

Culture and Ecology

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Abstract

Ecological psychology has boomed from a rare form of psychology to a flourishing field, including psychologists, sociologists, and economists. We review the development of the field from early studies to more recent advances in subsistence theories, environmental challenges, human environments, economic environments, and political environments. We also discuss frequent challenges in ecological psychology, such as reverse causality and ecological determinism, as well as ways to address these challenges. Finally, we outline paths forward including understudied regions and micro cultures.

Keywords: culture, ecology, social ecology

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During the cognitive revolution, psychologists mostly assumed that the human mind was like a computer. In that metaphor, computers process information the same way whether they are in Beijing or New York. But in the 1980s and 1990s, some psychologists became fascinated with the idea that even basic processes like thought and perception could be different in different cultures. For the next few decades, cultural psychology boomed. Psychologists rushed to find differences in the way people think differently and relate to people differently.

But amid the rush to find differences, most of the researchers left one critical question for later: Where do these differences come from? Psychologists have made sporadic attempts to try to explain cultural differences in the past. But in the last 10 years, psychologists have started devoting more time to testing different theories of where culture comes from. This chapter reviews research on one type of explanation: ecological theories of culture.

What are Ecological Theories?

Ecological theories see culture as a response to the demands of the environment. That environment can be literal, such as mountains and rainfall. The environment is clearly a strong explanation of why sailing is central to Pacific Islander culture and why farming was an important feature of American culture but not Inuit culture.

The environment can also be more figurative, more social (for reviews of social ecology, see: Oishi, 2014; Oishi & Graham, 2010). For example, the number of times people in a community have moved within the last 10 years is a part of the environment, and it can influence how likely people are to know their neighbors (Pettit & McLanahan, 2003; for a review, see Oishi, 2010). The environment can even be something non-physical and hard to measure, like how much people in a nation trust strangers (Fukuyama, 1995). And sometimes

the environment is both concrete and manmade, such as the unending uniformity of American suburbs (Oishi & Talhelm, 2012).

1: Early Ecological Studies

Early Ecological Anthropology

In his review of anthropology, Helm (1962) argued that the founders of anthropology were ecological. There were the early anthropologists Edward B. Tylor (the author of the 1871 book *Primitive Culture*) and Lewis H. Morgan (the author of the 1877 book *Ancient Society*). They saw technological advance as a major ecological variable that drives cultural change. From the start, much anthropology was ecological.

Early anthropologists also studied the types of subsistence styles that the environment made possible. For example, the North American plains supported large herds of buffalo. Egypt's Nile River supported farming. Anthropologists Friedrich Ratzel and Otis T. Mason wrote about the importance of these types of "food areas." The influence of food environments is the most obvious in harsh environments, such as in the arctic environment of Inuit culture.

As far back as the 1930s, when anthropologists described different cultures, they spent much time on the environment. For example, C. Daryll Forde described the environment of cultures around the world from African Masai cattle herders to Hopi farmers in North America in his 1934 book *Habitat, Economy and Society*. Alfred L. Kroeber (1947) divided North America into different subsistence and cultural regions. In his 1936 book *The Economic and Social Basis of Primitive Bands*, Julian Steward argued that hunting and gathering is best suited to patrilineal social structure.

Yet not all of anthropology was ecological. Hallowell (1949) explicitly criticized anthropologists for ignoring the environment. He argued that many anthropologists implicitly assume that "culture is a phenomenon, *sui generis*," or born out of thin air (p. 36). In his own

research, Hallowell used ecological data to understand the hunting systems of Algonquian tribes in North America. He analyzed variables such as the size of hunting grounds, the size of hunting group, and the ratio of active hunters to others. He also analyzed the resources available in different environments, such as which environments had lots of fur animals and different food types.

Historical Materialism

Arguably the most influential ecological theory was Marx's historical materialism (Marx & Engels, 1970). Marx's theory held that production systems were essential to culture. For example, Marx classified cultures into modes and structures such as primitive communist, feudal, and capitalist.

The German-American historian and playwright Karl Wittfogel built on Marx's theory in his "hydraulic hypothesis." Wittfogel (1959) started from the observation that Asian countries like China and Japan had strong despotic governments. Wittfogel explained this using Marx's emphasis on the mode of production. Wittfogel argued that India and China relied on large-scale irrigation, which lent itself to large forced labor projects. Since only a strong, centralized power could coordinate these programs, many societies in Asia developed into despotic empires. However, more recent scholars have argued that Wittfogel got some of the basic facts wrong. For example, most irrigation networks in China were coordinated at the village level (Bray, 1986; Elvin, 2008).

Although Marx is no longer mainstream, modern subsistence theories also focus on how societies made a living (Nisbett, Peng, Choi, & Norenzayan, 2001). In the tradition of materialism, anthropologist Marvin Harris studied how culture grew out of a response to environmental pressures. For example, he explained cannibalism in Aztec culture as a response to protein deficiency (Harris, 1977). He explained the Muslim prohibition on pork partly as a response to the fact that pigs root through the soil, which damaged the fragile soils

in Israel and the Middle East, where the prohibitions originated (Harris, 1975). He also argued that this could explain why Islam spread to the drier parts of western China, but not the wetter parts of eastern China, where the environment can support pigs.

It is important to understand these earlier ecological theories in the context of the time. Harris was arguing against researchers who believed culture was a reflection of genetic selection or inborn traits. For example, when Harris was explaining the warlike culture of the Yanomamo people of South America, he was arguing against people who thought this ferocity was genetic.

Ecological anthropologists like Harris were in the middle. They rejected earlier biological anthropology that saw cultural differences as inborn or entirely genetic. At the same time, they rejected symbolic anthropology, which views culture as a primarily or exclusively human construction.

Early Psychological Studies of Ecology

Against this backdrop, some early psychologists started studying culture as a response to the environment. One series of early ecological studies in the 1960s tested whether growing up in different physical environments affected people's visual perception (Segall, Campbell, & Herskovits, 1963). Researchers tested European Americans and 12 populations in Africa on common visual illusions like the Muller-Lyer illusion (Figure 1). They found European Americans and European South Africans were more susceptible to the illusion than some of the other African populations.

Psychologists thought of these illusions as fundamental, so why would people in different cultures be less susceptible? The researchers argued that Europeans were more susceptible to the illusion because they live in environments with more right angles—for example, the corners of modern rooms. The sorts of acute and obtuse angles in Figure 1 condition people to infer a three-dimensional rectangular space, which leads to the illusion

(Segall et al., 1963, p. 770). In contrast, people living in homes without modern carpentry or who spend more time outdoors do not see as many of these carpentered right angles. Thus they are less likely to infer a three-dimensional rectangle.

However, this does not mean that people in more natural environments are always better at perceptual illusions. Americans were less susceptible to the horizontal-vertical illusion (Figure 2). The researchers hypothesized that the horizontal illusion is caused when viewers subconsciously infer that the vertical line extends away from them in the visual field. That sort of inference would be more common for people living on open plains. In sum, there is some evidence that our physical environments affect even something as basic as a subconscious visual illusion.

Early Subsistence Theories

One major line of ecological theories is subsistence theory. Subsistence theories argue that the way people in a culture make a living—hunting and gathering, fishing, herding— influences their culture. In the 1950s and 1960s, Barry ran studies testing whether food accumulation is important for culture (Barry, Child, & Bacon, 1959; Berry, 1967). Farmers accumulate and store food because harvests are not spread out evenly through the year. In contrast, some hunter-gatherers and fishing cultures have more steady sources of food throughout the year.

Berry argued that cultures that accumulate food are more interdependent because they have to decide how to distribute the harvest throughout the rest of the year. Barry tested how much people conformed to other people's answers even when those answers were obviously wrong on the Asch (1956) social conformity task (Figure 3). He tested Temne farmers in Sierra Leone (who accumulate food) and Inuit hunters in northern Canada (who accumulate less food). Consistent with the theory, the Temne farmers conformed more than Inuit hunters.

The anthropologist Walter Goldschmidt (1971) tested a different version of subsistence theory that was not about food accumulation. He argued that the work of farming is more interdependent than herding. For one, herders do not depend on other people to complete their work as much as farmers. Second, herders move around a lot. This gives them more options for avoiding other people: “When conflict arises, they find it possible simply to move away from it” (Goldschmidt, 1971, p. 135). Because farmers are tied to their fields, they cannot just move away from conflict.

To test this idea, he studied people in four East African tribes that all had subgroups that herd and farm (Edgerton [1965] discusses the design of the study). He found that herders were far more independent than farmers, even though they were from the same tribe. By testing people in the same tribe who differ on farming and herding, Goldschmidt could help rule out variables that make it hard to compare two different cultures, like language and religion.

2: Modern Ecological Studies

Researchers have continued to test ecological theories in modern times. In *Guns, Germs, and Steel*, Jared Diamond (1997) proposed a complex ecological theory of European civilization. He outlined how Eurasia’s temperate climate and fertile soils gave rise to food surplus and plenty of domesticable animals early on. Over time, this gave Eurasian civilizations an advantage by providing food sources (e.g., chicken), military force (e.g., horse), and health (e.g., resistance to viruses). In Diamond’s view, these factors helped Europe dominate the world after the end of the medieval period.

