Annals of Anthropological Practice

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Disaster vulnerability in anthropological perspective

In the study of disasters, the concept of vulnerability has been primarily employed as a cumulative indicator of the unequal distributions of certain populations in proximity to environmental and technological hazards and an individual or group ability to "anticipate, cope with, resist and recover" from disaster (Wisner et al. 2004). This concept has influenced disaster research as a means to question how natural, temporary, and random disasters are and focused analysis on the human-environmental processes that produce disasters and subject some populations more than others to risk and hazards. Critics also point out that vulnerability frameworks elude measure, strip people of agency, and reify stereotypes of the Global South. In light of both the historical importance and the sustained critiques of the concept, this chapter looks to anthropological and related literature to explore several questions: is it possible that vulnerability has outlived its usefulness? Is it still analytically meaningful for anthropologists currently working in the area of risk, hazards, and disasters? And what are the potential consequences or benefits that could come with conveying the concept of vulnerability to policy and decision makers? [vulnerability, disasters, political ecology, discourse, agency]

Introduction

The term vulnerability has for decades served as a sort of conceptual scaffolding for social science theories of risk, hazards, and disasters. The special meaning of vulnerability in disaster scholarship goes beyond both vernacular and standard dictionary definitions of susceptibility to harm or being in need of special care; while sharing in the spirit of these quotidian meanings, as a theoretical concept, vulnerability has served as an idiomatic frame for several intersecting lines of thought. Over the years, the concept has helped focus and develop disaster-related theory in important ways. It has also suffered, as so many seductive and compelling theoretical concepts often do (e.g., hegemony, social capital, culture), from challenges of operationalization, consistent and replicable measurement, and tangles of political ideology, thus becoming generally defanged in policy and practice; and through bibliographic echoes of cumulative citations of citations with little regard for core conversations and debates around the concept. In light of these challenges, this manuscript reviews some of the core continuities and changes in the vulnerability concept, while asking what the enduring value of the concept might be.

In the study of disasters, the concept of vulnerability has been primarily employed as a cumulative indicator of the unequal distributions of certain populations in proximity to environmental and technological hazards and an individual or group ability to "anticipate, cope with, resist and recover" from disaster (Wisner et al. 2004). This concept has influenced disaster research in at least three key ways. First, the concept of vulnerability has been central to the processes through which social scientists came to reimagine and contest the extent to which disasters can be considered "natural" and contemplate the roles that humans play in producing risk, hazards, and their disproportionate distributions across populations and spaces. The second influence is temporal: the implication that disasters are "temporary" obscures the fact that daily life for many people is chronically insecure. Moreover, if vulnerability is produced by human behavior and is unevenly distributed, it is therefore historically produced. This means that processes that produce disasters often begin long before major catastrophic events and that destabilizing effects continue long after major catastrophes subside. Finally, vulnerability

ANNALS OF ANTHROPOLOGICAL PRACTICE, Vol. 40, No. 1, pp. 14–27,
ISSN 0094-0496, online
ISSN 1548-1425. © 2016 by the American Anthropological Association. All rights reserved.
DOI: 10.1111/napa.12084

politicizes disaster analysis by placing disadvantaged groups and disproportionate distributions of power and risk at the center of analysis.

Critics of the vulnerability concept argue that its measurement is often exceedingly complex and effective measures in one context do not often translate to others. Vulnerability-centered approaches, critics argue, also render disaster-affected people as passive, powerless victims (Hewitt 1997). They can portray entire regions of the world as unsafe and backward, justifying perpetual interventions into marginal populations (Bankoff 2001). In light of both the historical importance and the sustained critiques of the concept, this chapter looks to anthropological and related literature to explore several questions: is it possible that vulnerability has outlived its usefulness? Is it still analytically meaningful for anthropologists currently working in the area of risk, hazards, and disasters? And what are the potential consequences or benefits that could come with conveying the concept of vulnerability to policy and decision makers?

Conceptual background and four related frameworks

At the most basic level, we can conceive of vulnerability as the potential for loss (Cutter 1996:529) or susceptibility to harm (Adger 2006:269). Ben Wisner and colleagues elaborated on this to clarify that vulnerability can be taken to refer 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, italics in original). David Alexander (2013:980) points out that vulnerability is socially constructed, "mainly the result of social, economic, political, and cultural factors in decision making." Vulnerability can refer to the predisaster socioeconomic status of groups and individuals or the risks and hazards of particular geographical locations (Oliver-Smith 1999a:20). In many cases, exposure is actually a function of vulnerability; that is, people live in exposed localities because they are closed out of markets for more secure places.

Anthropologists and other social scientists grappled with vulnerability as we struggled to understand how and why disasters occur. The concept has been used in various ways and, though there are different interpretations and models of vulnerability (see below), the broad strokes of the vulnerability framework emerged out of a need to understand why disasters in the developing world were so much worse than in the developed world. Prior to the mid-1970s, many still operated under the hoary and jejune assumption that disasters were essentially accidents of nature, but the notion that hazards and disasters were so much more prevalent and devastating in the developing world as a result of mere happenstance increasingly strained credulity. In 1976, a landmark article by geographers Phil O'Keefe, Ken Westgate, and Ben Wisner called for taking the "naturalness" out of natural disasters. This article was an early signal that vulnerability would emerge as a means to explain how and why the impacts of a natural hazard were unequally distributed across populations and places. The explanatory differences, it turns out, were in the level of vulnerability and it came to describe the degree to which a community, family, individual, or place was susceptible to the impacts of natural and technological hazards. This perspective in effect began what constitutes a paradigm change, or at least the beginnings thereof, in disaster research.

