

Theories in Environmental Sociology

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Discarded television on shore of Hudson River, Staatsburg, New York.

Post your photo on theory to #TLEStheory.

Photo by Ken Gould

If you are not reading this lesson on it, it is probably on the table or chair next to you or maybe it is in your bag or on your body. Yes, I am talking about your cell phone, and odds are it is an iPhone. Officially launched in June 2007, Apple sold over 2.2 billion of them by the end of 2018. It is a product that has revolutionized how people communicate, obtain information, and consume media content. We listen to music, watch movies, and take photos through it. With FaceTime, we can video chat with friends and family all over the world and even do a job interview in our living room (hopefully fully dressed). We can use it to track our finances, diets, and workout routines. Through apps like Instagram, Snapchat, and Venmo, we can share our lives and money with the world as well (sometimes we share too much). Let's be honest, without a cell phone and Google Maps, we wouldn't know how to get anywhere. And with cloud computing, streaming services, and unlimited data plans, we can watch Netflix and live TV almost wherever and whenever we want. The iPhone is no longer a luxury for most people: it is a

necessity for modern living, it has become part of us. We're constantly on it, and if we forget it at home or leave it in the car, we feel like we're missing a part of us; and more importantly, we feel like we're missing out.

This ubiquitous object, which is so integral to everyday life, is also a rich example to use to introduce social theory. The analysis of the cell phone can illuminate the similarities and differences through which environmental sociologists study and explain socioenvironmental relations. While environmental sociologists seek to answer fundamental questions about why socioenvironmental problems and inequities exist, what produces them, and what needs to change to address them, not all theories approach these questions in the same way. ~~Ecological modernization~~ Ecological modernization theorists might look at Apple's efforts to reduce the use of toxic materials and increase the use of recycled materials in the iPhone as an example of how socioenvironmental relations are improving and how capitalism is capable of greening itself. In contrast, treadmill of production theorists might look at the growth imperatives of Apple and its need to sell more iPhones every year as a prime example of how capitalism and its technological innovations are incapable of greening themselves and will continue to produce ecological destruction at an ever-escalating scale. Ecological Marxists might inquire into whether the energy consumption and carbon production needed to power the cloud is fueling a rift in the carbon cycle that amplifies climate destabilization. World system theorists might research which countries receive the most and the least profit from the production and sale of the iPhone and how this is connected to their position in the global capitalist economy. **Risk society** theorists might investigate how and why people are using the iPhone to monitor their air quality, find mercury free fish, and eat GMO free foods. Ecofeminists might focus on the gendered inequities that emerge from the mining of aluminum for the iPhone, the working conditions in factories making it, and the e-waste dumps where many broken cell phones go after we are done using them.

There is no one way to be an environmental sociologist, and there is no one way to study socioenvironmental relations. That is the task before this lesson, to explore the theoretical toolbox of an environmental sociologist and guide you through the frameworks you have at your disposal to investigate socioenvironmental relations. What links all these different frameworks together is that each is shaped by environmental sociology being a social science, which entails a commitment to linking theory to data and ensuring that the explanatory power of theory stands up to empirical verification over time. Thus, a theory is not just a theory of what could be going on but utilizes data to support the claims that the theory asserts about how the social world works and why it works that way. Very basic questions guiding theoretical frameworks include the following: What is happening? Who is it happening to? Who is directing what is happening? How it is happening? Why is it happening? How is this connected to what has already happened and what might happen in the future?

At the same time, these frameworks also differ because each has particular philosophical assumptions built into them that shape what is perceived

as an issue or problem worthy of study, what questions are asked, how information is gathered to answer the questions posed, how the information collected is interpreted, and how that information is leveraged for social change. Certain frameworks might focus these questions through the lens of class, race, or gender, or approach such questions from the point of view of corporations and markets; while others will approach it through the lens of social movements and marginalized communities. The theorist could be a conflict theorist looking at struggles over access to environmental resources, while others might be symbolic interactionists investigating how people construct meanings about the environment that either prevent or facilitate ecological degradation (as discussed in Lesson 1). Frameworks can also differ based on whether they study socioenvironmental interactions at the micro, meso, or macro level. For instance, a framework may focus on how individuals explain the reasons for their political mobilization against mining companies extracting copper and gold for iPhones. This is the micro level, which focuses on the behaviors of and between individuals. Other researchers may focus on how the cultural, political, and economic structures of the Apple corporation play a role in pushing it to green its production practices. This is the meso level, which studies groups and institutions. Finally, an environmental sociologist might analyze the global carbon output of the iPhone commodity chain over time to see whether the iPhone is indeed requiring less resources to create it, consuming less energy during its lifespan, and producing less waste during its postconsumption phase. This is the macro level, which studies the society as a whole and the processes, institutions, and structures shaping it. Consequently, since theories orient the researcher toward asking particular questions at certain levels (over other questions at other levels), they differ in their explanations of what is happening, why, to whom, and how—all of which leads to different trajectories for social change.