Modern Subsistence Theory

One stream of research in the last 20 years has picked up the tradition of subsistence theory. Nisbett and colleagues summarized dozens of findings of cognitive differences between the East and West and argued that these differences stem from traditions of farming

in the East and a mix of hunting, herding, fishing, and trading in the West (Nisbett, 2003, p. 34; Nisbett et al., 2001). They argued that the West—and particularly Ancient Greece's—history of herding has given the West a more individualistic culture. In contrast, farming made up a bigger part of subsistence in East Asia, and farming leads to enmeshed, tight relationships.

Methodological Issue: How Can We Test for Causality?

At this point, savvy readers will notice a problem. How can we be sure of our explanations for differences between large cultural blocs like the East and West? There are lots of differences between East and West—development, language, religion, and warfare to name a few. How can we know that farming and herding made any difference to these cultures?

Cultural psychologists are limited because we cannot run true experiments. We cannot randomly assign one culture to herd for thousands of years and another culture to farm for thousands of years and see what happens. This prevents us from attaining the gold standard certainty of causality.

However, cultural psychologists do have other tools that can get us closer to causality. One common tool is controlling for third variables in regression analysis. Another tool is natural experiments. If we can find nearby areas that are similar on most variables but different on the variable we are studying, we can get a stronger test of whether that variable affects culture.

Uskul and colleagues (2008) found a natural experiment in Turkey. They tested people in nearby villages that share linguistic and cultural backgrounds. However, they differ in how they make a living—some farm, some fish, and some herd. They found that people in the farming and fishing communities had a more holistic cognitive style (more common in collectivistic cultures), whereas the herders had a more analytic cognitive style (more

common in individualistic cultures). This type of controlled case study offers more precise evidence that differences in subsistence style can cause differences in psychologies.

Most tests of subsistence theory have compared completely different styles, such as herding versus farming. Talhelm and colleagues (2014) tested whether different forms of farming can produce different cultures. Not all types of farming are the same. We tested whether Han China's rice-farming south has a different psychological culture from the wheat-farming north (Figure 4).

Why is rice farming so different from wheat farming? First, traditional paddy rice required about twice the number of man-hours per acre than crops like wheat did (Fei, 1945, p. 214). Second, rice farmers often built irrigation networks, which forced farmers to coordinate when they filled and drained their fields.

In contrast, wheat farming required about half the number of hours of work, and wheat farmers usually relied on rainfall. This means wheat farmers had less of a need to work together; rain falls whether families cooperate or not. Thus, wheat farmers had more freedom from their neighbors than rice farmers.

We found that Chinese students who had grown up in rice provinces were more interdependent and holistic-thinking than students from wheat provinces (Talhelm et al., 2014). There were even cultural differences among nearby counties along the rice-wheat border in central China. Even though counties along the rice-wheat border mostly share government, ethnicity, and religion, the different environments pushed the north and south toward different crops and different cultural styles.

Alesina and colleagues (2013) analyzed another distinction between different types of farming—whether farmers planted crops that required heavy plows or not. Crops like wheat, barley, rye, and paddy rice usually grow best in plowed fields, and people that grow these crops used heavy plows. Much of Western Europe and North America has a climate and soil

suited for plow crops like wheat. In contrast, crops like millet, corn, and sorghum can thrive in fields that are only lightly raked or hoed. Drier areas like Botswana, Kenya, and Tanzania in south central Africa have a hard time growing wheat and barley, but they grow non-plow crops like millet.

This is important for culture because plows require significant upper body strength, which is one of the largest biological differences between men and women. Thus, plow cultures developed a starker division of labor between men (who could plow) and women. But this division was not so stark for cultures that farmed crops like millet, which did not require so much upper body strength. Thus, women and men could contribute more equally to farming.

Alesina found that cultures' history of plow use affected women's position in society. Plow cultures—even in the modern world—have lower rates of female labor force participation, fewer female entrepreneurs, and fewer females in government. In the World Values Survey, people in plow cultures are more likely to say that men and women should have different roles in society.

The differences are particularly surprising among poor countries. It is intuitive to think that poor countries have traditional views on gender equality, but there were stark differences even between cultures with developing economies. For example, in Pakistan (a plow culture), 16.1% of women work; in Burundi (non-plow), 90.5% of women work.

One theme that runs through subsistence theory is the surprising finding that elements of our past can continue to affect our behavior today, even long after most people have put down their plows and moved to office jobs. One extreme example comes from Nisbett and Cohen's (1996) study of the US south's culture of honor. They built on a study of immigration to the original US colonies showing that the Appalachian south was settled by

people from herding cultures like the Scots-Irish. In contrast, the Yankee northeast was settled by English farmers and middle-class craftsmen (Fischer, 1989).

Nisbett and Cohen argued that herding influenced the South's attitudes towards violence and honor. Why? One thing that makes herding different from farming is that herders' property is easy to steal. Cows and sheep are incredibly valuable, and thieves can steal them in the time it takes their owner to nap. In contrast, fields of wheat and rice take hours and hours of hard work to harvest. Farmers did not wake up in the middle of the night to find thieves harvesting their wheat.

If herders have stealable property and live in an area where there is not adequate law enforcement, they must present a credible threat to thieves. Toughness is more of a cultural virtue in herding cultures. This is what Nisbett and Cohen (1996) found when they tested people from the South and the North. For example, they sent fake resumes to companies in the North and South in which the applicant admitted to killing someone. Yet the applicant explained that the deceased had had an affair with his wife (a classic affront to honor), and he had served his jail time. Southern companies were more likely than northern companies to respond to the applicant.

In another study, the researchers arranged for a confederate to bully participants and see whether participants would confront him. Participants came to the lab and started drawing pictures as a part of a study. The confederate then began annoying the participant in a series of scripted steps. He called the participant "slick," wrote this new nickname on the participant's paper, and even crumpled up his paper, threw it toward the waste basket, and "accidentally" hit the participant. The Southerners were more likely to take the abuse quietly at first and then explode in anger; northerners were more likely to argue at first, but then take the rest without fighting back.

Finally, Nisbett and Cohen analyzed public data on violence. They found higher rates of honor violence in the South, such as shootings based on an argument or an extramarital affair. However, there were no differences in non-honor killings, such as killings during robberies.

Although these studies have provided evidence that places with different historical subsistence styles have different cultures, one limitation is that most studies compare two cultures. Henrich and colleagues (2005) scaled up subsistence theory by testing more cultures and trying to abstract the general principles of subsistence across cultures. Instead of comparing, say, farmers and herders, they tested people from 15 small-scale societies around the world, from Polynesian whale hunters to nomadic foragers in Tanzania. They had people in each society play standard economic games like the ultimatum game (Figure 5).

To measure subsistence style, researchers ranked the different cultures on variables like market integration. They focused on market integration because dealing in markets gets people accustomed to making exchanges with strangers, thereby building norms of cooperation with strangers. They found that people in societies with more market exchanges were more likely to make generous offers to strangers in the ultimatum game. Furthermore, cultural-level variables (whether a culture had lots of market interactions) explained far more variance in people's behavior than individual-level variables (such as whether a person participates in market exchanges or not).

Reverse Causality: Are Cultural Practices a Response to the Environment?

One question that runs through many studies of culture and environment like these is reverse causality. For example, think of the independent herders and collectivistic farmers that Goldschmidt studied in Africa. Maybe one group was more independent in the beginning, so they decided to start herding because it fit their values. And maybe the other groups were already more collectivistic, so they decided to become farmers. If so, the subsistence style is

not changing the culture. Instead, their culture is determining what subsistence style they choose.

Goldschmidt argues against this interpretation. He writes that independence is “not merely a matter of personal choice, but is necessitated by environmental circumstances—i.e., it is an ecological adjustment” (p. 136). Most socio-ecologists similarly argue that cultural practices like farming usually depend on which activity is the most productive in different environments and not what people *want* to do, as if they were choosing from a menu of lifestyles in a restaurant. People generally adapt to their local environment to maximize the payoffs.

One way to test this question is to analyze the climates in different areas of the world to see which types of farming are possible in different areas. In their study of plow use, Alesina and colleagues used a climate database from the United Nations Food and Agriculture Organization to test which areas of the world have the climate to grow plow-suitable crops (such as wheat, barley, rye, and paddy rice) versus non-plow crops (such as millet, corn, and sorghum; Alesina et al., 2013). Using this method, they can test whether a non-human-controlled variable (climate) is related to cultural practices. If so, it is unlikely that human choice (reverse causality) is the key factor.

