999). These two sets of measures were to make sure preventive and primary care services were available to everyone under the condition that only minimal expenditures were to be paid by farmers themselves. However, after the agriculture reform, CMS and pre-payment plan collapsed in most of the rural areas, and government's budgets for rural health dropped significantly (Liu, Yuanli et al. 1999). This resulted in a tremendous vacuum in the rural health infrastructure. The number of township clinics declined by 14.2%, and the number of active primary health care workers declined by 35.9% (Liu, Yuanli et al. 1999). In contrast, roughly half of the urban residents continued to be insured either by Government Employee Health Insurance or by Labor Health Insurance (Liu, Yuanli et al. 1999).

In sum, the enactment of neoliberal economic reform in China's agriculture system, as well as the central government's biased policies between agriculture developments and industrialization resulted in the decrease of Chinese farmer's incomes, which constrained their

capabilities to make a better living and to pay for health care. According to various estimates, 30-50% of rural households lived under the poverty line, and due to which 58% reported an inability to pay for hospitalization (Ministry of Health, 1994). And due to a lack of government's subsidies and the degradation of the economy, rural residents could do nothing but to let CMS, the most important system to guarantee their access to affordable health services, gradually collapsed. To provide for their families and even to achieve a well-off living, rural residents had to work very hard, often with little to no reward. It is not hard to imagine what an allure it would be for them if they were offered 2,000 yuan for a single blood donation (Shao 2006). Maybe they saw it as a shortcut to achieve their aspirations or as a way out of tiring labor. No matter what it is, their economic and health difficulties were the determinant forces for them to sell their blood.

Part Two

Paul Farmer has emerged as one of most eloquent proponents for studying structural violence from the anthropological lens and his approach emphasizes how political-economic, large-scale and historically engrained forces wreak havoc on the bodies of the socially vulnerable (Bourgois 2009). In this section I would like to give two reasons why I take this epidemic crisis as a manifestation of structural violence. First, local governments not only withheld information of the cause and seriousness of this HIV infection crisis from all social actors, but also impeded anyone from seeking outside help. Second, local governments implemented the "Four Frees and One Care" policy, a policy that should provide free antiretroviral treatment, in rather ambiguous ways.

In 2003, the Associate Director of the Henan Center for Disease Control (CDC), Ma Shiwen was arrested and accused of betraying "State Secrets" because he shared information about the spread of HIV in his Province with an unofficial association (Rollet 2009). In the same year, in the village of Xiongqiao in Hubei province, a force of 500 policemen arrested 16 infected farmers who tried to claim medical and financial compensations from the local government because their actions were accused as an attack on the government (Rollet 2009). In June 2004, four HIV positive farmers from

Henan were arrested because they were going to petition the central government about the lack of promised antiretroviral treatments and for the government banning their children from attending schools (Parry 2004). Ironically after the crisis, people that were first arrested were not corrupted officials nor personnel who made huge profits from illegal and unethical plasma blood collection but journalists, doctors, and activists who were trying to help. They were arrested because they tried to tell the truth to those HIV infected rural donors about why they got sick and where they should seek help, and because they tried to let the whole country know the sufferings and struggles of these people so that more medical and financial help might be gathered. Nevertheless, their actions conflicted with the plan and concern of the central and local governments who tried to prevent nationwide panic by restricting the leaking of information.

In 2003, the central government issued a policy called "Four Frees and One Care" to provide free antiretroviral (ARV) treatment, tracing and counseling services to HIV infected rural residents, and to provide financial relief for their families as well as care for AIDS orphans (Rollet 2009). However, lots of problems occurred in its implementation. Taking Henan province as an example, the distribution of ARV drugs were limited, little to no medical services were provided to test or monitor the treatments, and no measure was taken to deal with the side effects or to ensure patients' adherence (Shao 2006). As a result, a three-year survival rate was only 50 percent. It is no wonder some rural residents suspected that these drugs were to hasten their death (Shao 2006).

Both central and local governments were responsible for the production and reproduction of structural violence. While the local governments were the direct actors, often times their misconduct was known to or acquiesced by the central government. Mr. Zhao, an HIV-infected farmer from Henan, said "we manage to find the invoice from the blood transfusion, the medical certificate, and the hospital discharge certificate, but the People's court wouldn't hear our case. We wish the government would give people living with HIV/AIDS their rights to sue and that the court will give us fair compensation" (Parry 2004). As it is said, public policies can create some of the worst

instances of social sufferings and intensify human miseries (Kleinman 1997). The policies and actions taken by Chinese government institutions to deny the victimhood of its rural citizens and to criminalize journalists, doctors, and activists who with the moralities to help, could produce detrimental social consequences. First, it might aggravate the physiological and psychological sufferings of the infected farmers and encourage discriminations from non-infected general public against them. Second it might create a discourse that you would get yourself into trouble by helping the infected voice their concerns and struggles. Such discursive practices not only served the government institutions to silence the HIV-infected rural blood donors, but also create material and psychological segregation in the whole society. Third, with the refusal of their rights to sue and with the delay in legislation to protect their rights of education and employment, it could result in lowering of their educational levels and employment rates, eventually generating greater poverties among those rural areas.