We can think of theoretical frameworks as intellectually and methodologically guided narratives of how the world works; a **theory** is “a set of concepts and ideas and the proposed relationships among these, a structure that is intended to capture or model something about the world” (Maxwell 2013, 48). In short, they are frameworks for making sense of what you see and the data you are collecting, be it through interviews, archives, ethnography, or statistical analysis; data that will be able to support, refute, or modify your theoretical presumptions about what is happening. Through the concepts of a theoretical framework, you are able to draw connections between what is happening that might otherwise remain hidden or invisible. Consequently, theories are quite powerful and important components of being an environmental sociologist because they assist us in making visible the invisible relations, structures, and processes shaping everyday life and the organization of socioenvironmental relations. Yet, one theory is often not able to illuminate or make visible all aspects of life; based on their assumptions, questions asked, and methods used to answer the questions, theories will be able to tell a story about the world, but not the only story.

Theories can shine light onto certain issues while being unable to explain other problems or relations. Thus, we need to be aware of the strengths and limits of the theories we are using, of what the theory can make visible but also what may still remain invisible, what the theory can explain and what it cannot explain. We now turn toward our first theory, **ecological modernization theory**.

ECOLOGICAL MODERNIZATION THEORY

“Truly innovative products leave their mark on the world instead of the planet.” This is the tag line on Apple’s website asserting their environmental bona fides, an assertion followed by a wealth of information about how the company is working toward reducing their products’ **ecological footprint**, the impact of the item on the environment based on its withdrawal of resources and addition of pollution and waste. Here is a short list for the iPhone X series: it is free of mercury, brominated flame retardant, PVC, beryllium, and has a glass display that is free of arsenic; its battery is free of cadmium and lead; the solder in the main logic board is assembled with 100 percent recycled tin; and 40 of its components contain recycled plastic, including the glass frame that is made with 32 percent bio-based plastic and the speaker enclosure that is made with 35 percent postconsumer recycled plastic. Plus, when you are done with your iPhone, there is the Apple Trade In program where it can be recycled free of charge, or you can exchange it for credit to be reused by another person.

These claims appear to be a win-win for us and Apple. We can continue to buy high-tech products, Apple can continue to make a profit, and we can consume less of the planet in the process. From these statistics, it looks like Apple is indeed shrinking our ecological footprints and dematerializing the economy (using less materials to produce the same or greater quantity of goods). If you approach the iPhone and Apple through ecological modernization theory, then you would come away with a fairly rosy picture. This is because ecological modernization theory is essentially a theory of environmental reform. It investigates how corporations and the state, the major economic and political institutions of today, are responding to the environmental crises that emerged in the 1970s by restructuring **commodity chains** (extraction, production, consumption, postconsumption) to make them more ecologically sustainable. Central to such efforts are efforts by companies to increase energy efficiency and restructure their production processes to incorporate more recycled materials and minimize the production of pollutants and waste. Through such efforts, ecological modernization theory proposes that the economic growth needs of capitalism can be reconciled with ecological principles in a win-win situation where future growth can be increasingly decoupled from resource extraction and the production of waste and pollutants.

By analyzing how the leading companies and industries are improving their ecological footprint, advocates for this theory contend that the processes of modernization and industrialization do not have to be abandoned. Instead they argue for the creation of more ecologically friendly technologies. By way of new technologies, destructive production practices can be restructured around **cradle-to-cradle design**. This is a process where products are designed with a closed-loop system in mind to minimize the extraction of raw materials, avoid toxic materials, and minimize the production of waste. This would occur through utilizing synthetic materials that can be reused without degradation and organic materials that when they degrade can be consumed (decomposed) by other lifeforms. The hope is that by having design processes and commodity chains mirror ecological processes—a concept known as **biomimicry**—environmental problems caused by modernization, including air and water pollution, deforestation, and climate destabilization will be addressed. Thus, technology, which was once the driver of ecological degradation, would now be harnessed toward environmental reform.

Central to this technological greening of capitalism, according to ecological modernization theorists, is the modernization of the economic as well as the political systems shaping capitalism. First, ecological modernization claims that the market structures are flexible enough to reconcile the existing tension between growth and the environment in ways that corporations center ecological values and practices within their operating procedures. Second, ecological modernization claims that government can also incorporate ecological values alongside of economic values within its operations and that it can and needs to push markets toward addressing environmental problems. Yet, if the state is going to realize this goal, ecological modernization theorists propose that it will have to jettison its top-down command and control model reliant on lawsuits, fines, and national-level regulations (e.g., Clean Water Act and the Clean Air Act). Instead, the state needs to adopt financial incentives, such as ecotaxes, and embrace public-private partnerships where the state works with companies to develop new technologies through publicly funding privately led research. Through adopting these more flexible and conciliatory pro-market practices, the state can fuel technological innovation within industry that facilitates growth but also reduces withdrawals and additions, thereby bringing together economic and ecological values.