Similarly, in our study of rice and wheat in China, we analyzed climate statistics to determine whether China’s rice and wheat regions were determined by what people *wanted* to plant versus what they *could* plant (Talhelm et al., 2014). In theory, farmers should plant paddy rice if they can because it produces far more calories per acre than crops like corn and wheat (Bray, 1986). For example, researchers in the 1930s found that Chinese rice farmers were producing 223 kilograms of rice per 666.5 square meters. Wheat farmers were producing 141 kilograms. Thus, places that have the right environment to plant paddy rice “should” be planting paddy rice.

This is what actual farming data showed in China. The potential to grow rice on farms was correlated very highly with actual rice production ($r = .85, p < .001$). Thus, rice farming in China seems to be more consistent with maximizing payoffs based on the environment, rather than people choosing the crops they want to farm.

However, we should not pretend that climate is simple. One type of climate can support many different patterns of living, and those styles can change over time. For example, modern-day California can produce many types of crops, such as broccoli, grapes, and even rice. But over the last few years, the price of almonds has gone up, and farmers have been ripping out other crops to plant more almonds (Smith, 2015). Even in a single climate, farmers can grow different crops. Climate constrains production, but it does not completely determine a single crop that must be planted.

Controversy: Is Ecological Psychology Ecological Determinism?

In the discussion of how the environment shapes culture, it is easy to make oversimplifications. People wary of these oversimplifications have sometimes accused ecological theories of “ecological determinism.” Ecological determinism is the extreme view that the environment completely determines culture. In the extreme, we would say “if you have X environment, you necessarily have Y culture.” If Brazil and Cambodia both have rainy, humid environments, they should have exactly the same cultures.

One reason “ecological determinism” is a dirty name is that oversimplified ecological theories rob humans of agency. If the external environment determines what sort of culture we have, then humans are passive cogs in a machine. And if so, is there any room left for humans to interpret their world through things like religion and philosophy? Surely the environment is not everything.

However, ecological theories need not be so deterministic. Virtually all cultural psychologists would agree that many factors influence culture. The environment is one factor among many—cultural sharing, genetics, and technology to name a few.

Another way to say this is that different cultures can arise from the same environment. Even in a single environment, cultures change how they interact with that environment over time. For example, in the early 1900s, Americans discovered large oil deposits in Texas, and a massive drilling boom started (Olien, 2010). That boom peaked in the 1970s, and it shaped the Texas economy. But eventually oil production shrank to a small portion of its former size (Olien, 2010).

However, that did not mean all the oil was gone. The ground had a lot more oil in it, but it was too hard to get out of the ground. All of that changed in the 2000s when the new hydraulic fracturing technique (fracking) allowed drillers to get to that locked up oil. Thus, even with a fixed amount of oil under the ground, technology has changed how humans have used that oil over time.

Cohen (2001) describes how very different cultures can grow even in similar environments. For example, he argued that people's decisions about whether to trust other people depend on the dominant social norm in an area. If people tend to violate trust, newcomers are pushed toward using the same strategy. That can lead cultures to a stable equilibrium that is hard to break. Thus, a single environment could host a trusting culture or a low-trust culture depending on the norms of the settlers and the institutions they build (Cohen, 2001, p. 457).

For that reason, most ecological psychologists hold a more nuanced version of ecological theories. One way to formulate this more nuanced version is that different environments present opportunities and problems, and people can respond to these problems

in different ways. However, some responses may be more common than others, and these encourage similar cultural adaptations.

One way to illustrate this “environments present problems” version of the theory is through China’s rice farming. The ecological determinism version of the rice theory is to say that rice farming causes cultures to be collectivistic. But Talhelm (2015) explains how the theory is actually more complicated. Irrigated paddy rice presents a problem: It requires more work than many other staple crops (Buck, 1935).

Lots of different cultures have farmed rice, but they have solved the labor problem in different ways. One of the most common ways to solve the problem was to form cooperative labor exchanges. Rice farmers in China, Japan, Malaysia, and Sierra Leone helped farm each other’s fields during peak labor times (Bray, 1986; Richards, 1987).

But people in other cultures solved the problem differently. Some US landowners in southern states like Georgia “solved” the problem by forcing slaves to plant the rice. And in modern times, farmers in Australia have used diesel plows and even airplanes to seed their rice fields. Even though all of these areas had the right environment for rice, they built different cultures around it.

3. Environmental Challenges

Disease

The environment’s capability to support rice farming or herding can be thought of as an opportunity, but environments also present challenges. One series of studies has focused on pathogen prevalence, the frequency of diseases in different areas. Tropical environments have high pathogen prevalence, but dry and cold climates are too harsh for many diseases, and so they are lower on pathogen prevalence. Areas that freeze in the winter time have some of the lowest rates because freezing temperatures kill many types of bacteria.

Several researchers hypothesized that pathogen-rich environments would make people more collectivistic and more likely to shun outsiders because outsiders are more likely to be a germ threat (Fincher, Thornhill, Murray, & Schaller, 2008). In fact, countries with higher disease prevalence rates score higher on measures of collectivism (Fincher et al., 2008). Regions with higher disease prevalence score lower on extraversion, openness to experience, and open sexual behaviors (Schaller & Murray, 2008).

A team of economists took a different approach to disease (Acemoglu, Robinson, & Johnson, 2003). From the 1600s through the 1800s, Europeans colonized many parts of the world. Yet, some of those environments were extremely inhospitable to Europeans. For example, a British committee deciding where to send convicts considered a site on the Gambia River in West Africa, but they decided against it because the mortality rates for Europeans there were too high—even for convicts.

The researchers argued that mortality rates were important for culture because mortality rates affected what type of colonies the Europeans set up. When Europeans found they could live and survive in a region, they tended to establish settler colonies with more infrastructure and institutions. When Europeans found it was hard to settle and survive in a region, they tended to neglect institutions and instead set up short-term extractive economies (for example, mining gold).

The economists found that this historical legacy persists into the modern day (Acemoglu et al., 2003). Countries that had high European mortality rates in the past now have far lower GDP per capita than countries where Europeans could survive. Their study suggests that the environment was important in determining whether colonies set up functioning institutions.

The difference between how the economists and psychologists approached the same problem gives an interesting example of how the two disciplines tend to think of cause and

effect. The psychologists focused on psychological adaptations to disease—xenophobia and low extraversion. The economists focused on external institutions—extractive industries that are not conducive to market economies and democratic representation. Researchers in both fields looked at how disease affects human culture but came up with very different mechanisms to link disease and modern culture.

Natural Disasters

Natural disasters like earthquakes and floods are another type of challenge that cultures face. Gelfand and colleagues (2011) hypothesized that natural disasters tend to create chaos, so cultures that frequently face natural disasters try harder to maintain order. These cultures punish people more harshly for deviant behavior and have stronger social norms. They also theorized that other threats would push cultures to enforce tight social norms—resource scarcity, high population density, diseases, and invasions. In contrast, when people are in safer environments, they are more flexible and tolerant of different behaviors.

To test the theory, they asked people in 33 nations to rate how acceptable different behaviors were in different situations. For example, how acceptable is it to eat in a bank, on the sidewalk, or in the workplace? How acceptable is it to flirt in a public park, in a classroom, or at a funeral? Cultures with higher rates of natural disaster had more restrictions on people's behavior $r = .47, p = .01$ (Gelfand et al., 2011).

Other researchers have studied the opposite perspective: What happens when cultures develop in safe, fertile regions? Galor and Özak (2014) found that areas with high potential crop yield before 1500 tended to have cultures with long-term orientation. They are more oriented toward future rewards, perseverance, and thrift. The main idea is that if the natural environment is benevolent and predictable, people who live in that environment benefit from making long-term plans. Yet when disasters happen and wipe out the resources that people have built up, it is harder to maintain a long-term strategy.

Frontiers

Frontiers are another type of environmental challenge. Their remoteness meant that state institutions often played a smaller role in frontiers. People living in dense areas can rely on police departments and courts to resolve disputes, but people in frontier areas more often have to solve problems without formal institutions. In a sense, people in frontiers were freer, but they missed out on some of the benefits of centralized governments (Scott, 2014).

Kitayama and colleagues (2006) tested Japan's northern frontier, Hokkaido Island. Although Hokkaido was inhabited with indigenous Ainu people, ethnic Japanese people started settling the island in the late 1800s. Settlers faced a harsher, colder climate and a sparse population.

Kitayama found that Hokkaido residents were more individualistic than people in other parts of Japan. For example, Hokkaido residents were more likely to associate happiness with personal achievement, as opposed to social reasons like close feelings to others. They were also more likely to explain people's behavior based on internal factors (such as personality) rather than external factors (such as social pressure).

Kitayama and colleagues (2010) also argued that frontiers shaped individualism in the United States. Researchers have found some American states are more individualistic than others. They ranked states on individualism based on indicators like self-employment, living alone, and divorce rates (Vandello & Cohen, 1999). Most Western states—like Colorado and Wyoming—are among America's most individualistic states. Kitamaya and colleagues argued that the frontier environment could explain these differences.