Given this general orientation, it has increasingly fallen upon social scientists to somehow operationalize the concept for description, explanation, and measurement. Susan Cutter, Bryan Boruff, and Lynn Shirley (2003:242–243) identified three principal tenets in vulnerability studies: unequal exposure to hazards and extreme natural events (after Anderson 2000; Burton et al. 1993), the social construction of hazards and disaster susceptibility (after Hewitt 1997; Wisner et al. 2004), and the production and emergence of geographies of hazard exposures and social capacities within them (cf. Cutter et al. 2000; Turner et al. 2003a, 2003b). Elizabeth Marino (2015—working from Adger 2006) further developed a thoughtful taxonomy of four primary conceptualizations of vulnerability. Marino's breakdown is particularly instructive when it comes to operationalizing the concept and I therefore use it as a guide for the remainder of this section. There is the exposure or hazard-centric model; the view of vulnerability as a lack of resources or entitlements; vulnerability as product of political ecology; and the pressure and release model. These conceptualizations can be helpfully distinguished by the relative degree of emphasis they place on social relations or the environment as drivers, which I illustrate using case evidence drawn from an ethnography of the 1999 and 2006 eruptions of Mt. Tungurahua in the Andean highlands of Ecuador (Faas 2015; Faas et al. 2014).

In the environmental, or "hazard-centric," model, the emphasis is on the hazard itself. People

living on or near active volcanos, fault lines, flood plains, tornado alleys, and coastlines (to name but a few hazards) are at risk principally because of their proximity to these hazards. The problem with this model is that it does not explain the uneven distribution of impacts and capacities to respond and recover that exist within a given area with equal distributions of exposure to a hazard. This is the model principally used by state and multinational organizations. For example, the World Bank assesses natural hazard vulnerability based on the exposure of places and populations to hazards (e.g., Dilley et al. 2005; more on this topic below).

A hazard-centric approach to vulnerability analysis of the 1999 eruptions of Mt. Tungurahua in Ecuador would point to the fact that, at the time of the 1999 eruptions, there were roughly 21,000 residents living within the zone determined to be high risk. This includes roughly 16,000 inhabitants of the town of Baños (Tobin and Whiteford 2002), the popular tourist destination at the northern base of the volcano, and approximately 5,000 residents of roughly two dozen villages along the western, southwestern, and southern flanks of the volcano (Instituto Nacional de Estadisticas y Censos [INEC] 2000). On the western and southwestern flanks, several of these villages are located in close proximity to the several gorges (Achupashal, Mandur, and La Hacienda) that serve as conduits for lava, lahars, and pyroclastic flows. However, calculations of places and populations exposed can prove rather elastic. When factoring in ashfall from the columns of ash that frequently (since 1999) spew forth from the crater and the lithic projectiles that are launched in larger eruptions (1999 and 2006, in recent history), the population at risk can grow to up to 650,000 (Pan American Health Organization [PAHO] 2006). In 2006, these factors resulted in six fatalities, more than 50 burns (United Nations Office for the Coordination of Humanitarian Affairs 2006) and the destruction of crops and the death of numerous large and small livestock. In the wake of the 1999 eruptions, the devastation to homes and property was so great that roughly 6,500 people were unable or unwilling to return home after the eruptions (Ecuadorian Red Cross 1-9-07). At the time of the 2006 eruptions, there was an estimated 3,000 people still living in shelters from the first eruption 1999. This number swelled to 15,000 in the wake of the August 16, 2006 eruptions.

The lack of resources framework has its roots in the anthropology of development and rural poverty (see Chambers 1983:112) and is largely based on Amartya Sen's (1984) emphasis on the lack of adequate resources an individual or community may have to respond adequately to stresses or changes. This perspective accords very little explanatory weight to the environment as the source of vulnerability. Instead, emphasis is placed on political, economic, and social relations that deprive some people of resources and entitlements—food, housing, secure infrastructure—to secure a stable livelihood or endure a crisis. This model helped explain famine as being not the result of drought, floods, or pestilence, but rather socioeconomic and political barriers to obtaining food (Adger 2006:270).

Using the lack of resources model to analyze vulnerability among the populations in the high-risk zone around Mt. Tungurahua, we could point to at least three key factors. First, the Town of Baños at the northern base is one of the most popular inland tourist destinations in Ecuador. During the earliest indications of a mounting eruption in 1999, local authorities and business owners were reluctant to give pre-evacuation and evacuation orders, for fear of disrupting tourist business (Linda Whiteford, personal communication). Though the evacuation of all 16,000 occupants of the town was ultimately successful, the tourism-centric priorities of local authorities almost certainly elevated the risks faced by local (and visiting) populations.