Such a process, it is claimed, can sustain both capitalism and the environment in a mutually beneficial relationship. Examples of this would be the adoption by companies of environmental management systems (EMS), which lays out a series of processes to document and calculate the firm's impact on the environment and then what steps could be taken to reduce the firm's impact on the environment. Many of the leading technology companies have EMS's, including Apple, Panasonic, LG, Google, Microsoft, IBM, and Samsung. The incorporation of environmental agreements within multilateral trade agreements that historically focus only on economic matters,

such as the North American Free Trade Agreement (NAFTA), also underscores the ascendancy of ecological issues alongside the traditional economic ones. So does the emergence of recycling within public utilities and private companies and environmental insurance policies that cover losses associated with pollution.

The use of ecotaxes (instead of income taxes) in Japan and Europe is also indicative of the shift away from top-down regulations toward market-based mechanisms. In Japan, taxes on sulfur dioxide (SO₂) lead to technological innovations, including the flue gas scrubber, which reduced air pollution in the country. Denmark, Germany, and the Netherlands implemented various carbon taxes on fossil fuel consumption that utilize market signals to push corporations toward reducing their carbon dioxide (CO₂) footprint by moving toward the use of renewable energy. One form of public-private partnerships is seen in Denmark where the Danish Environmental Protection Agency (EPA) worked with companies and financed and subsidized the creation of cleaner technologies in wood and furniture, graphic, electroplating, and fish-processing industries to reduce CO₂ and volatile organic compound (VOC) emissions.

In the United States, the automobile company Tesla would be an example of ecological modernization. Through market-led technological development, a product has been created that has significant consumer demand and is slowly pushing other automobile companies to adopt electric car production, the end result of which will be a significant reduction in fossil fuel consumption, air pollution levels, and CO₂ generation. Federal and state governments can then assist in both the adoption of this technology by other companies and its purchase by consumers through financial incentives in the form of tax credits. Right now these incentives, which range up to \$7,500 at the federal level and vary in the thousands at the state level, help generate the effective demand for these vehicles at a time when the purchase price of electric vehicles is higher than comparable gasoline models (although electric cars cost less to own over their lifetime).

Besides government employing market-centric policies and creating public-private alliances to generate greener technology, consumers are an integral component for ecological modernists. As with the Tesla example, if consumers do not purchase cleaner, less polluting commodities, then capitalism will be unable to green itself. This is because if there is no demand for greener products, then the market will not generate them. One area where this is occurring is within organic food sales, which has grown from \$3.4 billion in 1997 to \$45.2 billion in 2017, a fifteenfold increase (Organic Trade Association 2018). As a result, organic food sales constituted 5.5 percent of total food sales by 2017. Driven largely by the price premium attached to organic food, this growth in organic production, and the conversion of conventional farmers to organic farming, should produce declines in pesticide usage that would be beneficial to the health and resiliency of ecosystems. These examples suggest that under some conditions, capitalism can indeed become greener.

TREADMILL OF PRODUCTION

While ecological modernization theorists might see Apple as an example of a company at the forefront of green capitalism, treadmill theorists would see Apple in a very different light because of their different conceptual approach. In 2008, the first full year it was available, iPhone sales were a mere 13.7 million; yet by 2018, Apple was selling 217.7 million iPhones a year. Even if each unit is less toxic, made of more recyclable components, and is itself more recyclable, the total environmental impact of its production, consumption, and postconsumption is still far greater in 2018 than what it was in 2008. And this process is bound to continue for the company, according to treadmill theorists, because if it wants to maintain its high stock price (around \$220 per share in September 2019), as well as its status as a darling of Wall Street, it will have to sell more iPhones every year moving forward than it has in the preceding year. If Apple is unable to do so, then its stock price will decline, investors will seek out other more lucrative investments, and another company might step up to dominate the cell phone market. Additionally, with a lifespan of an iPhone being less than three years, treadmill theorists would ask how much waste is being produced with such a high rate of turnover? Given that Apple does not release statistics on its Trade In program, we do not know how many iPhone users trade in their phone nor how many are reused versus recycled; therefore, it is hard to know for certain whether Apple is successfully moving toward a closed-loop system that minimizes e-waste.

Then there is the issue that the 200 million plus iPhones, and the more than 2.5 billion smartphones globally, are a massive consumer of data as we use them to access digital music, movies, TV, maps, and social media. And while the iPhone might have combined a cell phone with digital cameras and digital music players, so we don't have to lug all three around with us anymore, we do not just have an iPhone but probably a laptop and possibly a tablet, a smart watch, a smart TV, and a smart car too—all of which are continually sucking down data from the sky. But this data, your data, doesn't merely float in a puffy cloud. It is materially rooted in some data center on the planet that is consuming a lot of energy and producing quite a bit of carbon to keep that data accessible to you 24/7. With ever wider swaths of the globe becoming hooked up to the cloud, global data traffic is doubling every four years and turning these data centers into the "factories of the digital age"; factories that produce as much CO₂ as the airline industry. For example, in 2010, global data center traffic was only 1.1 zettabytes (one billion terabytes); and cloud traffic accounted for under 12 percent of this data amount (Cisco 2011). By 2021, global data center traffic will have increased over twentyfold to 20.6 zettabytes, and cloud traffic will account for 95 percent of this data (Cisco 2018).