Another team of researchers tested the frontier theory from a slightly different angle (Conway III, Houck, & Gornick, 2014). First, they measured two types of terrains that are more likely to make areas less hospitable and more of a frontier—mountains and inland terrains. Mountains make travel harder, and they often have unpredictable weather. Inland

terrains are far away from the nearest ocean or great lake. Water was by far the most efficient form of transportation before trains, planes, and cars (Scott, 2014). Being far away from water transportation made inland areas more isolated.

Next, they tested whether mountainous and inland US states were more individualistic on Vandello and Cohen's (1999) individualism index and lower on a measure of legal restrictions (such as gun laws and traffic rules). They found that American states that were farther inland were more likely to be individualistic on both measures. Mountainous states had less restrictive laws, although they did not score higher on the individualism index. They found similar results when they used the same measures in a sample of over 70 nations around the world.

Fearon and Laitin (2003) argued that mountains have another effect—they make civil wars more likely. Mountains can support rebellion because they are sparsely populated and because governments have a hard time building roads and exerting their influence there (Scott, 2014). This makes rebel groups more likely to succeed in mountainous areas.

Fearon and Laitin (2003) framed their argument against a common explanation for civil wars. Many people have blamed ethnic and religious divisions for the bloody civil wars of the 20th century. However, Fearon and Laitin (2003) analyzed civil wars from the 1950s through 2000 in the massive Correlates of War database and found that ethnic and religious diversity did not predict civil wars. But consistent with their hypothesis, mountainous areas were more likely to have civil war.

The Wealth Buffer

If the environment presents a challenge, wealth often provides a way to deal with that challenge. Similar to Gelfand's argument about environmental threats, Van de Vliert (2007) argued that harsh climates make cultures less accepting of self-expression. Van de Vliert measured harsh climates by temperatures hotter or colder than 22C (72F). However, Van de

Vliert took this idea a step further by saying that this relationship weakens or disappears in wealthy countries. Wealthy countries can use wealth to protect themselves from the climate. For example, wealthy Singaporeans live in air-conditioned homes and shop in air-conditioned malls.

Van de Vliert (2007) tested whether wealth could buffer the effect of climate on self-expression. Replicating Gelfand's theory, he found that countries with harsher climates are less accepting of self-expression. But in line with the buffer theory, among poor countries, countries with harsh climates were less likely to support self-expression values. Among wealthy countries, the climate made no difference.

Van de Vliert (2009) found a similar pattern in the relationship between climate and life satisfaction. People are generally happier in countries with comfortable climates (around 22 C or 72 F). In less-developed countries, this relationship is strong; people are less happy in places that are too hot or too cold. But the climate mattered a lot less for people in wealthy countries. Results were similar when they analyzed anxiety, depression, job burnout, and health complaints as the dependent variables (Fischer & Van de Vliert, 2011).

Physical Environments

Nunn and Puga (2012) analyzed how treacherous physical environments can actually be a good thing. This is counterintuitive because rugged environments are usually bad for the economy. Mountains, swamps, and waterfalls make it harder to build roads and ship goods, which means rugged areas tend to be poorer than accessible areas (Nunn & Puga, 2012, p. 23).

However, Nunn and Puga (2012) found that Africa is an exception to the ruggedness rule. Why? From 1400 to 1900, the slave trade devastated Africa. But rugged areas were partly spared because it was not efficient to move slaves through these regions. Slave traders mostly avoided mountainous areas. Unlike the rest of the world, Nunn and Puga found that

rugged African countries have *better* economies nowadays. This was particularly true for West Africa, where the slave trade was the most severe.

Psychologists studied another type of physical environment that is closer to modern life—the urban environment (Miyamoto, Nisbett, & Masuda, 2006). They started with the decade of research in cultural psychology finding that Easterners and Westerners have different perceptual styles. For example, when looking at the same pictures or websites, Westerners tend to spend more time looking at the main objects (for example, a ram in front of a mountain, Figure 6; Masuda chapter, this volume; Masuda & Nisbett, 2001; Dong & Lee, 2008). In contrast, people in East Asia tend to split their time more evenly between the central object and the background.

Miyamoto and colleagues (2006) had the idea that the built environment in the East and West might reinforce these perceptual differences. Miyamoto noticed that Japanese cities simply have more objects to look at, more stuff going on. In contrast, American cities were “cleaner,” with fewer things to look at. She hypothesized that exposing people to these city environments in Japan and the US could activate the two styles of perception.

To test the hypothesis, they first tested the base assumption that Japanese cities are more complex. They collected pictures of small, medium, and large cities in the US and Japan, and then they used a computer program to quantify the number of objects in the environment—the more objects, the more complex the scenes. As they predicted, the Japanese environments were more complex than the US environments.

Next, they showed people pictures of Japanese and American cities and tested their perceptual style. Sure enough, showing both American and Japanese participants the complicated Japanese scenes increased their attention to the contextual details. Showing them the more simple American scenes increased their attention to focal objects. This suggests that people’s physical environments can encourage different types of perceptual styles.

4. Human Environments

The buildings, streets, and parks we live in are an obvious type of environment. However, psychologists have also argued that we live in a human environment too—the people around us. Psychologists have studied how that human environment affects our behavior.

Population Density

One simple measure of the social environment is how many people are there around us? Milgram (1970) developed the “overload hypothesis” to understand how population density affects us. He argued that people in dense urban environments see so many people everyday that they need to conserve their energy and limit the number of people they interact with. This could explain the popular perception that people in big cities are cold, whereas people from small towns are nice and willing to help strangers.

Researchers have also argued that population density could make cultures collectivistic (Kitayama, Conway III, Pietromonaco, Park, & Plaut, 2010, p. 566; Triandis, 1995, pp. 58-59; Triandis, 2001). The reasoning is that, if we live around lots of other people, we have to learn how to get along with them and grow accustomed to other people. If we live in places with few people, we have more land to ourselves, and we do not have to interact with other people.

Although the logic seems intuitive, some studies have found support for the density theory, and some have not. A study in the US found that densely populated states are more collectivistic, but it was not significant ($r = .22, p = .12$; Vandello & Cohen, 1999, although the percent of population in urban areas did significantly correlate with collectivism $r = .38, p = .01$). A study across countries found no significant correlation between density and four measures of conformity ($ps > .25$; Murray, Trudeau, & Schaller, 2011). At the very least, the link between population density and collectivism remains unresolved.

Rather than looking at collectivism per se, Gelfand and colleagues (2011) theorized that population density would be related to situational tightness. They argued that historical population density was a survival pressure because density would have made famines more acute and disease more common. In response, these cultures have tighter restrictions on people's behaviors. For example, it is less acceptable to hold hands in public or eat in a classroom. In line with this prediction, areas with high historical population density had tighter situational constraints ($r = .77, p < .01$).

Ethnic Diversity

Another type of human environment is ethnic diversity. Researchers argued that historical diversity affects how people express emotions (Rychlowska et al., 2015). They argued that expressing emotions more clearly helps people communicate with people from other cultures. As an extreme example, if you meet someone from a different culture who speaks a different language, you might start using exaggerated facial expressions to get your meaning across. But in cultures that are more homogenous, people can rely on shared understandings of expressions and the meaning of situations, and thus they do not need to rely on explicit emotional expressions.

To measure ethnic diversity, the researchers used the number of countries that modern-day residents can be traced back to. For example, people living in the United States today can be traced back to 83 countries in 1500 AD. Canadians can be traced back to 63 countries. The Japanese can be traced back to only 1 country, a single major wave of immigration. In a large cross-cultural survey, people from diverse countries like the US and Canada were more likely than people in less-diverse countries like Japan to say it is OK to express emotions like anger, happiness, and sadness in a variety of situations. Cultures that were historically settled by people from many cultures are now more emotionally expressive.

Researchers have also tested whether ethnic diversity causes social conflict. For example, a team of economists found evidence that ethnic diversity can reduce how much different countries provide in public goods (Alesina, Baqir, & Easterly, 1999). They found that diverse neighborhoods, counties, and cities in the US spend less on public goods like schools, roads, and libraries. This relationship held even comparing areas with similar levels of wealth.

Similarly, Robert Putnam (2007) argued that ethnic diversity causes “hunkering down.” He found that more diverse areas of the United States have lower social capital. People in diverse areas tend to trust each other less (even people of the same race). They are also less likely to donate to charity and to believe that other people will cooperate to solve common problems (such as voluntarily using less water to ease a water shortage).

This argument has caused controversy, particularly among liberals, who often celebrate diversity (Jonas, 2007; Sturgis, Brunton-Smith, Read, & Allum, 2011). However, Putnam did not say diversity is always a curse. He pointed to cases in which organizations became more diverse and stronger, such as when the US army became racially integrated. In the long run, he argues that diverse societies can overcome the “hunkering down” response and create new forms of identity that include more people. For example, Americans that used to identify as German or Irish now often identify simply as Americans.