Meanwhile, agropastoralist smallholders living along the western, southwestern, and southern flanks of the volcano lacked basic infrastructure to prevent, mitigate, and respond to volcanic emergencies. Several villages on the western and southwestern flanks are bound by the Chambo River to the west and the volcano to the east/northeast, leaving them with just one north–south road that traverses the many gorges likely to channel lava, lahar, or pyroclastic flows for evacuation. These flows damaged or destroyed several bridges and extents of road at the gorges in 1999; though there were repairs in the years following, in the aftermath of the 2006 eruptions, the Ecuadorian state simply refused to reinvest in infrastructure in the high-risk area, leaving those who continue to eke out their livelihoods in the region to fend for themselves crossing gorges on foot or with pack animals. Finally, a September 2006 survey by the Ministry of Housing and Urban Development (MIDUVI) determined that a total of 553 households were eligible for relocation outside the high-risk area. With the exception of one small, 42 household resettlement built by a small Ecuadorian nongovernmental organization, all four

other major resettlements built by the Ecuadorian state and U.S.-based Christian relief organization Samaritan's Purse were built on urban grids lacking in land for agriculture and without any locally available productive resources or economic opportunities in terms of employment or other industries (Faas 2015).

While an inventory of hazard exposure is no doubt an important component in vulnerability analysis and a decidedly logical place to begin, focusing on the hazards alone runs the risk of overlooking the relationships between populations with varying degrees of exposure. Hazard exposure is not only a matter of relationships between humans and the environment, but also, and arguably largely, a result of the relationships between groups in a society. The resources approach begins to address this issue: looking away from hazards, this framework is trained on the social production of unequal risks and impacts. However, one important limitation of the lack of resources model shares with the hazard-centric model is that they are both trained on limited spatiotemporal spheres of exposure, susceptibility, coping, impact, response, capacity, adaptive capacity, and interactions with perturbations. In other words, these frameworks principally highlight the *proximate* causes of disaster. The two remaining frameworks, the human/political ecology and pressure and release models, examine the historical production of vulnerability; that is, they focus on both *distal* and *proximate* causes, though with different degrees of emphasis on social and environmental factors in these equations. As Paul Farmer and colleagues (2010) have noted, unpacking and confronting the structural violence that produces inequalities and vulnerabilities worldwide requires attention to both distal and proximate causes and interventions.

The third model is alternatively referred to as human ecology (Adger 2006) or political ecology (Marino 2015; after Susan Cutter 1996) and, on this there is a need for clarification. Human ecology can be broadly defined as the "study of the relationships and interactions among humans, their biology, their cultures, and their physical environments" (Sutton and Anderson 2010:3). Under this broad umbrella, we can also distinguish two largely complementary strands of inquiry: cultural ecology, or the study of human adaptation to environments through culture (Sutton and Anderson 2010:3–4) and political ecology that trains analytical attention on unequal power relations in human–environment relationships. Here power is generally defined as a socially intrinsic relational dynamic chiefly derived from the ability to control and allocate relatively scarce resources (Wolf 1990), including risks (Hornborg 2001:1), and is often exercised in the practice of making decisions that affect others' livelihoods (Narotzky 2005:81–82). Some have claimed that cultural ecology is more concerned with long-term adaptations of small-scale groups, while political ecology focuses instead on shorter term concerns of groups as they are embedded in global networks and processes (Sutton and Anderson 2010:27–28). I would respectfully disagree with the distinction in the temporal frame of reference, especially as political ecology is, after all, an eclectic field about which it can be difficult to generalize in these terms. In point of fact, attention to the historical production of vulnerability—the distal causes of hazard exposure and disaster impacts—is perhaps one of the core strengths of the political ecology approach to the study of disasters (see Oliver-Smith 1999aa:29–32, 1999ab).

A political ecology framework therefore calls attention to the fact that the poor and marginalized in a given society are more likely to live in hazardous places and less likely to have the wherewithal to cope with and adapt to the hazards they encounter. This is predominantly a result of (1) marginalization from political protection and decision making; (2) inadequate infrastructure to cope with hazardous conditions; and (3) inadequate resources to cope with disasters before, during, and after the episodic hazard event occurs (Marino 2015:26). Here we can see how political ecology makes an explicit attempt to explain why the poorest and most marginal are disproportionally affected by disasters.