Part Three

The outbreak of HIV infections among rural blood donors started in the 1990s and was caused directly by the unregulated illegal plasma collection practices in which small commercial plasma collection stations collected blood from rural donors with unsanitized equipment and reinfused red blood cells into donors. In the earliest systematic census done in 2005 to trace HIV infection rates, the Chinese Ministry of Health registered 29,337 cases of HIV infection among Henan's 100 million inhabitants, 90 percent of whom were former blood donors and 98 percent were peasants (Rollet 2009)

The Blood Donation Law was issued in 1998. Its second and eleventh articles make very clear that "The State institutes a blood donation system. The State encourages healthy citizens from 18 to 55 years of age to donate blood voluntarily" and "Donated blood shall only be used for clinical purposes and not for sale" (lawinfochina.com 1998). The effects were obvious, after it was finally implemented in 2002, that in just one decade, voluntary donations have increased from 5.5% to 99% (Shi et al. 2014), which seemed to be a success. Foucault (1991: 102) defined the term

"governmentality" as "the ensemble formed by the institution, procedures, analyses and reflections, the calculations and tactics that allow the exercise of this very specific albeit complex form of power, which I have as its target population, as its principal form of knowledge political economy, and as its essential technical means apparatuses of security." Drawing on the theoretical concept "governmentality", I would like to argue that through legislation, the government institutions in China redefined where lies the normality and legality of blood donation. By changing the public's conceptualizations about the nature and the goals of blood donation, they managed to change the public's behaviors, resulting in increased voluntary donors. Admittedly this was an optimistic case of governmentality, however, I suggest more critical thinking be given to what it means for rural donors who had already been infected and their descendants who were also infected through vertical transmissions, and how might this law influence their lives and their futures.

In article one it says "This law is enacted for...developing humanitarianism and promoting socialist material as well as cultural and ethical progress" (lawinfochina.com 1998), and sets the evaluation criteria with which the humanitarian part is praised while the monetary part is belittled and disciplined. Maybe it tries to convey the idea that contributing to the community is good while serving your own interests is not so good? Although I do not think it is wrong to illegalize the practice of buying and selling blood, since the Chinese government has not acknowledged its role in how the crisis happened nor its responsibilities to take care of the infected rural residents, and now with this law? I am worried that its implications and the ways they might get interpreted would lead to further discriminations and isolations of infected rural donors who could be discouraged from seeking rightful citizenships since selling blood has already been identified as illegal behaviors.

Besides the core ideas to ban all commodification of blood and to encourage humanitarian commitments, the law also promotes stricter securitization and advanced biotechnologies. In article nine and ten, they require that not only "A blood donor center shall carry out the necessary medical checkup on blood donors" but also "a blood donor center shall collect

blood strictly in compliance with the relevant operation procedures and regulations, blood collecting shall be done by qualified medical workers." Will it influence the ways people perceive how we should improve the credit and reliability of Chinese blood banking system? "Blood Banking in China" (Shan et al. 2002) and "Blood safety and availability" (Shi et al. 2014) suggest we should: 1) build well-regulated, high-quality donor and donation information system. 2) invest more in improving testing mechanisms and laboratory practices. 3) improve the quality of licensed collection kits. 4) rigorous training of specialists for blood collection. To a certain degree, it is understandable that this medical journal concentrates on pure biomedical interventions and avoids discussion of adjustments that need to be made in societal dimensions. Nevertheless, it is worrisome that there might be misrecognition of the socioeconomic origins of the contaminated blood crisis in the 1980s. As Lock & Vinh-Kim (2018) point out, health-related matter is routinely objectified by government and medical institutions as a technical problem to be solved through the application of technology and conduct of science. Without government's recognition or academic discussions, it raises concerns that as time passes the economic and health inequalities that gave rise to the disaster will become more invisible, as will the embodied experiences of discrimination and marginalization of rural residents.

Part Four

In the book *The Gift Relationship* (Titmuss, 1970), the "crowding out" effect was defined as the phenomenon that monetary rewards for donating blood might reduce the supply of blood donors, as the introduction of payment may reduce the intrinsic motivation to behave altruistically or perform one's civic duty. In 2008, Mellström and Johannesson conducted an ethnographic study in Gothenburg with Gothenburg County residents to reexamine the applicability of Titmuss's hypothesis. The results suggested that for the overall sample the supply of blood donors decreases from 43% to 33% when a payment is introduced. More interestingly, when gender was introduced as a variable the crowding out effects were more obvious among women participants such that their donations decreased from 52% to 30% after a

payment was introduced. However, maybe they have overlooked how participants' socioeconomic needs might affect their choices. For people who live in great poverty, would they prefer to donate their blood for free or for a fee?

Traditionally Chinese people believe blood is an essential life force and loss of blood would diminish their vitality (Erwin 2006), but socioeconomic forces back then, such as decreased incomes, scarcities of material goods and health resources, counteracted this cultural belief. It is not like these poor rural farmers believed selling blood could make them billionaires, they were just too desperate to stop their lives from going downhill.