Residential Mobility

Another characteristic of the social environment is residential mobility—how frequently people move. Some cultures encourage people to move more, whereas others encourage people to stay in one place. For example, universities in the US rarely accept their own undergraduates to stay on for their PhD at the same university. Instead, most American researchers believe that going to a different university will help students by exposing them to different perspectives. In contrast, it is more common for undergraduates to stay in the same

school for their PhDs in countries like Germany and Japan. The cultural endorsement of moving could explain why 50% of Americans move at least once every five years versus 28% in Japan (Oishi, 2010).

Researchers have explored how these different rates of mobility affect culture (for a review, see Oishi, 2010; Oishi & Talhelm, 2012). One finding is that people in communities with high mobility tend to identify with groups conditionally (Oishi, Ishii, & Lun, 2009; Oishi et al., 2007). If the group identity is beneficial, movers are more likely to identify with the group. If it is not beneficial, they are more likely to dissociate from the group.

One study tested this idea by having students at the University of Virginia read an article that ranked it as the top US public university (Oishi et al., 2009). Students in another condition read an article reporting that Virginia had just lost its #1 spot. After the article, researchers asked the students how much they identified with the school. Non-movers tended to identify with the university regardless of the ranking, but mobile students were less likely to identify with the university if it was no longer #1.

That study measured individual moving, but moving can also be a characteristic of a community. Mobility can change the culture of a community, even for people who have not moved themselves. In the same way, a history of rice farming or herding can affect people's behavior, even if they do not farm rice or herd cattle themselves (Nisbett & Cohen, 1996; Talhelm et al., 2014).

Mobile communities tend to support community causes less. For example, people in mobile neighborhoods in Minnesota were less likely to buy "critical habitat" license plates that give a portion of money to protect natural areas (Oishi et al., 2007). Baseball teams in mobile US cities had more "fair weather fans" who stop attending games when the team is having a bad season (Oishi et al., 2007). Although Japan has lower mobility than the US,

baseball fans in mobile Japan cities like Fukuoka had more fair weather fans than teams in less mobile cities like Osaka (Oishi et al., 2009).

Mobility can also alter the friendship strategies that make people happy. If the people around you are likely to move away, it makes sense to diversify your friend investment and have a broad but shallow friend network. That way, even if a friend moves away, you still have many other friends to fall back on. However, if the people around you are likely to stay in the same place, you can invest more time in a small group of tight friends. Those sorts of deep ties are particularly useful when we need help.

Oishi and Kesebir (2012) tested this by asking people around the US about their friendship strategy. In general, people who had a broad-but-shallow strategy were happier, which is consistent with the fact that the US is a highly mobile culture. But people in low-mobility communities—particularly communities that had struggling economies—were happier if they had a narrow-and-deep strategy.

Relational Mobility

Later researchers extended the concept of residential mobility to relational mobility (Schug, Yuki, & Maddux, 2010; Yuki & Schug, 2012). Residential mobility is how often people move; relational mobility is their perception of how easy it is for people in the community to make new friends and leave old friends. Thus, two communities could have the same residential mobility rate but different perceptions of how often people move between relationships.

One study found that relational mobility could explain why Americans share personal information with new people so easily and why people in Japan are much more reluctant to share personal information (Schug et al., 2010). Sharing personal information helps create new relationships, and Americans may be in the habit of sharing personal information so easily because they start new relationships so frequently. In contrast, Japan's low relational

mobility could explain why people in Japan tend to share less personal information. Schug and colleagues found that people who see their community as relationally mobile are more likely to want to share personal information.

More recent studies have found that relational mobility can explain cross-national differences in how well self-esteem predicts life satisfaction (Yuki, Sato, Takemura, & Oishi, 2013; Sato & Yuki, 2014). In the US, people with high self-esteem were much more satisfied with their life than people with low self-esteem ($b = 0.70, p < .001$). In Japan, people with high self-esteem were also happier, but the relationship was less strong ($b = 0.45, p < .001$). In addition to self-esteem, social relationship quality predicted how happy Japanese people were, but not for Americans.

The researchers argue that societies with high relational mobility act like free markets, and people with high self-esteem (high social worth) can use that worth to go out and acquire satisfying relationships. In contrast, in countries with low relational mobility, people tend to form committed relationships that are not so affected by people's market value. Because the social relationship market is not a free market, it is hard to for people with high self-esteem (high market value) to go out and acquire new friends to form more satisfying relationships with. Thus, the relationship between self-esteem and life satisfaction is weaker.

5. Economic Environments

Economic Downturns

The economy is another sort of not-quite-physical environment that shapes human culture. For example, researchers in the 1940s analyzed data on cotton prices and anti-black lynchings in the US South (Hovland & Sears, 1940). They found that, when the cotton economy was bad, there were more lynchings. This suggests that racial attacks were at least partially motivated by economic frustration.

One historic study of how changes in the economic environment affect people was Glen Elder's (1974) *Children of the Great Depression*. Elder followed 167 children born in 1920 and 1921. These children grew up in what was probably the worst economic recession in US history, and then they experienced the post-WWII economic boom. Elder followed these children over time and witnessed changes in their values toward material needs. He found that the economic deprivation in their formative years made them value material success in their early adulthood. The post-WWII economic boom and the GI Bill made many of the participants indeed far more materially successful than their parents.

Sales (1972) theorized that economic hard times make people more likely to join authoritarian religions. He built on laboratory findings that raising people's perception of threat increases their endorsement of authoritarianism. Based on this finding, he analyzed the number of conversions to more authoritarian churches (e.g., Roman Catholic, Southern Baptist) versus less authoritarian churches (e.g., Presbyterian) in the United States. He found that more people converted to authoritarian religions during economic downturns, whereas more people converted to less authoritarian religions during economic booms. There are, of course, other possible explanations as well. For example, Catholic and Southern Baptist churches may also be more communal, whereas mainline Protestant churches may be less communal and more prosperous (Cohen & Neuberg, CHAPTER, this volume).

Modernization and Wealth

In addition to economic downturns, researchers have studied what happens when cultures become wealthier over time. Triandis (1989) theorized about how wealth affects people's view of the self. He argued that some cultures think more about the private self, the public self, or the collective self. He reviewed evidence that people in more developed cultures think more about the private self and the public self, but less about the collective self.

Baumeister (1987) made a similar argument: He studied historical documents and found that self-identity was rarely a problem in Western culture in the Middle Ages, but it became a problem in the modern era. Why were identity crises so rare in the Middle Ages? People often lived and died in the same village. Most people inherited their occupation and even their reputation from their family. That made it hard to be undecided about your identity—it was already decided for you. Yet as the economy grew more complex and people could choose between different careers, meet new people, and move away from home, people started worrying about how to decide what their identity should be, and identity crises became more common.

Greenfield (2004, 2009) studied modernization on a smaller scale with the Zinacantec Mayan people of Mexico. She studied the Zinacantec as their economy shifted from a subsistence agricultural economy to an economy of money and commerce. She found that the culture became more individualistic as it modernized.

One example was how parents taught their children. In the past, Zinacantec mothers taught their daughters how to weave clothes. But over time, the mothers were more often busy with work, such as selling goods in another city or making embroidery to order. In response, children became more independent and started learning on their own through trial and error.

Researchers have also studied how the shift to a market economy changed the culture of the Oksapmin people in New Guinea (Saxe, 1999). In the 1970s, the Oksapmin lived by hunting and farming. But soon a market economy developed, and many people started working in stores for wages. This shifted the culture toward commerce and money.

Saxe (1999) studied how this shift toward commerce affected their cognitive style. For example, the Oksapmin traditionally thought of numbers very concretely. The word for “thumb of the right hand” was the same as the word for “one.” But as the culture embraced commerce, they developed a more abstract system of numbers. This new system made it

easier to add and subtract numbers, which was probably helpful for doing business, although it was less connected to concrete numbers like fingers on the hand.

China is another example of a society that modernized rapidly. Yan (2002) studied how love and marriage changed in a village in northern China as the country developed from 1950 to 2000. He studied records of marriages and found that people in the village traditionally married based on the advice of their parents. In 1950, 73% of marriages were arranged. Marriages affected the family's social standing, so they were often a pragmatic decision involving the whole family.

But as the economy developed, children began having more free choice in their marriages. In the 1990s, not a single marriage was arranged in the village. Young people started emphasizing romantic love over family considerations. Yan found that children often used the lyrics of pop songs to express their romantic love to each other, perhaps to avoid the embarrassment of expressing it directly. Marriage had shifted from a collective decision to a more personal decision.

Another type of relationship that people have less choice over in less-wealthy areas is friendship. In his time in West Africa, Adams (2005) noticed a cultural belief he rarely saw in the United States: enemyship. People in Ghana warned people to beware of enemies among their friends. One local bumper sticker reads "I am afraid of my friends, even you." Adams interviewed Ghanaian and US participants about their views on friendship. The Ghanaian participants reported experiencing enemyship much more frequently than the US participants.

Adams (2005) conjectured that economic hardship may make enemyship more likely. Economic hardship may put people in situations where they have to split resources, hide resources from their friends, and compete with them for scarce goods. At the same time, poverty can limit people's freedom of movement and their ability to extract themselves from unsatisfying relationships.