The core questions of the political ecology model (after Marino 2015:27) attempt to explain the historical production of vulnerability: *Why* does a given group lack adaptive capacity and necessary resources to cope with hazards? And *how* did people come to occupy a given hazardous space in the first place? Returning to the case of the Mt. Tungurahua eruptions, we might look at the history of colonialism, the postcolonial hacienda economy, the legacy of land reform, and the clientelist politics of Ecuador that articulate at local, regional, national, and even international levels of scale (see Faas in press). Spanish colonists imported indigenous labor into the areas around the volcano in the late 16th century. This population took shape over the next three centuries into mestizo peasant communities tied to haciendas through debt peonage and systems

of corvee labor. When, in the early and mid-20th century, land reform legislation aimed at breaking up the hacienda political economy created a pathway to landownership for peasants, new groups of elites emerged, and consolidated larger landholdings among the majority smallholders in the region. These new elites often consolidated political power by serving as brokers of political patronage and access to institutional resources outside communities (Faas in press). Meanwhile, national and provincial political agendas at the end of the 20th and beginning of the 21st centuries could be characterized as exhibiting a malign ambivalence regarding smallholder lifeways. Government investment in services and infrastructure in the region had long been negligible and largely dominated by regional and local elites. After the eruptions, the largest state-funded resettlement programs placed erstwhile smallholding agropastoralists in landless urban grids, without land or any alternative economic resources (Faas 2015). Resettlers who alternated between their lands in the shadow of the volcano (the only viable livelihood strategy available to most) and their homes in the landless resettlements were subject to threats of eviction. Meanwhile, local elites occasionally organized their communities to report members of other communities for violations as they engaged in a sort of politics of deservingness in the resettlement environment in which productive resources were replaced by flows of aid as the principal objects of political competition.

One critique of the political ecology model—one that has been leveled against political ecology more broadly (Walker 2005)—is that environment is often bracketed out of analysis (Adger 2006; Wisner et al. 2004); though it is often considered a dependent variable, it is rarely, if ever, considered as a causal agent. While inequalities are produced by human systems, it is difficult to speak about risk, vulnerability, and disasters without factoring in human–environment entanglements, and some degree of ecological/material agency outside human action. One final model—one intimately related to political ecology—constitutes an attempt to resolve this enduring lacuna.

Wisner et al. (2004) developed a model of disaster vulnerability that spells out how social, economic, and political root causes, dynamic pressures, and unsafe conditions, combined with a hazard, produce a disaster. This model—known as the pressure and release model—comes from the field of ecology. Wisner and colleagues were concerned with bringing the environment back into consideration along with the social construction of vulnerability. Here, as pressure on a system increases, "the more likely the system will collapse or be forced to change into something new. Risk (of disaster) in this model is an expression of vulnerability and hazard—articulated conceptually as R (of D) = V x H" (Marino 2015:27). The idea is that disasters are a result of the interaction of both vulnerability and hazard. This is an express acknowledgement of the "internal conditions of vulnerability (e.g., lack of entitlements, lack of political will to demand government intervention) and the physical outcomes of [a given hazard] as a combined explanation for negative consequences" (Marino 2015:27). This model compels us to examine the social factors of the production of vulnerability around Mt. Tungurahua discussed above alongside the exposure model, but with some added temporal depth. We can point also to the significant damage of eruptions in 1773, when the region was evacuated, and the devastation to the region wrought by further eruptions in 1886 and again from 1916 to 1918 (Hall et al. 1999). And yet, the 20th century saw an expansion of human settlements in the region—largely as a result of the dual processes of land reform and the scarcity of land available to poorer agropastoralists—with little in the way of prevention, aside from seismic monitoring by the Ecuadorian Geophysics Institute since 1989 (Whiteford and Tobin 2009). Though several volcanic tremors caught the attention of volcanologists in 1994, nothing rose to the level of emergency, and there was no official information on risks posed by the volcano publicly disseminated to the public before the 1999 eruptions. The events of the 1999 and 2006 eruptions were therefore the consequences of mounting volcanic and settlement patterns accumulating into a highly precarious situation.

It is important to note that the differences between the political ecology and pressure and release models of vulnerability are more of degree than kind. In fact, as Marino (2015) makes clear, all four primary models of vulnerability vary chiefly in terms of their relative emphasis on social and environmental factors as causal agents. Yet, the political ecology and pressure and release models thus far represent two of the best attempts to critically examine both the social and environmental production of vulnerability. Indeed, some years ago, Oliver-Smith outlined a political ecology of disaster in which

> a necessary but not sufficient condition for a disaster to occur is the conjuncture of at least two factors: a human population and a potentially destructive agent. The society and the destructive agent are mutually constitutive and embedded in natural and social systems as unfolding processes over time (1999a:30).

Today, many scholars share the perspective that it is essential to consider both social and environmental factors, while underlining that human actions deserve special consideration.

Measurements and perceptions

Though we can point to an enduring struggle for a common conception of vulnerability, the preceding section makes clear that the core domains of vulnerability are well established. Of course, one reason for a lack of uniformity in theoretical frameworks of disaster and vulnerability is that "there is no single universally acceptable way of formulating the linkages between human and natural systems" (Berkes and Folke 1998:9, cited in Adger 2006:269). And while this diversity can perhaps be considered a strength more than a weakness (Adger 2006; Oliver-Smith 1999a), not surprisingly, the lack of consistency in frameworks of disaster and vulnerability presents serious challenges to effective measurement. Even some of the most ambitious attempts to synthesize the multiple factors considered in vulnerability constructs have had to confront of number of ensuing methodological challenges. Here, the important work of Susan Cutter and colleagues (Cutter 1996; Cutter et al. 2003) is instructive in this regard.