In looking at these numbers, it appears all is not that green with Apple. At the per unit level, each Apple product is greener than the previous model. But by volume, the environmental impact is far greater, and the cloud

infrastructure that it is connected to consumes more and more resources every year. Apple is therefore a clear example of the anti-ecological structure of capitalism. This would be the take from a treadmill theorist. **Treadmill of production theory** aims to explain how the relations between capitalism, the state, labor, and the environment produces environmental degradation as a normal part of its operations with little hope for correction without structural transformation (Schnaiberg 1980). This framework has been popularized by Kenneth A. Gould, David N. Pellow, and Alan Schnaiberg and is influenced by both neo-Weberian sociology and Marxist political economy. Treadmill theory is a conflict theory that explains the social and ecological problems facing society as an outcome of how industrial capitalism privileges the needs of an economic system organized around profit maximization and continual economic growth. It focuses attention on the power that corporations and the economic and political elite wield within this system (see Lesson 5).

While ecological modernization theory sees liberal capitalist democracy as having the capacity to reform itself, treadmill theory sees its structural configuration as preventing environmental reform and the substantive restructuring of society around ecological principles. This is because the state generally privileges the profit needs of corporations over and against the social and environmental needs of people and the planet (see Lessons 3, 9, and 13). On top of this, when the state does attempt to balance these often competing needs, it does so in ways that further degrades the social and environmental needs of people and the planet (see Lesson 17). Treadmill theory refers to this conflict within the political system as one between exchange values and use values. For instance, the state tries to balance the demands of corporations and investors for economic growth and conditions that facilitate the private accumulation of socially produced wealth (exchange values) with the demands from the public for social amenities, services, and goods—such as public parks, public education, public transportation, affordable housing, and clean air and water (use values). Given that the public's demands often require regulations and taxes on corporations and the elite to fund such programs, policies, and projects, regulations and taxes that diminish profit rates, the state is constantly trying to juggle the provision of social amenities and environmental protection with capital accumulation, a scenario that often pits it against one of these core constituencies. The state often tries to meet both demands by facilitating economic growth to grow the economic pie and create the tax revenue to meet the public's needs; however, this often works at cross purposes since the economic growth generated to fund such public desires often degrades the social and environmental amenities of the public desires.

A prime example of this scenario is when efforts to improve the wages and benefits of automobile workers combine with attempts to reduce air pollution through new environmental regulations on the fuel economy and emissions output of automobiles. Both of these initiatives impose new costs onto automobile companies. Auto companies may try and reduce the costs of new greener technology in their cars through selling more cars overall, since each

car may have a smaller profit margin now. Automobile companies may also respond to these new labor costs through investments in labor-saving technology, which leads to workers becoming unemployed, and thus the need to sell even more automobiles to generate more jobs for those previously unemployed. Such layoffs also push the state to incentivize the growth of other industries to hire the newly unemployed workers, which means that more withdrawals and additions are produced to employ the same number of workers as before. Other tactics employed by auto companies to maximize earnings, given these new costs and increased competition from European and Asian automobile companies, include starting new workers at lower hourly wage rates and with reduced benefits packages compared to long-term workers while simultaneously speeding up production processes so that workers are more “productive” for the company (see Lesson 4). Both of these changes to the working conditions of employees harms their quality of life inside and outside of the jobsite, as they will be more exhausted at work and less able to buy a house, send their children to college, and save for retirement. The end result of these changes is that automobile companies extract more and more resources from the planet than before, consume more energy and chemicals to produce automobiles with automated processes, increase air pollution and the volume of waste through selling more automobiles, and employ less workers than before or employ workers whose quality of life is and will continue to be much lower than employees hired in previous decades. Thus, efforts to improve the social and environmental amenities within the treadmill of production (TOP) often exacerbate the very withdrawals and additions that they were trying to reduce based on how the treadmill operates.

Additionally, even when the state tries to balance the needs of economic growth, social welfare, and environmental sustainability, the capitalist class often rejects regulations and taxes as a threat to their power and profit maximization practices; thus, they generally attempt to gain either direct or indirect control over the state to ensure that use values are not prioritized over exchange values. Such a framing of the conflict-ridden politics of the liberal capitalist state helps to explain the anti-environmental shift in the 1980s after the passage of monumental environmental legislation in the 1970s (such as the creation of the EPA, the Clean Air Act, the Clean Water Act, and the Endangered Species Act). For soon after the passage of such legislation, Ronald Reagan was elected as president under the banner of rolling back such actions and creating a United States devoted to free market politics (Layzer 2012). Consequently, the state prioritized the demand for capital accumulation over clean air and water, disinvested in protecting the environment and the public’s environmental health, sought to undo the Clean Air Act, and worked to make the EPA as ineffective in enforcing environmental regulations as possible. Another example of the state asserting exchange values over and against use values is the effort of the Trump administration to roll-back the Corporate Average Fuel Economy (CAFE) standards, which are fleetwide averages designed to improve the fuel efficiency of cars and light