I do not think it is morally problematic to provide monetary rewards to blood donors, especially to those who live in poverty, but I would like to argue that fundamentally it is the job of the nation's powerful institutions to contemplate over how can they relieve the financial burdens from socially vulnerable bodies and how can they achieve health equalities for them so as to eliminate the necessities to sell blood.

Conclusion

Early in the 1980s, economic liberalization, health reform, and the Chinese government's less favorable policies towards rural areas became the determinant forces that drove farmers to turn their blood into monetary sources. The results could have been different if local and central government were to make information about the cause and seriousness of this HIV infection crisis transparent to rural residents and journalists, and welcome help from doctors, scientists, and non-governmental organizations; if surveillance was imposed, not on farmers, but on local governments to make sure they strictly implemented every regulation published by the central government; if power was not abused by governments to punish farmers who struggled for survival but to punish those who had made tons of money from people's death; and if there were laws to ensure infected rural donors' judicial rights to sue against unfair treatment and for compensation. If all of these were true, there would not be so much death and fear, then and now.

Governmentality exerted by institutions certainly can have positive influences, banning monetary rewards and advocating for voluntary

blood donations. However, what the Blood Donation Law meant for rural blood donors who had already been infected with HIV in the process of selling their blood and for their children who were also infected through vertical transmission, as well as the influences it brought to their lives, remains undiscussed. And we have reasons to worry that the disciplinary discourses created by it and the implications it conveyed might be harmful to infected rural donors.

Both in political and academic spheres, there are professionals who advocate that we reinforce the safety and credit of Chinese Blood Banking system by updating testing and collection technologies. It is not my intention to oppose that possibility but I hope people will realize that although advanced biotechnologies and biomedicine can heal viruses or diseases, they cannot heal traumatized experiences; they can be used to objectify and essentialize social problems, but not to achieve a harmonious and blessed society.

Illness, such as those stemming from HIV infection, not only cause hundreds of thousands of deaths, but they have long-lasting impacts on societal and cultural domains. In this epidemic crisis, HIV infections created numerous orphans, as kids who lost their parents had to be taken care by their grandparents or sent to institutions (Rollet 2009), and couples who desired to have a son would have to refrain from doing so because of fear for vertical infection (Shao 2006). People are forced to give up those important and traditional Chinese values because they embraced fears and anguish not only toward death but also toward loss of identities and social values.

Compared with research done in other fields, we lag behind to examine how this epidemic crisis happened in China from medical anthropology lens, especially about the lived experiences of those infected rural donors. In this new era, I propose research be done to investigate what kind of lives they live now, and what political changes or economic politics are influential to their survivorship. Essentially, I believe we need more scholarship to convey their voices and concerns, as well as to help them combat structural violence and public misunderstanding.

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The Legacy of Classical Sociological Theory: Androcentrism and Universalism in the Tradition of the Canon

Carolyn Conant

Introduction

Sociology is unique among the social sciences for its cross-disciplinary contributions to research, its varied quantitative, qualitative, and mixed methodologies, and its application of theoretical frameworks to the interpretation of empirical data. The discipline also stands out among all of the sciences for the curious distinction of being one of the only fields that continues to hold its founding literatures at the center of contemporary practices and applications of its scientific work. Most graduate programs in sociology require a classical theory course and a comprehensive exam in classical theory, and fresh research across the field's wide expanse of sub-disciplines continues to invoke the theories of early thinkers in sociology.

How can this be? How have the theories of a select handful of European men from the late nineteenth century been maintained as the basis of a scientific and academic discipline in the twenty-first century? Is teaching contemporary graduate students classical sociological theory not like “teaching chemistry students about alchemy” (Ogburn in Levine 2015:306)?

While a handful of voices have emerged from within the discipline to express their opposition to adherence to the classical canon, the prevailing viewpoint values and validates—or, as often, accepts unquestioningly—the utilization of nineteenth century theorizing in contemporary work in the field of sociology. This practice presents a variety of contradictions and is inherently problematic. In this paper, I add a voice to the chorus of opposition that questions the perpetuated centrality of the classical canon in sociology. My discussion will center on the important limitations of the classical texts and their authors that compromise their ability to act as the guiding force for the field of sociology. I then argue for the equal or greater importance of works

that have traditionally been denied the hallowed status that is ascribed to the classics, based on their unique, important contributions to the field and their avoidance of the limitations that constrain the classics.

Limitations of the Classics

In this paper, the terms “classics” and “classical canon” refer to the body of sociological work created by Auguste Comte, Herbert Spencer, Max Weber, and Emile Durkheim. I have excluded Karl Marx and Georg Simmel from this collective due to important distinctions in their approaches to sociology that I will elucidate later on.