Cutter (1996:532–533) acknowledged that vulnerability had to account for hazard exposure, or the "magnitude, duration, impact, frequency and rapidity of onset"; and vulnerability of social response as "historical, cultural, social, and economic processes that impinge on the individual's or society's ability to cope with disasters and adequately respond to them" (Cutter 1996:533). She also importantly confronted the issue of determining the appropriate level of analysis—individual, social, or spatial. Cutter proposed the "hazards of place" model, which refers to geographic and social spaces and the people most vulnerable within them, essentially bounding social response and hazard exposure in space.

> In this conceptualization . . . risk (an objective measure of the likelihood of a hazard event) interacts with mitigation (measures to lessen risks or reduce their impact) to produce the hazard potential. The hazard potential is either moderated or enhanced by a geographic filter (site and situation of the place, proximity) as well as the social fabric of the place. The social fabric includes community experience with hazards, and community ability to respond to, cope with, recover from, and adapt to hazards, which in turn are influenced by economic, demographic, and housing characteristics. The social and biophysical vulnerabilities interact to produce the overall place vulnerability (Cutter et al. 2003:243).

Cutter and colleagues (2003) developed this model further by operationalizing a number of specific variables for measurement. Though they note problems with the tendency to use individual demographic attributes—age, race, health, income—as proxies for social vulnerability, they drew upon an extensive literature review to identify the most commonly specified variables in social vulnerability. They paired down 85 "raw and computed variables" from the 1990 U.S. Census into 11 composite factors: wealth, age, built environment density, single-sector economic dependence, housing stock and tenancy, African American, Hispanic, Native American, Asian, occupation, and infrastructure dependence (Cutter et al. 2003:249–252). This represents one of the more rigorous attempts to create a quantitative index to facilitate replicable measurement of vulnerability. Unfortunately, they found that there was a weak and negative relationship between this index and the frequency of disaster declarations by county throughout the 1990s. Moreover, while such an index might have proven instrumental in the United States and select other nations with readily available census data, such calculations would not be feasible in numerous other national contexts.

We must not only consider the framing and operationalization of vulnerability in particular context, but also who does the framing. And as a kind of disaster industry term, vulnerability has become a frame imposed upon other people. Within at-risk and disaster-affected populations themselves, it is often a matter of perception whether they recognize vulnerability and how they construe this. People may minimize the risks posed by hazards, refuse to recognize hazards, and deny vulnerability outright. At times, people recognize some risks and not others. And there are also communities that see themselves as frequently vulnerable to so many hazards, whether they are or not. Sometimes people

may fully recognize their vulnerability or exposure, but also understand that they have little choice but to live where and how they live. They are dealing with daily chronic risks that come with vulnerability and betting/hoping they will never become acute by hazard onset. There are also many instances where people contend with "risk perception shadows," or a historically constituted distrust of corporate and governmental statements regarding risk and hazards (Checker 2007; Stoffle et al. 1988). Finally, vulnerability is at once political and negotiated—people do consciously engage with political, economic, and hazard vulnerabilities; the vulnerable are not passive bodies on whom labels of vulnerability are imposed, but rather actively engage in the discursive framing of their practices and conditions.

Following the eruptions of Mt. Tungurahua in Ecuador, many locals resisted the imposition of the "risk zone" label on the region encompassing their homes and communities. While many had relocated to resettlement communities at a safe distance from the volcano, these resettlements lacked land and productive resources, and so residents returned to their homes in the officially designated "high risk zone" in order to work their lands. Locals were of course well aware of the risks posed by chronic ashfall—it reduced or obliterated crop yields and posed a health risk to both humans and animals—and made significant modifications in their agricultural practices as a result, including experimenting with new crops and animal species. And yet, people actively resisted the "risk zone" designation, often publicly downplayed volcanic risks, and local leaders periodically campaigned to reduce risk alert levels. Conversely, there were instances where locals welcomed (albeit somewhat begrudgingly) the use if the risk designation. In fact, people would engage in code switching between resisting and welcoming the risk designations. They saw the risk designation as inhibiting their access to scarce resources they saw as necessary for restoring their livelihoods. In the wake of the 2006 eruptions, the Ecuadorian state became reluctant to invest in infrastructure in the risk zone and private lenders regularly denied credit to people living and working in the shadow of the volcano. However, nongovernmental organizations were often attracted to working with "los afectados" (the [disaster] affected) and distributing aid and development resources in the region. People would therefore alternate the codes applied to the region, resisting risk designations they saw as impeding resource access, while applying the same designations to legitimize claims to aid from nongovernmental organizations.

The notion that there is some objective, expert perception of risks that can be somehow deposited into local and lay populations was long ago dispelled by studies that revealed a great deal of variation in perceptions of risk among the experts themselves (e.g., Slovic 1987). Many studies have attempted to uncover variables that reliably predict risk perception. In their cross-cultural study of risk perception in Mexico and Ecuador, Eric Jones and colleagues (2013) synthesized variables in three core domains: demographic (age, gender, education, population density, and religion), wellbeing (mental and physical health, household conditions), and the hitherto understudied factors of social network composition and structure. Remarkably, there was little consistency in variables associated with risk perception, results that point instead to locally embedded histories and relationships as better explanations for variation in risk perception.