In contrast to these detailed studies of individual cultures, Inglehart (2000) has studied modernization from the perspective of the world at large (Inglehart, Foa, Peterson, & Welzel, 2008). Inglehart (2000) has analyzed global surveys that include cultures that represent 75% of the world's population. He found that people in less-developed countries focus on survival goals, like developing the economy regardless of pollution or preserving traditional culture. Yet people in wealthier countries more often emphasize lifestyle goals, like protecting the natural environment even at the cost of economic growth. This fits with Maslow's (1943) classic hierarchy of needs, which argues that people focus first on basic survival needs and only after these needs are met do people focus on higher-order needs like self-actualization.

Socioeconomic Status

Researchers have also studied how different socioeconomic classes within the same nation might be different sub-cultures. In general, researchers have found that high-status cultures tend to emphasize free will and personal choice, whereas low-status cultures tend to emphasize fitting in and obligation (Kraus, CHAPTER; Markus & Hamedani, CHAPTER). In one study, researchers compared the lyrics from songs that college-educated Americans and high school-educated Americans like (Snibbe & Markus, 2005; Stephens, Markus, & Townsend, 2007). They found that the songs of the college-educated Americans emphasized uniqueness and influencing other people. In contrast, the songs of high school-educated Americans emphasized maintaining integrity and adjusting the self.

The researchers also found that higher-educated Americans put more value on free choice (Snibbe & Markus, 2005, Study 3). In one condition, the researchers randomly assigned participants to choose one of four pens to use and then rate how much they like it. In another condition, participants chose a pen, but then the researcher told the participant that that was the last pen of that kind and then gave the participant a different pen. Higher-

educated Americans rated the pen lower if it they had not chosen it. In contrast, the lack of choice did not change the ratings of the high school-educated participants.

This emphasis on free choice mirrors differences across nations. Americans are more likely to see actions (such as buying a TV or picking a topic for a class project) as choices, but people in India are less likely to see their behaviors as choices (Savani, Markus, Naidu, Kumar, & Berlia, 2010). For example, researchers asked people in India and the US to list the things they did yesterday that were choices and that were non-choices. Americans listed significantly more choices than the Indian participants. Results were similar when Americans and Indians had to code the behaviors of people in a video as choices or non-choices (Savani et al., 2010, Study 3).

There is also evidence of SES differences in accommodation to the needs of others. For example, one study found that working class Americans scored better at reading other people's subtle emotional expressions than upper class Americans (Kraus, Côté, & Keltner, 2010). Researchers even found that high-SES students occupied more space than low-SES students while studying and lounging in an amphitheater on campus (Hoffman & Trawalter, 2014).

Researchers have also tested for cognitive differences between SES groups. We know from prior research that people from individualistic cultures tend to think more analytically (Nisbett et al., 2001). If high-SES people are more individualistic, they probably also think more analytically. In contrast, people of low-SES should be more likely to think holistically. A study in the US and Russia found that low-SES groups in both countries thought more holistically than high-SES groups (Grossman & Varnum, 2010). Other studies have replicated this finding (Talhelm et al., 2015). In sum, economic and social class differences seem to create different cultures, even within the same nation. Kraus (CHAPTER) in this book talks about SES in more detail.

6. Political Environments

The political environment is another ecology created by people. Researchers have tested how different political environments affect people's behavior. The most straightforward way to test this is to compare countries with different political systems, although that comes with lots of third variable problems. One way to minimize third variables is to test what happens after the political system of a single country changes over time.

Inglehart and Baker (2000) took advantage of the collapse of the Soviet Union to see whether the political changes altered people's values. They found that a shared history of communism was more important than the economic booms and busts that followed. They could test this because, after communism fell in the 1990s, some post-Soviet countries grew sharply, such as Hungary and Slovenia. Other post-Soviet countries fell into economic collapse, such as Russia, Estonia, and Latvia. Did this economic growth push Hungary and Slovenia toward secular values and Russia and Latvia away from secular values?

Under the Soviet Union, most of these nations strongly endorsed secular values and mostly did not support self-expression values. The economic booms and busts in the 1990s did not cause large changes in people's values. However, their shared history of communism seemed to have a lasting effect on their values.

Another effect of Communist systems is on women's place in society. Many people in the West think of the rise of communism as having negative effects on society. For example, some writers have looked at China's low trust in strangers and attributed it to the chaotic Cultural Revolution (Wielander, 2013).

But communism has had some effects that fit quite well into the value system of modern societies. For example, communist governments often encouraged women to enter the workforce. Chairman Mao famously said that women hold up half the sky. This ideology was not just empty words; it led to real changes. Even after the fall of Communism, former-

communist countries have higher rates of female labor force participation (Alesina et al., 2013).

Income Inequality

Income inequality is another important part of the political environment. Of course, income inequality is an economic phenomenon, but governments influence inequality through tax laws and social programs. Researchers have tested how inequality affects society by testing people in 15 countries with high and low income inequality (Loughnan et al., 2011). They asked students to rate themselves on positive values and personality traits, then rate the average student. People in countries with high income inequality rated themselves as much more positive than the average student—they self-enhanced a lot. In more equal countries like Germany and Japan, students rated themselves closer to the average student (although still a bit more positively than they rated others). Self-enhancement is often linked with individualism, but wealth inequality predicted self-enhancement better than countries' individualism scores (p. 1256).

Why would inequality make people more likely to self-enhance? Loughnan and colleagues argued this is because inequality makes people want to signal that they are a part of the “winning” part of society. But if people are more or less equal in a society, it is less necessary to try signal that you are in the successful tier of society.

Research also links income inequality to happiness. There is evidence that Americans are less happy when income inequality is high (Oishi, Kesebir, & Diener, 2011). Americans have reported their happiness since 1972 on the General Social Survey. Over that time, income inequality has gone up and down (and most recently up). During years with high inequality, Americans were less happy. This relationship was mediated by lower general trust and lower perceived fairness. People seem to be aware of this inequality, and they feel that society is less fair.

Is the effect of inequality limited to lower income brackets? To find out, the researchers analyzed the effect of income inequality across income brackets. Inequality had a strong effect for people in the lowest 20% of the income bracket ($r = -.54, p < .01$) and the 20-40% group ($r = -.63, p < .01$).

What about rich people? Rich people might be happier because inequality tends to be good for people on the top. The top 20% of the income bracket earned more money in unequal years. However, they were not any happier when inequality was high ($r = .03, p = .88$). Thus, it seems that no one is happier when income inequality increases—not even the people who are benefitting financially.

One way to reduce income inequality is progressive taxation. Progressive taxes charge wealthy people a higher percentage of their income than poor people. Countries that have more progressive tax rates (such as Sweden and Denmark) are happier than countries with less progressive tax rates (such as Hong Kong and Russia; Oishi, Schimmack, & Diener, 2012). This study did not have data on trust and perceived fairness, but it did have data on satisfaction with public goods, such as transportation and education. The data showed that the relationship between tax rates and happiness was mediated by satisfaction with public goods, which can be paid for with progressive taxes. Countries with progressive taxes tend to have better public services, and these seem to increase people's well-being.

7: Changes Within Cultures over Time

One important way to test theories of cultures is to study changes within a single culture over time. Like natural experiments (e.g., Uskul et al., 2008; Talhelm et al., 2014), studies within a single culture over time can help control for the effect of third variables that can confound comparisons of different cultures, such as language and religion.

Twenge has analyzed several longitudinal surveys to see how Americans have changed over the last century. One of the biggest changes is that Americans have become

more likely to endorse individualistic values and the importance of the self (Twenge, 2001, 2006). For example, in the 1950s, only 12% of Americans agreed with the statement “I am an important person.” In the 1980s, 80% agreed (Twenge, Konrath, Foster, Campbell, & Bushman, 2008). Americans have also expressed individuality in another way—they are becoming more and more likely to name their children with unique, rather than popular baby names (Twenge, Abebe, & Campbell, 2010).

Why have Americans become more individualistic? Grossman and Varnum (2015) used time-lag analysis to try to tease apart these changes over the last 100 years. They used markers of individualism from year to year, such as unique baby names, divorce rates, and the percentage of people living alone. They tested five potential causes of individualism: the shift to white collar jobs, urbanization, declining religiosity, infectious disease, and disasters. They found that white collar shifts were the only consistent predictor of increasing individualism. This fits with earlier research that found that white collar professions tend to emphasize individual initiative and autonomy, whereas blue collar professions tend to emphasize following directions (Kohn & Schooler, 1973). As the US became wealthier and more people moved into white collar jobs, indicators of individualism increased.

Japan is another interesting test case of change within a culture over time. Japan’s per-capita GDP rocketed from about US\$2,000 in 1950 to over \$20,000 in the year 2000 (in constant 1990 dollars controlling for purchasing power; Maddison, 2003). In the 1950s, Japan had less than half the wealth per person compared to Western Europe. In the 1970s, Japan surpassed Western Europe. So did Japan become more individualistic as it became wealthier?