The classics are lauded for their efforts in mapping out grand schemas of society and its functions and for developing research methodologies that could yield universal truths and definitive social laws, demonstrating the feasibility of sociology's application as a science on par with biology or physics. The titles of the classical works reveal their emphasis on the analysis of abstract concepts that might produce such all-encompassing laws: Spencer's *Social Statics*, *Synthetic Philosophy*, and *The Principles of Sociology*; Weber's *Economy and Society* and *The Protestant Ethic and the Spirit of Capitalism*; and Durkheim's *The Division of Labor in Society*, *The Rules of the Sociological Method*, and *The Elementary Forms of Religious Life*. It is this emphasis on generating laws based on abstractions and universalisms that has simultaneously provided for the timeless invocation of classical theory and invested it with a weighty problematique.

We will begin with an analysis of themes of universalism and abstraction in the work of Emile Durkheim before moving onto a feminist theory-informed critique of the limitations of universalism and abstraction as conceptual frameworks. Durkheim serves as the focusing lens of this analysis as a comparatively “modern” member of the classical cohort who benefitted from sociology's

status as an established field of study (albeit still not a widely accepted one). One could argue that the earlier classical theorists were obliged to focus on their work on outlining broad structural facets of sociology in order to define it as a discipline, confining them to the realm of the overarching and the abstract. Durkheim, although not confined by the obligation of delineating the field, remained within that same realm in his career as a sociologist, reflecting important limitations inherent to his specific position within the field.

Durkheim's chief scholarly interests were the social and collective realms, including the production of knowledge, the formation of categories of thought, and the internalization of values, all of which, for him, coalesced to form universal moral facts—what we would now refer to as culture (Turner et al, 2012:355;329). In all of his work, the individual is overlooked in favor of the collective, the microsociological discussed only as it informs overarching themes of systems-wide meaning. In *The Division of Labor*, individuals become more interdependent and increase their solidarity as their work becomes more specialized; Durkheim uses the concept of the individual to promote the idea of collective consciousness. In *The Elementary Forms of Religious Life*, Aboriginal individuals develop totemic identities to help understand and articulate the difference between themselves and others; again, the individual serves only to characterize a social *grouping* and demonstrate a form of societal-level mapping. There is an almost neurotic refusal to dwell on the individual at the individual level, and a complementary near-complete dismissal of the usefulness of empiricism due to its failure to account for abstraction (Durkheim, [1912]1995).

For Durkheim, empiricism serves its purpose in that it establishes a dialectical duality with rationalism in the production of knowledge that provides a basis for the mapping and categorizing of all of existence. He was a positivist who believed in and sought to establish universal laws. Although he agreed with Montesquieu's theory of cultural relativism (Turner et al, 2012:307), the idea does not emerge in application in his work, which transmits unexplored assumptions about the superiority of the “civilized West” over societies like the Aborigines, as we see in *The Elementary Forms of Religious Life*. Although many scholars see *The Elementary Forms of Religious*

Life as a groundbreaking work for undermining the idea of European superiority due to Durkheim's suggestion that European religions emerged from the same roots as Aboriginal totemic practices, there remains an Orientalist othering of the Aborigines under discussion in his work. The work also contains the suggestion that stasis and underdevelopment characterize Aborigines as a people who occupy only the foundational level of development of religious practices in a model wherein European practices occupy the more highly developed upper tiers. By identifying Aboriginal totemic practices as “foundational” for most western religions, Durkheim's ideas perpetuate the West/Rest binary, maintain western practices as the universal standard for comparison, and suggest that contemporary practices of Aboriginal spiritual rites are frozen in arrested development due to their “failure” to morph into a religious model more akin to the European one. This is a classic example of how epistemological structures can function to support and enable western imperialism (Said 1979).

While many of Durkheim's discussions and theories—such as the homo duplex, the perceived lack of soul in women in some groups of Aborigines, collective consciousness, and social pathologies—can be directly applied to the theme of the subjugation of women and people of color, Durkheim never applies himself to that task in his work. He maintains the Cometic tradition of universal social laws and the organismic metaphor that asserts the superiority of Europe over its colonies and essentializes “civilized” versus “primitive” peoples. Critics of Durkheim accuse him of “conservative and authoritarian ideology” (Zeitlin in Levine 2015:316) that pigeonholes sociology into a “science of the synchronic present” and neuters it from having potency for effecting progressive change (Gouldner in Levine 2015:316). Any theoretical approach based on the premise of the truth of universal social laws positions society as static, stagnant, and incapable of the kind of radical change that would threaten the privilege and power of the dominant class that theorists of universalism—like the sociological classics—belonged to. Indeed, Durkheim's abstract and universalist approach to sociological theorizing has additional implications for its usefulness in the discipline, as I will describe below.

A universalist approach to theories of social structures necessarily obfuscates the distinct realities of groups outside of the dominant group, whose viewpoints and experiences are posited as the common lived experience of all people and projected upon all others. In the case of the sociological canon, this dominant group is comprised of white European males and all of the associated privileges that membership in that group entailed within the context of a patriarchal nineteenth-century Europe engaged in a variety of colonial and imperial projects around the world. Thus, universal laws produced by this time, space, and group are infused with androcentric and Eurocentric privilege. This unexamined reproduction of Eurocentric patriarchy creates “serious distortions of reality” (Chodorow, 1978:144) that have major implications for the validity of the theories that act as conduits for this form of reproduction.