trucks (Eisenstein 2019). In 2012, the Obama administration announced that CAFE standards would require an average of 54.5 mpg by 2025. The Trump administration has not only sought to reduce these requirements to 37 mpg, but to stop requirements on the production of hybrid and electric cars, and to eliminate the legal waiver enabling California to have stricter standards than those at the federal level given the state's long history of horrible air quality. Although the Obama administration's standards would have saved US consumers billions of dollars on gasoline and healthcare costs as well as reduced deaths linked to air pollution, the Trump administration has primarily pushed for these changes to protect the profits of oil, gasoline, and automobile companies. I live in California's San Joaquin Valley, which has the worst air quality in the country. Lowering the CAFE standards, eliminating requirements for electrification of the automotive fleet, and eliminating California's ability to set stricter air quality regulations will only intensify environmental inequities and increase air pollution and health inequities for the more than 4 million people who call it home, a region with some of the highest poverty rates in the country. From a treadmill perspective, the federal government is clearly choosing Big Oil, Big Gas, and Big Auto over the lives of San Joaquin Valley residents and the region's **carrying capacity**, precisely because this is how the TOP operates.

Since a main problem with the treadmill is how it organizes political and economic structures in an anti-environmental manner, treadmill theorists have long critiqued reform efforts such as recycling as a pathway to challenge overconsumption and endless economic growth. From the TOP perspective, the option of recycling within the treadmill enables us to go about our regular consumeristic ways, rather than reducing our level of consumption, because as long as we recycle, we can feel better about our impact on the planet. Such feel-good behaviors effectively keep the treadmill humming along even though the majority of recyclable items are either thrown directly into waste bins or are unrecyclable because they are ~~either~~ contaminated (by mixed materials and food and liquids), existing municipal streams are unable to recycle them, or there is no profitable market for their resale—which means the potentially recyclable item ends up in the landfill too.

The central problem here is that the treadmill's push toward endless economic growth leads to single-use products, **planned obsolescence**, and the prioritization of disposability that fuels escalating levels of ecological degradation (see Lesson 7). Planned obsolescence is a design process where the product is created to have an "artificially" short lifespan to ensure that consumers will have to buy a new product in the future. Utilizing this design process, companies are able to increase demand for their newest products even through the older models are still functional. For instance, the rechargeable batteries in Apple's AirPods or AirPods Pro earbuds have a lifespan of around two years; after that, most people will throw them out and buy new ones even though all that needs to be replaced is the battery. This process will unfold precisely because the AirPods were not designed in a way to replace the battery, that is, they were designed to be obsolete. Sure, Apple might

recycle the AirPods for you, but with 70 percent of the US economy tied to consumer spending, such processes are not going to change anytime soon. For these theorists, recycling our technological gadgets presents the illusion that we can have our cake and eat it too.

Consequently, treadmill theorists deny that the best hope for solving environmental problems is to embrace new technologies since technological development is driven by capitalist profit motives not ecological values, which means that new technologies often intensify ecological withdrawals (resource extraction) and additions (waste and pollution). This can be explained through the **Jevons paradox** in which increases in efficiency of resource consumption actually increases rather than decreases the demand for that resource (see Lessons 6 and 9). This can happen in two ways. First, given that newer commodities are more energy efficient, people tend to use them more and thus consume more of the resource that powers it. Second, while each commodity is more efficient than its predecessor, the total consumption of those items increases as more people buy them since they become more affordable; this increases overall consumption of that resource and the energy that powers it. For instance, the average gas mileage of cars and light trucks in 1975 was under 13 mpg; but in 2017, it was 25.2 mpg. However, vehicle miles per vehicle nearly tripled (from 1.2 trillion to over 3.2 trillion), and there are millions and millions of additional cars on the road today compared to the 1970s; as a result, overall gasoline consumption is much higher today than decades ago.

This process is interconnected with and fueled by the structural processes of the TOP. Returning to the previous example of how the automobile industry responded to labor organizing and environmental regulations, the improvement in the average mpg of cars and light trucks was undone at the national level for a number of reasons. One, the pursuit of growth by the automobile industry fueled the shift toward sport utility vehicles (SUVs) over cars because their profit margins are higher even though their gas mileage and emissions output are far worse than cars. Additionally, if we scale out beyond gas consumption and tailpipe emissions to the automobile industry's adoption of production technology that replaced workers (with good wages and benefits) with fossil fuels and chemicals (robotics), we see that the automobile industry consumes far more resources than it did in previous decades. Not to mention that the subsequent growth of an automobile-centric environment created growth and resource-consuming opportunities in industries that catered to the automobile, those that maintain and repair cars as well as those that supply fuel, parts, and insurance for cars. If we then include the housing industry, which has built an extremely resource intensive form of existence around the automobile—that of the suburban single-family home with its multicar garages, irrigated green lawns, and swimming pools—the ecological impacts are far worse. These impacts have been exacerbated by the shift in federal transportation dollars from public transportation toward roads, highways, and freeways for private automobiles. Factoring in the ecological withdrawals and additions of these transformations, the stand-alone

increase in average mpg of cars and light trucks appears to be negligible if not a drop in the ocean. Overall, the shift away from public transit, biking, and walking as forms of transportation toward the automobile has degraded the environment while diminishing people's quality of life through higher transportation costs, worse air quality, longer commute times, and higher accident and fatality rates.