Hamamura (2012) tested this question by analyzing Japanese people’s responses to large-scale surveys. Over several decades, some measures of individualistic values have risen, but many have gone in the opposite direction. For example, the percentage of people saying that it is important to “respect individual rights” has gone down over time. Meanwhile, the

percentage of people agreeing that it is important to emphasize “social harmony” has gone up. At the very least, Japan has not become consistently more individualistic as it has become wealthier.

8: Future Directions

Understudied Regions

Ecological psychology has made lots of progress in the last 20 years, but there is much to be done. For one, large parts of the world have been studied very little. To demonstrate how research attention is distributed, we searched on the PsycNet database (AKA PsycInfo) for articles with “culture” and the names of the three most populous nations in East Asia, Africa, and South America. The nations in South America and Africa had less than 20% of articles of East Asia (Figure 7). These understudied continents are ripe for research.

Micro Cultures

Researchers have argued many times that nations are not the best unit of analysis (Conway et al., 2014; Georgas & Berry, 1995). The problem is that cultures are not always perfectly contained within nations. For example, Catalonians in Spain argue that their culture is different from the rest of Spain. In the same way, Germany is now united, but researchers have found differences between the old East and West German regions (Frese, Kring, Soose, & Zempel, 1996).

Yet researchers in the past decade have added many studies on differences within nations (Greenfield, 2009; Grossman & Varnum, 2015; Kitayama et al., 2006; Talhelm et al., 2014; Uskul et al., 2008). Cultural psychology has become more balanced between the value of research between nations and within nations. At the same time, there is pragmatic value in using nations as the unit of analysis. Lots of data is available at the nation level but not at the regional level. And of course nations are important units too. We reject the idea that researchers should *never* study nations.

Although researchers have studied more regional cultures, one area that is largely unaddressed is what we might call “micro cultures.” Micro cultures could be cultures in different parts of a city, say Manhattan versus Brooklyn (Rentfrow, CHAPTER, this volume). Different companies can also have micro cultures, and cultural psychologists have rarely turned their lens onto the cultures of companies. Even different divisions within organizations can have different cultures—the IT department versus the sales department in a company or the humanities versus the engineering department in a university. Delving into these micro cultures can help us get a better understanding of how culture works.

More Systematic Comparisons

Another path forward in ecological psychology is to test theories more systematically. For example, many studies are based on a sample of two countries or people within a single country. Yet if a theory is true and general, it should hold across different samples, different nations, and different cultures. If studies replicate across different samples, the end result can be theories that are more robust. One example of this type of research is a study in which researchers tested people on common economic games in 15 small-scale societies (Henrich et al., 2005).

Another path is to create a more systematic look at ecological variables. Georgas and Berry (1995) grouped variables such as climate, education, and media to create a taxonomy of ecological variables (Georgas & Berry, 1995). They later refined the taxonomy and tested whether it could predict cultural values and happiness across cultures (Georgas, Van De Vijver, & Berry, 2004).

According to Georgas and Berry, this approach could help refine the way cultural psychologists work. They argued that cultural psychologists often work by noticing a difference between cultures, testing it, and then guessing at an explanation afterwards.

Instead, researchers should at least sometimes start with a set of ecological variables and make predictions in a deductive way (Georgas & Berry, 1995, p. 127).

Underused Methods

Finally, one way to expand ecological psychology is to use more diverse methods. We can gain new insight by conducting longitudinal analyses (e.g., Hamamura, 2012), field experiments (Johansson, Hartig, & Staats, 2011), and laboratory experiments (Oishi et al., 2007). These methods usually require more time and effort, but they offer valuable evidence.

New types of data analysis can also push the field forward. One rich source of new methods is economics. Because economists often analyze non-experimental data, they have developed more techniques that look for clues of causality in non-experimental data.

Psychologists can pick up new tools such as:

- **Instrumental variable regression** tries to get around reverse causality by replacing the variable that might have been chosen by humans (such as choosing to farm rice) with a variable that is not plausibly caused by humans (the proper soil and rainfall for rice; Alesina et al., 2013; Talhelm et al., 2014). The section “Reverse Causality” in this chapter describes two examples of instrumental variables (but see also Cohen, CHAPTER, for some cautionary examples).
- **Regression discontinuity** looks for a discrete change at a single point in time or physical space. For example, the Spanish colonial government assigned certain districts in Peru to forced labor in silver mines (Dell, 2010). Yet people right across the border of these districts were exempt. That created a situation where one variable (forced labor) changed sharply at the district border, whereas other third variables (such as elevation and ethnicity) did not. Dell

found that these historical borders of forced labor predicted worse economic and health conditions in modern-day Peru.

- **Phylogenetic analysis** builds trees of cultural descent to test whether two variables are related through common ancestry rather than causality. This is perhaps easiest to understand with the example of dairying and lactose tolerance (Holden & Mace, 2009). One plausible hypothesis is that after a group of people started keeping animals for their milk, they became more likely to develop the ability to easily break down the lactose in milk into adulthood. A simple analysis would take a sample of nations and correlate (1) whether that nation practiced dairying and (2) the percentage of people who are lactose tolerant in that nation. One problem with that analysis is it would treat all of northern Europe as independent cases. Lactose tolerance is high in Ireland, the UK, the Netherlands, and so on. Yet, these cultures also share common ancestors. So are the Irish lactose tolerant because they practiced dairying or because they descended from people who were lactose tolerant? Phylogenetic analysis corrects for this by taking into account common ancestry and estimates of when cultures adopted a practice. (See also Mesoudi, CHAPTER, this volume).

Students of culture will always struggle with the question of causality, but these new methods can get us closer to that goal.

9: Conclusion

We think the wealth of research we cite in this chapter shows that ecological psychology has grown from a minor thread in the field to a burgeoning field. This happened as cultural psychology pushed from documenting cultural differences to searching for the causes of those differences. Of course, ecological research on culture is not solely the domain

of psychology. Ecological research stretches from anthropology, which has long been concerned with culture, to economics, where studying culture has only more recently become accepted (e.g., Alesina et al., 2013).

We sometimes refer to this field as “socio-ecological psychology” to remind ourselves to not be too literal about what counts as an environment. Temperature, rainfall, and natural disasters are classic features of the environment. Yet the environment is also human. We have to navigate human environments like democracies versus autocracies, wide open spaces versus densely populated spaces, and relationally mobile versus stable communities. Human environments are environments too.

As the field moves forward, we see exciting areas of opportunities. There are vast parts of the world that have received very little research, such as Africa and South America. There are techniques developed in biology and economics that can help us tease apart the age-old question of cause and effect—a question that nips at studies of culture in particular because true experiments are often impossible. Researchers who push forward in these paths will likely lead the field forward.

Finally, we think ecological thinking can be a source of inspiration for researchers, even for researchers not “officially” interested in culture. Social psychologists have long debated whether we should study human behavior as driven by stable individual differences or as driven by situations (Mischel, 1968). Ecological psychology can offer inspiration for researchers to think of how human behavior is shaped by—or is suited to navigate—environments defined more broadly.

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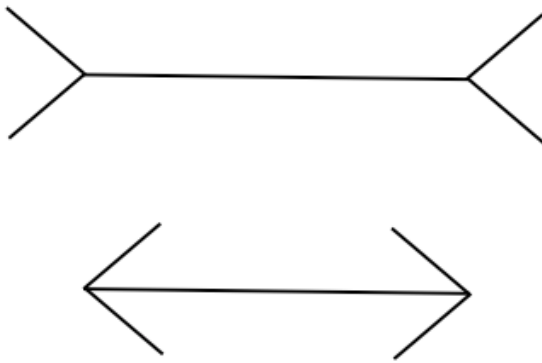


Figure 1. The Muller-Lyer illusion. To most people, the bottom line appears shorter than the top line, but they are both the same length. Researchers have found that European Americans are more susceptible to this illusion than people from several traditional African communities.

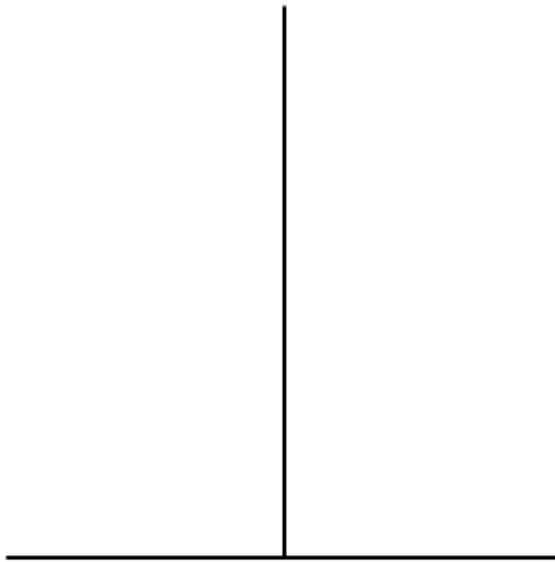


Figure 2. The horizontal-vertical illusion. To most people, the vertical line appears longer than the horizontal line, but they are both the same length. Researchers have found that European Americans are less susceptible to this illusion than people from several traditional African communities.