Perception is framed by culture—shared patterns of meanings and relationships—which in turn affects the way people respond to environmental dynamics (Roncoli et al. 2009). In their examination of anthropological approaches to climate change, Carla Roncoli and colleagues (2009) encourage anthropologists to pay particular attention to how people perceive climate change, how they comprehend what they see (knowledge), how they value what they know, and how they respond individually and collectively. They point out that it is critical to understand the phenomena that people use as evidence that climate is changing. Noting that quantitative variation in variables in climate models does not necessarily point us to factors that are locally meaningful, Roncoli and colleagues argue that examining local and indigenous epistemologies can illuminate significant departures from normative parameters of environmental variations. It is important not to reduce these systems to mere signs and beliefs and it is very difficult to "disembed" this kind of knowledge and apply it out of context. However, while we do not know how well any given indigenous strategies will translate into long-term adaptations, we can use ethnography to help unravel the logics and practices that emerge from iterative and ad hoc adjustments over time. In her ethnography of the Kigiqtaamiut people's confrontations with climate change and attendant outcomes on the island of Shishmaref in Alaska, Elizabeth Marino (2015:31–41) found that locals' perceptions and interpretations of climate

change outcomes were remarkably consistent with scientific models. However, local perceptions of changes were decidedly nuanced and shared little with the often breathless hyperbole expressed by mass media coverage of issues in Shishmaref (Marino 2015:62–65). This leads us quite naturally to consider discursive cross-currents in vulnerability knowledge and imagination.

Vulnerability discourse and disaster risk reduction

In Haiti, many people refer to the 2010 earthquake as the "event," and the "disaster" was what came afterwards and what came before. There was no word for vulnerability in Kreyòl. People came to speak about vulnerability as being produced by policies that were championed by the United States (Schuller 2016). Many Haitian people noted the role of plantation slavery and the world's isolation of the country following the 1804 Haitian Revolution. Wisner and colleagues (2004) referred to this as "root causes." The dynamic pressures of the pressure-and-release framework developed by Wisner and colleagues began during the 1915 U.S. occupation, a 19-year military occupation that Haitian scholars (e.g., Jean-Baptiste 2012; Lucien 2013) argued centralized power in Port-au-Prince. A dramatic deterioration occurred following the implementation of neoliberal economic policies in the 1980s, and particularly after the ouster of the Duvalier dictatorship in 1986. The population of Port-au-Prince was 736,000 in 1986 and three million two decades later as a direct result of neoliberal economic policies (Dupuy 2010). This calls our attention to the fact that vulnerability is in many ways a product of development (Cuny 1983; Oliver-Smith 2013; Oliver-Smith, this issue) and the related issues of poverty, population, and environmental degradation (Cutter 1996).

Importantly, the issue of vulnerability as a product of development presents a bit of a double bind. On the one hand, vulnerability (or disaster prone) is one of several discursive constructions (after disease-ridden and impoverished) of the Global South that have been used to portray places in this domain as perpetually unsafe and justify perpetual intervention and (re)colonization (Bankoff 2001; see also Escobar 1995). On the other, several scholars have argued that disaster risk reduction policy and practice are myopically focused on detection, mitigation, and neutralization of hazard factors at the expense of focusing on uneven, unsustainable, and precarious processes of development that place some groups at greater risk of disaster than others (Oliver-Smith 2013; Wisner 2016).

Historian Greg Bankoff (2001) sees vulnerability as following tropicality and development as a Western othering of the Global South as perpetually dangerous and in need of Western intervention. The development of germ theory provided an expert means for the West to "cure" the disease-ridden tropics. Bankoff sees this as in many ways an outgrowth of the U.S.-Western European Cold War strategy of replicating purportedly advanced Western political economies around the world, creating a mission to eradicate a newly imagined poverty while creating donor/recipient dependencies on top of capitalist economies predicated on the extraction of natural resources from underdeveloped nations. These processes take people and places out of their own histories and place them on the timelines of Western marches of progress and development, from tradition to modernity. Furthermore, this is no longer merely a Western vision of the Global South, but one now often internalized in these regions (Bankoff 2001:23; Escobar 1995:214).

Bankoff notes that the disparate frequency of disaster and the magnitude of disaster impacts in the Global South—which has preoccupied disaster researchers for decades—goes beyond mere geography and demography. He notes that the impacts of disaster have been aggravated by inequalities hard coded into international agreements and, more importantly, "created by particular social systems in which the state apportions risk unevenly among its citizens and in which society places differing demands of the physical environment" (Bankoff 2001:25). Importantly, this clarifies that vulnerability is produced in specific historical processes, by relationships between particular sets of actors, and as part of a human–environmental entanglement; arguably a synthesis of human and environmental factors in the production of vulnerability and disaster. But, as Bankoff's own work demonstrates, vulnerability is an imposed condition that is the outcome of systems of structured social inequality and the maldistribution of risk. Elsewhere, he adroitly uncovers the specific historical processes of population growth, massive urbanization, the settlement of urban poor, squatters, and informal settler families along riverbanks and flood-prone areas, in addition to accumulations of refuse in drainage canals and declines in basic services as exacerbating the preponderance of topographical and hydrometeorological

factors that create the conditions for disasters in the Philippines (Bankoff 2003). Revealing the historical production of vulnerability in this way begs a reevaluation of the logic of merely technological solutions to reduce risk and vulnerability; instead, we are given to question the unequal and (spatially) uneven development that fosters the production of these conditions over time. Vulnerability may be a trope in elite discourses about poverty and disasters, but it is also a lived (and resisted) set of social relations and material circumstances that are concretely experienced on a chronic basis and in the event of hazard onset, rather acutely. In point of fact, then, hazard onset turns chronic risk into acute risk and ultimately disaster.