Another aspect of the TOP is its detrimental effect on workers, who are continually expected to work longer and harder and faster for less, an issue that is largely unaddressed within ecological modernization theory. This scenario has played out with Apple as it has contracted with suppliers in China, like Foxconn, to produce its iPhones even though the company has a long history of exploitative labor practices (Barbosa 2016; Hamilton 2019). In 2019, Foxconn's factories employed a workforce that was around 50 percent temporary. Chinese labor laws only allow temporary workers to constitute 10 percent of a company's workforce. Yet, such workers are utilized because they do not receive the benefits of full-time workers including paid sick leave; paid vacations; and medical, unemployment, and pension programs. The outcome is that workers often work illegal overtime of up to 100 hours per month, even though the government only allows 30 hours per month. In fact, workers at Foxconn need to get approval for managers to "not do overtime." On top of these issues, 10- to 12-hour workdays, 6 to 7 days a week, are the norm where they either sit or stand, repeating the same motions time and time again in very noisy and hot conditions with regular beratement by managers for not working fast enough. All of these conditions exist because the company is expected to pump out half a million iPhones per day at its Zhengzhou factory to keep up with the growth demands of Apple; and workers have very little in the way of labor rights and legal protections to change the working conditions at Foxconn, which is why the iPhone is produced there in the first place.

Thus, rather than seeing new technologies as saving the planet, treadmill theorists contend that reducing the ecological and social destruction of liberal capitalist democracies will require a restructuring of power relations between corporations, people, and the state as well as between marginalized communities and the economic and political elite. Since technology is driven by capitalists and the state in ways that amplify rather than address social, economic, and ecological inequities facing humanity, what is needed to create a more ecological and just society is procedural justice (equity in decision-making; see Lessons 4 and 7). This entails the democratization of voice in technological development and how and who will receive the benefits and burdens of technological change. Through the empowerment of marginalized communities and the general population by way of social movements, the state can be pushed to prioritize use values, environmental amenities, and social equity over capital accumulation. In this respect, ecological problems are not technical problems but political problems. Such an analysis has pushed treadmill theorists to critique ecological modernists for failing to focus on how the inequities wrapped up with ecological problems are raced,

classed, and gendered. It has also driven treadmill theorists to study how marginalized communities are organizing and building power to contest the TOP and what strategies are successful or not in doing so, all in the hope of strengthening environmental justice movements and their attempts to halt the treadmill or at least force it to more equitably distribute the “goods” and “bads” it produces (see Lessons 10 and 18). Next, we turn toward another theory influenced by Marxist political economy, that of Ecological Marxism.

ECOLOGICAL MARXISM

Let us return to Apple’s AirPods. There are indeed perks to having wireless headphones. No more time spent untangling cords, having to carry your phone with you or having your cord pulled out of your phone, not to mention your cord shredding or falling apart. With AirPods, not only is there no cord failure to worry about but your phone will never be damaged again through your headphone cord knocking over a drink of water or dragging your phone off the table and onto the floor. However, if ecological modernization theory contends that capitalism is greening itself and moving toward incorporating biomimicry within its production processes to reduce withdrawals and additions, then why has Apple long resisted efforts to create more cradle-to-cradle practices within its product design? The planned obsolescence of the AirPods is by design after all: they were created to become waste. And this design process occurred even though Apple has received a lot of criticism for having non-replaceable batteries in their iPhones, and most recently, for slowing down iPhones with older batteries. In fact, while in the 1990s many cell phones had replaceable batteries, today almost none do. And the iPhone battery has always been sealed within the product. The only way to replace it is to either do it yourself, which would void the warranty on the iPhone, or bring it to Apple and pay them to do it for you. Why is this occurring? Why are technological innovations moving toward more and more of a linear waste stream and creating ever higher levels of pollution and waste? **Ecological Marxism** contends that it has an answer.

Ecological Marxism, which is associated with theorists John Bellamy Foster, Richard York, Brett Clark, and Rebecca Clausen, among others, builds on the work of conflict theorist Karl Marx by linking the socially destructive tendencies of capitalism with the ecologically destructive tendencies of capitalism, emphasizing how they are interconnected. Capitalism’s inherent need to expand (or suffer economic recessions and depressions) and increase its rate of profit (generally through increasing the productivity of labor) means that capitalism will expand and intensify its ecological degradation (see Lessons 4 and 9). From this perspective, capitalism alienates both humanity from itself but also from nonhuman nature.