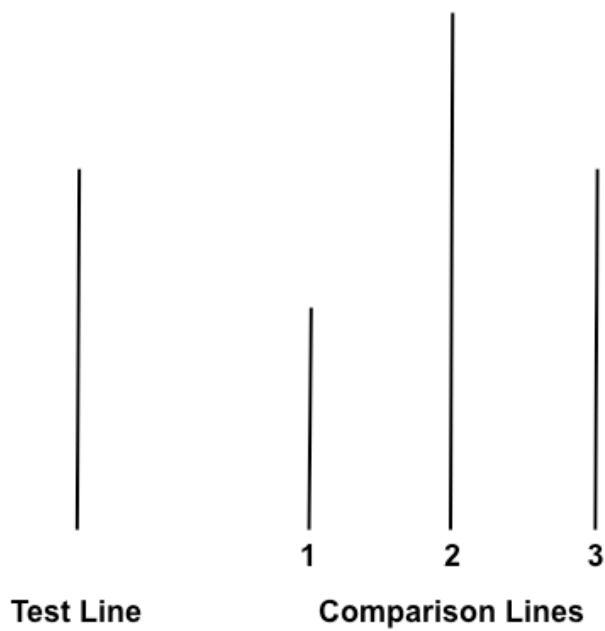


Figure 3. In Berry's adaptation of the Asch social conformity task, participants have to say which comparison line is the same length as the test line. However, on some trials, participants learn that others in their group have chosen the incorrect answer. The key measure is the percentage of participants who follow others' incorrect answers.

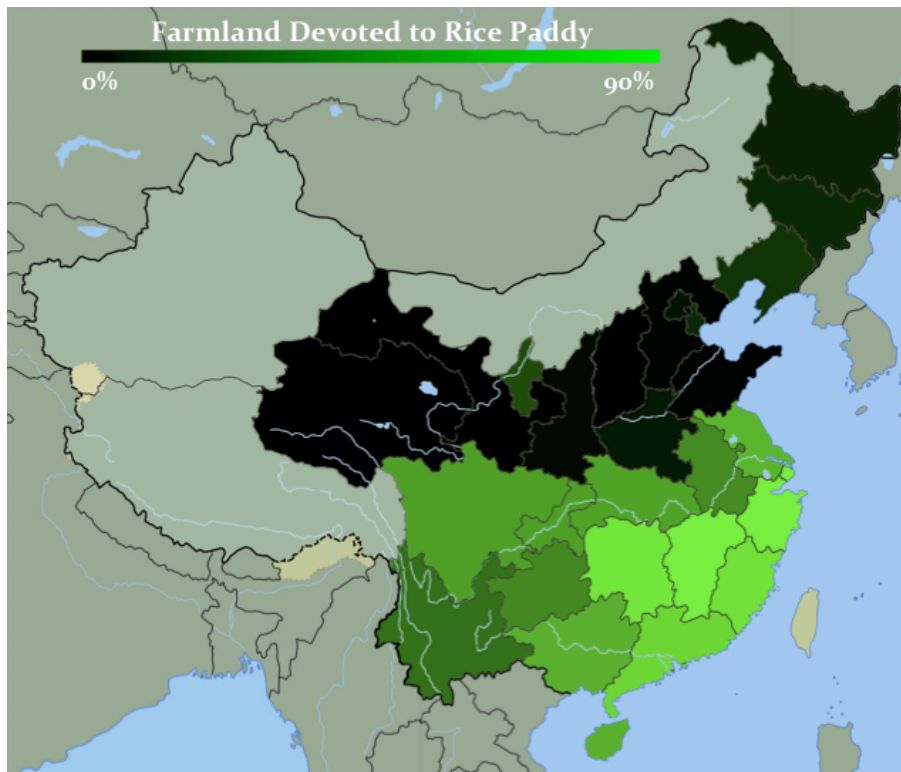


Figure 4. Percentage of farmland devoted to rice paddies per province in China. Statistics are from the 1996 Statistical Yearbook. Southern China has a history of farming rice, and its culture has tighter, more enmeshed relationships compared to the relatively loose culture of China's wheat-growing north.

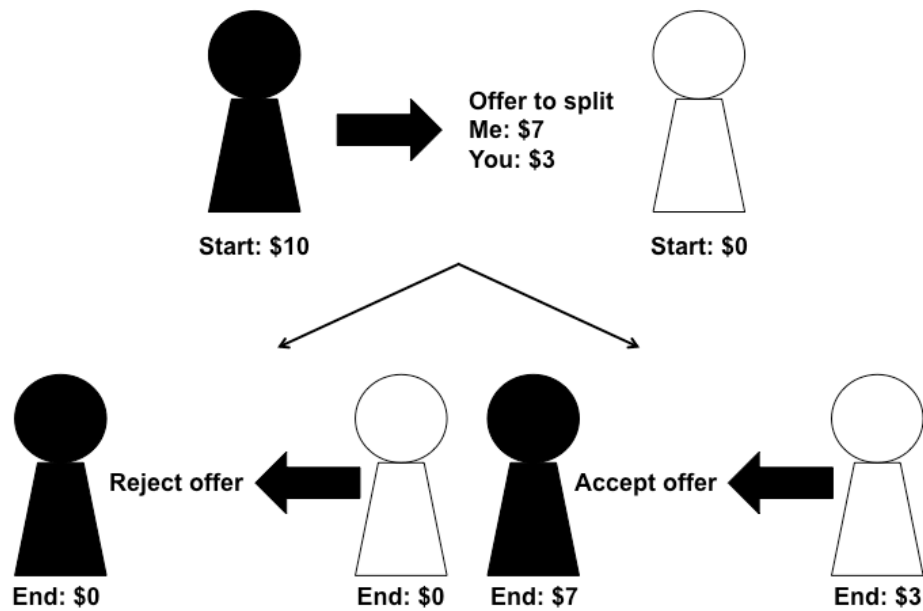


Figure 5. In the ultimatum game, one participant starts with \$10 and has to decide how to split it with another player (completely selfish = 10-0; completely equal = 5-5; completely generous = 0-10). The other player can accept or reject the offer. If the receiver rejects it, both people receive nothing.



Figure 6. In studies of scene perception, Westerners tend to spend more time looking at the focal object, here the ram (from Masuda & Nisbett, 2001). People in China and Japan also look at the focal object, but they spend more time than Westerners looking at the background.

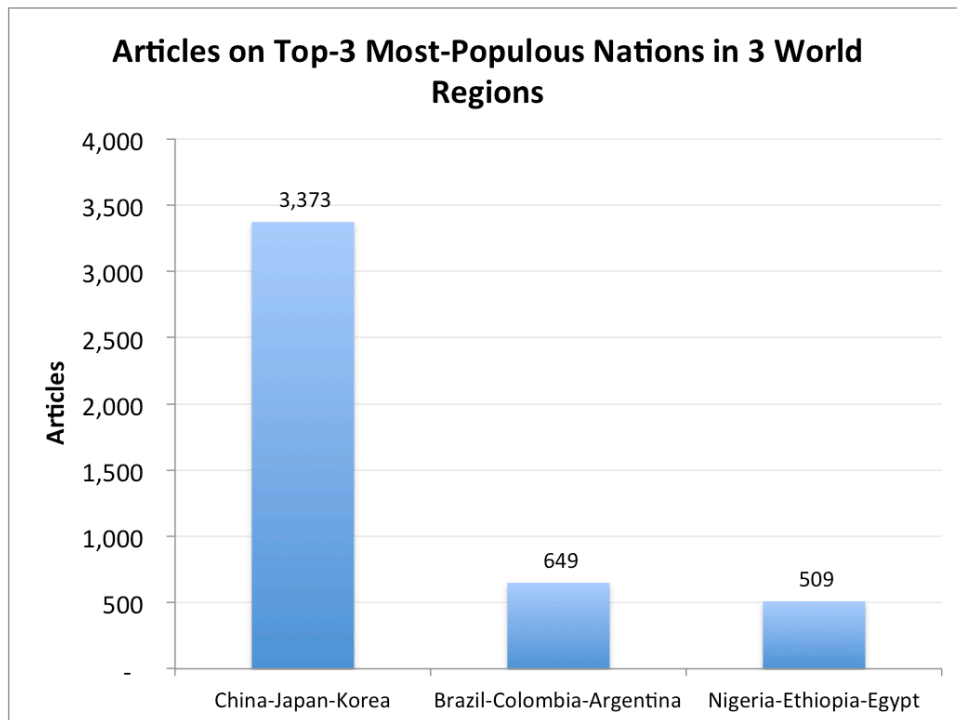


Figure 7. Number of articles containing the world “culture” and the name of the three most populous countries in East Asia, South America, and Africa. Search results are from PsycNet on September 23, 2015. Far less research is done on South American and African countries.