In their study of the experiences of the Wutai Rukai indigenous people of Taiwan in recovery and resettlement after Typhoon Morakot, Hsu et al. (2015) point out that the discursive construction of vulnerability is not merely a dialog of the West about the tropics, the Global South, or the Third World. Instead, they argue that Western nations are hardly at the center of all colonial and postcolonial histories and investigations into the historical production of vulnerability should focus on the particular histories and power relations of a given place. In the case of the Wutai Rukai in Taiwan, they point to histories of Dutch colonial rule, but also to the Koxinga, the Qing dynasty, Japanese colonial rule, and the current Kuomingtang rule and the bevy of nongovernmental organizations operating in the postdisaster context. These nested histories have had the cumulative effect of sidelining the indigenous peoples of Taiwan in decision making regarding their own disaster recovery and resettlement. They call attention to the "procedural vulnerability" (after Veland et al. 2013), or the means by which indigenous peoples are considered as having capacity deficits in disaster response and recovery and their relationships to power (rather than environment) and their capacities for self-determination in the context of these power relations. This not only directs our gaze to particular histories of pre-disaster vulnerability, but also the ways in which the state and nongovernmental humanitarian organizations can reify vulnerabilities in response and recovery efforts, sidelining local capacities and knowledge and treating them as objects to be controlled and treated by expert specialists (see also Marchezini 2015).

From suffering subjects to agency

In many ways, anthropological focus on vulnerability has made sense in terms of broader themes in anthropological imagination. The emergence of the vulnerability concept in the mid-1970s through the 1980s roughly corresponded with the disappearance of the "savage" and the emergence of the "suffering subject" as the principal focus of the anthropological gaze (Robbins 2013). The suffering subject elicited empathy, rather than otherness; it called attention to shared humanity, injustice, and critical questions of power. It has also, however, proven problematic in terms of our understanding of culture and human agency. The vulnerability concept has, at times, suffered from the same issues. Uses of vulnerability have been critiqued for assuming that disaster affected peoples are powerless victims, which has inspired many humanitarian agencies and workers to miscalculate and undermine local adaptive capabilities (Blaikie 2010:5; Zhang, this issue; Maldonado, this issue).

In her spectacularly rich ethnography of the 2004 tsunami impacts, response, and recovery in Sri Lanka, Michelle Gamburd noted that the seemingly passive responses of disaster-affected peoples "may stem from the centralized, bureaucratized, top-down approach taken by those who administer aid" (Gamburd 2013:7). Gamburd still finds the concept compelling and is able to see her way past the subsumption of agency into vulnerability in her telling of the tales of specific actors affected by the tsunami. Living on marginal lands, lacking resources, and gender and caste status all affected villagers' susceptibility to harm and ability to mitigate the effects of and recover from the tsunami. She found, however, that among those with shared sociodemographic characteristics, some lived and some died; some faced certain challenges in obtaining government compensation that others did not; and all the while they may have superficially shared many of the markers of vulnerability. People's actions, it turns out, matter for the consequences they face in disaster.

It often proves difficult to imagine agentive maneuvers for suffering subjects and the empathic underscoring of shared humanity is also prone to a naïve realism that imagines people's perceptions and practices are all basically the same beneath superficial cultural garbs. The suffering subjects may be going the way of the savage slot in anthropology, but exactly what subjects will come in their place remains a matter of speculation (Robbins 2013). What remains critical for the enduring purchase of the vulnerability concept is that social scientists consider it as part of a set of conditions that constrain or afford agency, not a condition that precludes it. Specific

local actors in disasters may operate at the interstices between local and global power, but it would be mistaken to consider them as passive victims.

Official definitions

One glaring and persistent problem with vulnerability is that social variables are commonly ignored in official vulnerability assessments (see Oliver-Smith, this issue). Throughout the 1990s, frameworks for policy and action were almost exclusively restricted to hazard exposure. The United Nations' International Decade of Natural Disaster Reduction (IDNDR) of the 1990s used hazard-centric vulnerability assessments to anticipate potential damage and mortality from extreme environmental events (Cutter 1996:529). At the time, the U.S. National Oceanic and Atmospheric Administration's Areal Locations of Hazardous Atmospheres system likewise modeled potential exposure to airborne toxic releases and the Environmental Protection Agency's Computer Aided Management of Emergency Operations also long employed exposure indicators for planning and real-time responses (Cutter 1996:535).