To theorize the ecological degradation of capitalism on people and the planet and why this happens, ecological Marxism uses the concept of

metabolic rift. Karl Marx theorized that capitalism produces a rift in the metabolic relations between human and nonhuman nature based on capitalism's continual drive for endless accumulation of wealth. This happens because capitalism breaks up the ecological flow of nutrients within a circular loop of reuse (extraction, production, distribution, consumption, reuse) and shifts it toward a linear production line of waste (extraction, production, distribution, consumption, waste) with disastrous social, economic, and ecological consequences. Marx's example of this process focused on how the capitalization of agriculture degraded soil fertility because food waste and "nightsoil" (manure) was not being recycled back to the farm and the rural country from which it came but treated merely as a waste product to be dumped anywhere and everywhere within the city and broader urban environment. This shift from circularity to linearity robbed the soil of the nutrients it needed while making urban life toxic for communities and workers through food, human, and animal waste being dumped in the streets, waterways, and landfills. Thus, for Marx, "all progress in capitalist agriculture is a progress in the art, not only of robbing the worker, but of robbing the soil" (Marx 1976: 637–638). Moreover, with the growing division between town and country producing a metabolic rift, capitalist-led science and technology was called on to create synthetic, fossil-fuel-based fertilizers to ensure capitalist agriculture could continue growing food in spite of the loss of soil fertility. This invention, rather than solving the ecological crisis, actually intensified it by creating new ecological problems such as polluted waterways, eutrophication, and carbon dioxide emissions. Akin to treadmill theorists, ecological Marxists contend that capitalism's attempt to solve a metabolic rift through technological innovation, rather than reducing that metabolic rift, generally produces newer and ever larger metabolic rifts that threaten humanity, the planet, and capitalism.

Recent research has explored how this metabolic rift may be moving from industrial agriculture to certified organic farming too, as it turns toward relying on more off-farm agro-inputs (organic fertilizers and pesticides) with negative effects on water quality. The concept has also been applied to other social-ecological relations, including the carbon cycle, where the overproduction of carbon due to the burning of fossil fuels combined with deforestation has disrupted the carbon cycle. As a result, more carbon is produced with fewer places for this carbon to be absorbed, which generates carbon or biospheric rift that leads to climate and oceanic destabilization (see Lesson 15). Ecological Marxists have also applied the concept to the disruption of the oceanic ecosystem due to the capitalization of fishing, which has either fully exploited, overexploited, or depleted over 75 percent of global fisheries. The collapse of fish stocks globally has led to declines in predator fish and fish-eating birds, both of which also eat sea urchins. Consequently, sea urchin populations have exploded and devastated kelp forests, coral reefs, and sea-grass beds that are vital to the healthy functioning of oceanic ecosystems. To address this metabolic crisis, capitalism has produced the **technofix** of aquaculture, aka fish farming, a solution that has actually intensified and

amplified oceanic destabilization rather than reduced it. This has occurred because farmed fish are fed a diet rich in fishmeal and fish oil, which further depletes fish stocks. Additionally, farmed fish often disrupt marine ecosystems through their waste production, transmission of diseases to wild fish, and when nonnative fish escape their pens. Thus, for ecological Marxists, aquaculture is another example of how capitalism's new technology amplifies rather than reduces the metabolic rift as well as the alienation of humanity from nonhuman nature. Ecological modernists might look at this differently, however, seeing in aquaculture the promise of using greener technology to raise and harvest fish in more sustainable but less profitable ways. This could be done through decreasing the need for external inputs, particularly animal-based inputs, by utilizing ecosystem biodiversity to create closed-loop ecological flows between plants and animals within aquaculture systems or integrating the wastes of aquaculture systems into fertilizers for land-based agricultural practices. This would of course entail moving away from a monoculture aquaculture system where only one fish is grown toward one that reflects the biodiversity of healthy oceanic ecosystems. The question is whether aquaculture will move away from a linear waste stream to a system organized around biomimicry; time will tell.

Ecological Marxists also analyze the relationship between capitalism and the environment through a focus on the contradictions of capitalism; how the normal functioning of capitalism creates crises that threaten the system's viability. Historically, Marxists theorized crisis as systemic to capitalism based on several economic tendencies that threatened the conditions for capital accumulation (e.g., not enough business opportunities to invest in for an adequate return, not enough effective demand to buy mass-produced commodities so companies can realize a profit, or markets that are too competitive and provide marginal and declining profit rates). These economic crises tied to capital-labor relations are called the first contradiction of capitalism. The work of ecological Marxists, most notably James O'Connor (1998), shifts the focus away from "pure" economic factors toward how capitalism's destruction of the environment actually threatens the system's long-term viability. This happens because the scale of ecological degradation today pushes capitalism to internalize environmental costs that were once externalized onto nature, communities, workers, the public, and the state (see Lesson 13). O'Connor named this capital-nature conflict the second contradiction of capitalism and saw it as problematic for capitalism because it reduced the profit rates for companies and at a large enough scale can threaten the long-term viability of businesses and industries. This problem is seen in many economic sectors today. The continued destruction of soil fertility and ecosystem diversity through industrial agriculture means that more and more money needs to be spent for synthetic fertilizers and pesticides, which increases the costs of production for farmers and reduces their rate of profit. Lumber companies in the United States are engaging in more expensive management of forests through long-term cutting and replanting practices instead of the prior practice of clear-cutting. Private insurance companies will face billions of dollars in claims

due to sea-level rise and coastal flooding attributable to climate destabilization. And public and private insurers will face billions in losses for commodity crops destroyed through shifting climates and extreme weather events (droughts, floods, hurricanes), also attributable to climate destabilization. Apart from these costs, a growing problem will be the need to expend more and more money to ensure the work force is healthy enough to be productive for capitalists. With more and more pollution comes higher rates of respiratory issues, cancers, blood disorders, sterility, birth defects, and abnormalities in liver and kidney function, all of which increase healthcare costs for individuals, employers, insurance companies, healthcare providers, and the state.