Privilege manifests in the classics as a glaring lack of engagement with topics like race and gender that would presumably be on the forefront of theorizing around topics like social stratification, social solidarity, authority, division of labor, and collective consciousness—topics that occupied much space in the classical works that were produced during an era characterized by gender- and race-based stratification. However, analysis of gender is scarce and superficial, and the only mentions of race serve to reinforce ideas of white supremacy rationalized by “march of progress” evolutionary rhetoric that assume western civilization to be the pinnacle of development and sophistication, and the undisputed outcome of linear social progress.

This omission is only possible from a dominant standpoint that has normalized the exclusion of non-dominant perspectives and experiences. Feminist sociologist and psychoanalyst Nancy Chodorow writes, “the normal tendency in most social and psychological thought [is] to equate maleness with humanness” (1978:143), and Freudian legacies reinforce the idea of male normalcy with their theories of penis envy, the supposed female interpretation of the clitoris as an underdeveloped penis, and the masculinity of all prepubertal genitality (Ibid:148). In the words of another feminist psychologist, Carol Gilligan, “The failure to see the different reality of women’s

lives...stems in part from the assumption that there is a single mode of social experience and interpretation” (1982:173). This positing of (white) maleness as normal and normative necessarily interprets all other categories in relation to maleness as the central construct for comparison.

This problem reflects in the classical sociological texts and their failure to engage with topics of othered races and genders, and is a chief criticism of postcolonial literature that addresses this central problematique in the social sciences: “any universal or normative postulation of rational unanimity is totalitarian and hostile to the challenges of otherness and difference” (Gandhi 1998:27). Postcolonial sociology can work to overcome the problems generated by universalist, bifurcating theoretical tendencies by “incorporating *relational* social theories to give new accounts of modernity” (Go 2013:25) that challenge the hegemony of a single, dominant viewpoint.

Furthermore, the defining of sociology as a discipline built on abstractions like Weber’s ideal types and universal social laws that presume the homogeneity of thought and experience has created a dubious inheritance for modern sociologists, made worse by the lack of reflexivity in the engagement of the classical texts by their continued placement at the heart of the discipline. Insisting on time- and space-transcending theories oriented in privileged universalism produces a practice of iteration without modification, promoting the maintenance of a tradition steeped in patriarchy and Eurocentrism. In sociologist R.W. Connell’s words, “Sociology was formed within the culture of imperialism and embodied a cultural response to the colonized world. This fact is crucial in understanding the content and method of sociology as well as the discipline’s cultural significance” (1997:1519). And yet, modern sociologists continue to idolize the theorizing of the canonical authors, writing off their blatantly racist statements as justified by the flaws of their contemporary biological understanding and lack of access to historically accurate materials, rather than seeking to infuse the particular privileged context of such statements into an interpretation of their theories and how they are applied in modern sociological work. The power of the legacy of the sociological canon provokes the worrisome question, “To what extent do progressive white scholars of today

unwittingly interject racist biases into their sciences even while believing they stand above prescientific racial assumptions” (Morris 2015:221), simply due to their employment of the classical theories?

These limitations have very real and very deep consequences for the validity of sociology as a scientific field. The exclusion of women and men of color from critical theory-building studies results in a highly skewed schema of social theory that is misapplied to groups who were not taken into consideration when those schemas were formulated, and, in certain cases, can produce misinformed characterizations of those marginalized groups. For example, “The disparity between women’s experience and the representation of human development...has generally been seen to signify a problem in women’s development” (Gilligan 1982:1-2), highlighting the problem with using a universal standard to evaluate nuanced realities. The use of nineteenth-century andro- and Eurocentric social theory to explain modern social structures composed of peoples of all gender identities and ethnicities is a fundamentally flawed methodology; one would not attempt an explanation of the force of gravity with the principles of chemistry, or an analysis of ancient Sanskrit poetry with themes from twentieth-century Soviet literature, and still expect meaningful, accurate results.

To return to Gilligan’s point about representative disparities, “the failure of women to fit existing models of human growth may point to a problem in the *representation*, a *limitation in the conception* of human condition, an *omission* of certain truths about life” (Ibid, emphasis mine). The danger of this kind of (mis)representation lies in the power of the production of knowledge; when epistemologies become dominant, “it is difficult not to think in terms of social relations and institutional arrangements that somehow fit their contours....and are set up *a priori* to obey its conventions” (Marston et al 2005:422), resulting in phenomena like the apparent failure of women to fit these conventional models. So, given the limited and omission-riddled representations of the human and social conditions in the classical canon, why does sociology continue to maintain the canon as the central point of reference for modern theoretical application?

Contributions by the Non-Traditional Classics and Argument for their Elevation

In this section, I make an argument for the elevation of the disciplinary importance of the non-traditional classics by pointing out both their overcoming of the limitations of the classical canon and their uniquely important contributions to the field. This dual strength demonstrates the advantage of centering on the non-traditional classics as a new focal point for contemporary sociological research and theorizing.