In the Hyogo Framework for Action, the 2005–2015 global framework for disaster risk reduction brokered by the United Nations Office of Disaster Risk Reduction, vulnerability is defined as: "The conditions determined by physical, social, economic and environmental factors or processes which increase the susceptibility of a community to the impact of hazards" (United Nations Office for Disaster Risk Reduction [UNISDR] 2005:1). There is a decided lack of specificity in this definition, including the vague distinction between "physical" and "environmental" conditions and the abstract use of the word "community" (Wisner 2016). Ben Wisner (2016) also points out that this definition lacks any reference to politics, power relations, institutional failures, or intentionality (be it malign or beneficent, as in the Wisner et al. 2004 definition). The problem here is that silences on these factors in the policy prescriptions of an international body such as the UNISDR means that targets for progress on addressing issues of development, social inequalities, and political roadblocks are absent from performance targets and priorities for action. What is more, such lacunae guide others away from attention to the nuanced social variables that are fundamental to the critical concept of vulnerability (for more on disaster risk reduction, see Oliver-Smith, this issue).

Discussion and conclusions

The problem of vulnerability remains complex. How do you measure it? Can you quantify it? In some ways, what has happened with the term is that it is now subject to certain kinds of caveats. Some persist in seeing it as a mere matter of exposure. Other people criticize it because they say it has been conflated with poverty; that not all poor people are equally vulnerable. Some, for example, have said that labeling a community as vulnerable in effect robs it of agency; that you can be poor and at the same time be able to absorb or deal well with an environmental hazard. Of course, one major criticism is that vulnerability has morphed into a policy instrument, which is interesting in and of itself; the same thing has happened with resilience (see Barrios, this issue). Vulnerability started out as an analytical—and sometimes descriptive—concept, but it has morphed into a policy device in both the disaster and the climate change communities (Oliver-Smith 2013:278). When that happens, more often than not, it becomes simply a descriptive term. It was developed to be a critical concept but it is now frequently reduced and dehistoricized in some ways; in other words, it is used to describe a set of conditions, not why. Vulnerability was about describing *how* and *why* people were vulnerable, but the concept is frequently defanged and stripped of its criticality.

And yet, we would caution against abandoning the concept. If anything, conceptual debates about the rightful degree of emphasis on social, political, and environmental factors call attention to a range of problems and promises that enrich our understanding and interrogation of the concept of vulnerability as it is lived and experienced by real people. Furthermore, we would argue, along with Ben Wisner (2016), that the absence of critical attention to social and political factors in policy frameworks and, to a lesser degree, some scholarship, is hardly cause to jettison the concept, but instead good reason to argue for the criticality of vulnerability and campaign for attention to social and political factors in these frameworks. Importantly, we see this as including concerted efforts to foster a willingness to question and seek alternatives to development strategies that produce and exacerbate risk.

Careful readers will note that the review of contributors to theories of vulnerability in this essay includes a range of contributions outside anthropology—including geography, sociology, engineering, history, ecology, and psychology, to

name a few. The perspectives brought from scholars from each of these disciplines have enriched our debates and understanding of vulnerability immeasurably. Undoubtedly, scholars and policy makers will continue in the laudable pursuit of robust measurements—including social and political variables—to help anticipate vulnerabilities and reduce risk. We do not, however, think that this is the primary course of anthropological contributions to the disaster scholarship, policy, and practice. Instead, we see the value of anthropology as rooted in the ethnographic lens and the ability to capture how processes play out in particular contexts among situated actors. This is not to advocate "just so" etiologies, but rather an endorsement of the enduring the value of historically rich ethnographic approaches that uncover the historical production of disaster—particular constellations of environmental, social, economic, discursive, and political processes—without rendering people as passive victims, but active agents capable of maneuver. From our vantage point, it is difficult to see what anthropological subjects take the place of the suffering subject, yet we are confident that we must pursue the dialectical tensions between discourse and practice, suffering and agency, power and powerlessness, and be mindful to ground our work in encounters with actual people in real situations.

Note

Acknowledgments. The author is tremendously grateful to contributors to this manuscript, Anthony Oliver-Smith, Mark Schuller, and Susanna Hoffman, and to his co-panelists, Roberto Barrios, Tess Kulstad, Julie Maldonado, and Qiaoyun Zhang. The author would also like to thank Elizabeth Marino for stimulating his thinking on many of the issues he discussed in this article. The study of recovery and resettlement following the Mt. Tungurahua eruptions was funded in part by the National Science Foundation (0751264/0751265, Collaborative Research—Social Networks in Chronic Disasters: Exposure, Evacuation, and Resettlement), a National Science Foundation Dissertation Improvement Grant (1123962), and the Public Entity Risk Institute's (PERI) Dissertation Fellowship in hazards, risk, and disasters.

1. This special issue and each contribution within it is based on a question considered in the plenary panel, *Continuity and Change in the Applied Anthropology of Risk Hazards and Disasters*, at the 75th Annual Meeting of the Society for Applied Anthropology in Pittsburgh in 2015. This article features contributions from Anthony Oliver-Smith, Mark Schuller, and Susanna Hoffman, to whom the author is exceedingly grateful.

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