By non-traditional classics, I refer to those works that have been systematically excluded from disciplinary prevalence and undervalued in comparison to the classical canon as resources for modern sociological work. Specifically, I will highlight the contributions of Georg Simmel, Charlotte Perkins Gilman, Ida Wells-Barnett, and W.E.B. Du Bois. I would also argue for the inclusion of major early postcolonial theorists like Edward Said and Frantz Fanon in this elevated group of social science theorists but will not draw out that argument in detail here.

Karl Marx has been left out of the discussions of both classical and non-traditional classical theorists due to his unique straddling of these two groupings. While he too tended towards systems-level generalizations and excluded race from his discussions of exploitation, he clearly empathized with the “other”—the proletariat—and acknowledged gender in his discussion of the patriarchy as the earliest form of capitalism in that it exploits the reproductive and domestic labor of women for the profit of men. Although focused on macrosociological topics, he vehemently insisted upon a materialist grounding of his theorizing in an intentional and provocative break from the lofty Hegelian idealism that had previously dominated philosophical and sociological thinking.

For Marx, reality is a “*sensuous human activity*” and must be evaluated as such (Marx [1845]1955:121). He was also an adamant supporter of socioeconomic revolution to dismantle systems of domination and oppression, and he saw his sociological work as a mechanism of this project; his famous truism trumpets that “The philosophers have only *interpreted* the world, in various ways; the point is to *change* it” (Ibid:123). Thus, Marx does not fully belong in the castle in the clouds with the privilege-blinded universalist enclave of the

classics; nor does he belong in the trenches of empiricism with the interactionist-oriented theorizing of the non-traditional classics' cohort.

Despite his parallel status as a white European male, I begin with Simmel as he marks the transition of sociological thinking from the universal, macro-level approach to a truly microsociological, symbolic interactionist approach. This emphasis on understanding social production on the basis of individual interactions allowed him to delve for the first time in sociology into the topics of gender, gender as a social construct, and various forms of gender oppression, and presents a radically different way of viewing the world and the study of its social systems than the abstract, universalist approach that had characterized the discipline for its first half century. Furthermore, as a German Jew in the late nineteenth century, Simmel experienced ethnic discrimination that removes some of the privilege inherent to white European males and, one could argue, made it possible for him to identify the impracticability of imposing universal truths across all social identities and systems. With this break from universalism, Simmel took a historical step in making sociology more reflexive, relational, and inclusive, and thus a better tool for the evaluation of social structures. However, despite his focus on processes of interaction and how they reflect structural systems of inequities, it is important to note that Simmel did not turn his attention to the havoc that European colonizers were wreaking at the time in West Africa, or engage in examination of race in applications of his theory.

In his work, Simmel dealt with the rich fluidity of human interaction. His microsociological analyses, while reviled by many during his time, are enduring works of sociology due to their emphasis on increasing degrees of social differentiation and his exploration of topics that are deeply human and thus relatable in the modern context. Unlike the classics and their promotion of timeless universal laws, Simmel engaged in analysis of the intrinsic temporality of many social forms—like fashion—and the constant transformation of social life that promotes a disciplinary reflexivity to the study of social processes. For Simmel, society was no more than the sum of interactions among human beings (Turner et al 2012:263), so studying interactions at the individual level would yield the most important

insights about underlying processes of social reality (Ibid:265).

Furthermore, although he was not the first sociologist to investigate the concept of money and exchange, he was the first to do it from the perspective of social exchange and interaction, again demonstrating an inversion of the classical approach to theorizing (Ibid:283). Simmel consistently refrained from “employ[ing] the vocabulary of abstract theory” (Ibid:294) and remained grounded in empirical observation and a symbolic interactionist approach to his sociological theorizing.

He was also one of the first to delve into gender as a social, rather than purely biological, construct. In “Fashion,” he discusses how women are forced to “peacock” to attract men due to their exclusion from participation in the economy and resulting dependence on men for procuring their livelihood: “the freedom of personal action and self-improvement were still denied her [women]. She sought redress by adopting the most extravagant and hypertrophic styles in dress” (Simmel [1904]1957:551). This view of gender as a performance helps to highlight the structural forces of patriarchy that work to marginalize women and reveals the ways that marginalized groups' behavior is often moderated in response to the systems that oppress them, as Du Bois' theory of double consciousness reveals.

The idea of the social construction of gender is driven home in Charlotte Perkins Gilman's *Herland*, a feminist utopian novel that deconstructs patriarchal assumptions through the fictitious production of a mirror society composed only of women, and absent of any social pathologies. A boisterous male protagonist, Terry, who has been thoroughly socialized by his patriarchal context, is astonished at the “asexual” and “abnormal” behavior of the young women in *Herland* who do not fawn over him nor succumb to his romantic overtures the way that women in his male-dominated society do. In this context, it is the absence of patriarchal restrictions on the women's access to economic wellbeing that causes them to act as they do towards Terry, much as it is the absence of access to economic wellbeing that causes the women in Terry's society—and Simmel's—to dress and act extravagantly to attract the attention of men.

In addition to making powerful statements about oppressive social structures by denormalizing the prevailing hegemonic status quo, Gilman's work represents an important contribution to sociology by demonstrating the power of alternative viewpoints in challenging the universal assumptions wrought by androcentric theorizing. Her emphasis on constant, ongoing, critical self-examination for progress and improvement offers a very different approach to sociology and the development of social forms that is strictly at odds with the tradition-preserving tendencies of patriarchy. Her simple and yet simultaneously revolutionary suggestion for this obvious approach of structuring society according to its specific contemporary realities translates into a strong argument against the preservation of the classical sociological works at the center of the discipline. In one passage from *Herland*, a female protagonist engages in her usual line of Socratic reasoning with one of the male invaders (the narrator) that highlights the absurdity of the preservation of traditional logic ([1915]2018:91-93):

“What I cannot understand,” she pursued carefully, “is your preservation of such a very ancient state of mind. This patriarchal idea you tell me is thousands of years old?”

“Oh yes—four, five, six thousand—every so many.”

“And you have made wonderful progress in those years—in other things?”

“We certainly have. But religion is different. You see, our religions come from behind us, and are initiated by some great teacher who is dead. He is supposed to have known the whole thing and taught it, finally. All we have to do is believe—and obey.”

.... “[W]hat I cannot understand is why you keep these early religious ideas so long. You have changed all your others, haven't you?”

“Pretty generally,” I agreed. “But this we call ‘revealed religion,’ and think it is final.”

.... “Shall I be quite, quite honest?...It seems to me a singularly foolish idea,” she said calmly. “And if true, most disagreeable.”

In this excerpt, we could easily substitute “classical sociology” for “religion” and arrive at the same position of the inexplicably inappropriate continued adherence to outdated theoretical laws and methodologies. Here, we see the great value in the elevation of a traditionally excluded voice in sociology for its ability to examine the unexamined and question the traditions that have been preserved regardless of their applicability to contemporary context.

Ida Wells-Barnett occupied the doubly marginalized position of a black woman in the late nineteenth- and early twentieth-century United States. This perspective, unique among the whitewashed and privilege-steeped cohort of the classics, offers a radically different approach to sociological research and writing and should be better recognized for its important impact. In what is perhaps her most famous work, *On Lynchings*, Wells-Barnett firmly pulls sociological theory out of the clouds and forces it into a brutally corporeal integration through her examination of society-wide lynching practices of blacks by whites at the turn of the twentieth century. Her ethnographic accounts are systematic and logical while retaining the deep emotional experience of horror and outrage at the widespread barbarism that characterized lynchings and their lack of repercussions in the justice system. Like Simmel, she uses micro-level interactions to reveal society-level norms and systems. The interactions between lynch mobs and black men demonstrate the deep institutionalization of racism and discrimination in American society and the “justice” system, and the interactions between white men, white women, and black men involved in cases of alleged rape or illegal consensual relationships highlight the structural and performed nature of patriarchy and white supremacy in this context.

By emphasizing corporeal and lived experiences, Wells-Barnett is able to empirically and effectively demonstrate the real impact of social categories of thought and behavior. Her work also differs from the classics in that she intentionally avoids the imposition of universalist blanket statements about truth, specifically stating that she does not argue the innocence of all black men accused of crimes, pointing out the fallacy of female “virtue” (if it is an inherently universal condition of women, how can it apply to white women and not

black women?), and empirically dismantling the sexist presumption that women do not initiate sexual interactions. With these examples, Wells-Barnett helps to point out of the incapacity of universals to reflect accurate truths. *On Lynchings* as a whole also deeply underscores the inadequacies of laws and systems designed by and for a specific group of people—white men—that can be applied to the universalist systems-level approach of the classical sociological theorists.

While it is conceivable that Wells-Barnett and Gilman have been excluded from a central position as classical sociological theorists due to their prioritizing of political activism for social progress over engagement in the realm of social sciences academia, this flat-footed justification fails to explain the case of the exclusion of prominent and highly educated scholar W.E.B. Du Bois. Du Bois' scholarly contributions included a wide range of writing, the utilization of multiple groundbreaking sociological methodologies, and training in both American and German sociological traditions. Today it is widely accepted that Du Bois was systematically excluded from the inner circle of sociology to which he no doubt belonged for the political and racist motives of his contemporaries. However, despite this acknowledgment, little has been done to remedy this historical marginalization and elevate Du Bois to the position of centrality that his sociological legacy deserves.

In his career, Du Bois was the paradigmatic example of a social scholar applying their research and intellect to enacting social change and progress; he “embodied the highest standards of scholarship and the courage to employ knowledge to inform social change” (Morris 2015:xvi). One of his most important contributions to sociology included a clarification of the boundaries of sociology as an interdisciplinary field by embracing history, anthropology, political science, economics, and the humanities in his work while analyzing them through a strictly sociological lens (Ibid:xxi). In addition, the Atlanta School of Sociology that he founded predated the Chicago School as the pioneering platform of American sociological theory and work, introducing new methodologies and promoting the value of empirical research (Ibid:xxi-xxii).

Du Bois brought mixed methods and quantitative research from Germany to the United

States (Ibid:21) and brought critical race theory from the United States to Europe. Indeed, he was sociology's preeminent theorist of race, responsible for enacting a paradigmatic shift in racial thinking within the social sciences that positions race as a social construct rather than a biological category (Ibid:xx). The parallels between his argument for race as a social construct and the context of gender within a social sciences framework made Du Bois an early proponent of intersectional analysis of social categories like gender, race, and class that is now the standard in the field (Ibid:220). This intersectional approach to ontological questions is also at the root of postcolonial theory, which seeks to dismantle the universality and hegemony of sociology's traditional narrative through emphasis on “the interactional constitution of social units, processes, and practices across space” (Go 2013:28).

Like the other theorists among the non-traditional classics, Du Bois emphasized the clear connections between individual lived experiences and society-level forms of stratification. He employed ethnographic and humanistic techniques that integrated human forms of expression, such as “Of the Sorrow Songs,” and empirical realities, such as those of black Georgians in “Of the Black Belt,” to make inductive claims about the nature of social structures (Du Bois [1903]2015). This demonstrates a fundamental shift from the approach of the traditional classical theorists, who used deductive reasoning to apply their abstract rules and universal laws to specific social contexts. Du Bois recognized the tendency of the classics to mistake abstractions for reality and believed that sociology should be a “science of human action, not an enterprise seeking to explain abstractions that begot more abstractions in a futile effort to discover universal laws” (Morris 2015:26). This emphasis on *action* and applicability defined Du Bois' sociology as a dynamic, reflexive process that could more accurately interpret social realities than the “static, mechanistic sociology based on universal laws of human behavior” that defined the classics and “failed to capture social reality” (Ibid:27). Thus, while patriarchy-enforcing practices of adhering to theoretical tradition and propagating abstract laws across a broad range of contextualities of time and space have mired sociology in stagnation, a Du Bois-style approach answers the critique of Gilman's Herland protagonist, constantly reacting and

responding to the contextuality of a particular moment to analyze it with the appropriate lens. This attitude towards sociological methods and interpretation is a crucial contribution to the field and deserves elevation to the status of a central tenet in sociological theory.

Conclusion

The works of the traditional classics were instrumental in laying the foundations for the discipline of sociology, and for beginning to apply philosophical reasoning with a social lens in an attempt to analyze and interpret that most fluid and complex realm of reality: the social world. Many of the non-traditional classics and contemporary figures in sociology stood on the shoulders of the classical giants, to borrow a line from Newton, as they morphed and advanced the field over time. My argument is not to invalidate the importance of the classics, but to shed light on their limitations, recognize the improvements that more recent scholars have made, and elevate these other scholars and their work to our central model for contemporary research in the field of sociology. I am in agreement with Donald Levine: “Rather than read the classics to discover timelessly valid tools of use in contemporary research, it is valuable to read them now in order to disclose the particularizing milieus that shaped the ideas contemporary sociologists have naively inherited from them” (2015:312). The “inherited class and national privileges” (Morris 2015:153), adherence to androcentric universalisms and abstractions, and outdated contextuality of the classics fundamentally undermine their functionality within modern sociological work.

The tradition-worshipping insistence in sociology on maintaining such an emphasis on the classical texts represents a hypocritical lack of self-awareness in the field of the perpetuation of patriarchal, racist, and colonial legacies that put contemporary sociologists at risk of “unwittingly injected” biases (Ibid:221). Postcolonial theorists, drawing on a Foucauldian understanding of knowledge-power, have long warned that “all knowledge may be variously contaminated, implicated in its very formal or ‘objective’ structure” (Young 1990:11). Currently, the “teaching of the canon in American graduate education...consolidate[s] the ideology of

professionalism in sociology,” providing a “badge of membership...complete with the patterns of hegemony inscribed in the canon” (Connell 1997:1545). Sociologists must recognize that “[s]ociology as a collective practice—that is to say, a set of institutions, a pedagogy, and a genre of writing—developed in a specific social location: among the [white] men of the liberal bourgeoisie in the [European] metropole” (Ibid:1527), and work to dismantle the implicit assumptions that have been inherited from that specific social location in order to make the science more usable in today’s context, and less exclusionary and problematic.

The good news is that sociology already has access to the kind of empirically grounded, reflexive, relational work that can serve as a model for avoiding the inherent privileges and biases of the traditional classics. Simmel, Gilman, Wells-Barnett, Du Bois, and postcolonial theorists like Fanon and Said all demonstrated how social scientific work can avoid the critical flaws of the classics and “expand the understanding of human development by using the group[s] left out in the construction of theory to call attention to what is missing in its account” (Gilligan 1982:4). By elevating the status of these non-traditional classics, sociology can move to “an encyclopedic, rather than a canonical, view” of the works that define our field (Connell 1997:1514). For how will sociology progress when our eyes are fixed on the past and our minds constrained by the theories of a specific time, place, and group of people? “As the cultures of imperialism persist,” writes Julian Go, “new and different sorts of knowledge must be produced to help decolonize consciousness” (2013:30). Letting go of tradition and embracing reflexivity will help us to establish a sociological Herland in our midst and reaffirm the scientific validity and contemporary applicability of sociology, and the social sciences more generally.

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