Overall, while ecological Marxism is a conflict theory like treadmill of production, its focus is on theorizing how the economic conditions and structures within capitalism drive ecological degradation in ways that threaten the reproduction of capitalism. Although they agree with treadmill theorists that capitalism cannot be reformed to save the planet and that technological innovation within capitalism tends to exacerbate rather than address ecological problems, their analytical focus is primarily on studying the processes of capitalism and not the social movements emerging to oppose capitalism and restore the metabolic rifts destabilizing the planet. We now turn to the final theory influenced by Marxist political economy, **world systems theory**, which shifts focus from metabolic rifts and the contradictions of capitalism toward how power relations between nations structure international trade relations to favor certain countries over others.

WORLD SYSTEMS THEORY

When you wake up in the morning and check the news app on your cell phone, you might see headlines reading “Avocado Demand Threatens Mating Grounds for Monarch Butterflies”; “Coffee and Chocolate Consumption Driving Deforestation in Africa”; “Another Shipment of E-waste Arrives in India”; “Polluted Air from China Settles in Los Angeles.” After reading such headlines, do you wonder why this is occurring? Do you stop and think, why are the things I am consuming both coming from and ending up back in low-income countries? World systems theory seeks to explain this relationship through looking at capitalism as a global economic system linking all countries into the pursuit of profit and a competition-based logic prioritizing economic growth as an end in itself. For these theorists, the world economy is one of unequal economic and ecological exchange affixed to a global division of labor that emerged from Western European colonialism beginning in the 1400s. In this global economy, a small number of “core” countries have political and economic power to dictate the division of labor and terms of trade to be favorable to themselves, specialize in high-value commodities, and receive a large share of global wealth. These countries now include Western Europe, the United States, Australia, New Zealand, and Japan. Then there

are the “periphery” countries that were often either directly or indirectly colonies of Western Europe and the United States and specialize in low-value, raw material commodities and receive a small share of global wealth. These countries include many countries in Africa, Central and Southern America, and Southeastern Asia. Then there are “semiperiphery” countries that specialize in the export of both raw materials and manufactured goods and receive a medium sized share of global wealth and aspire to become a core country specializing in high-value services and goods. These countries include Mexico, Brazil, Argentina, Taiwan, South Korea, India, China, Saudi Arabia, Russia, and South Africa.

This global division of labor, and its winners and losers, becomes clear when looking at which countries benefit the most from the production of an iPhone. If I asked you who benefited the most from the iPhone, besides Apple, would you say China? Many Americans do, but this is not true. Raw materials for components, a low-value activity, comes from China, Chile, Rwanda, Congo, Turkey, and Peru, among others; while most of the technology, a higher-value activity, comes from Taiwan, Korea, Japan, and the United States. China’s largest role is in supplying the raw materials, the battery, and the labor that assembles all these components together in factories owned and run by companies like Foxconn, which is actually a Taiwanese company. As a result, the majority of profit goes to the designer of the iPhone, Apple, while the core countries of the United States and Japan come in second, followed by the semiperipheries of Taiwan, South Korea, and China. The periphery countries that supply only the raw materials for the iPhone do not even show up on this list of the top five.

For world systems theorists, this global division of labor between core, semiperiphery, and periphery often go back to the origin of capitalism that has permanently affected who benefits and who bears the burden from global trade. Given that many peripheral and semiperipheral countries were colonies or subordinate to the core countries, global trade has long been shaped to exploit the ecological wealth of these countries. This enabled the core countries to become very wealthy and invest in their own industrialization and urbanization while periphery countries became poorer and poorer through this export-led development model. This occurred because their economies were organized around meeting the needs of core countries rather than their own. In short, they were extraction zones (see Lesson 19). This meant that periphery countries were drained of their ecological wealth through the export of raw materials, and profits from such activities were not reinvested in the periphery country but traveled to Europe with the raw materials. Periphery countries were unable to create robust public infrastructures or investment in their people like Europe and the United States were able to, nor were the profits accumulated as nest egg for future national investment. Furthermore, export-led resource extraction meant less and less ecological wealth to tap into to jumpstart domestic-led development in the future and produced a range of ecological problems for the periphery, including deforestation, biodiversity loss, and air and water pollution.

Given the competitive structure of capitalist markets, such historical processes have been exacerbated over the last fifty years as periphery and semi-periphery countries try and play catch-up development with core countries. This often leads to the hyperextraction of resources with minimal environmental regulations to generate enough revenue to jumpstart industrialization, which means escalating rates of deforestation, soil erosion, water and soil mining, and air and water pollution due to strip mining, cattle ranching, clear-cutting, and industrial agriculture. Alongside these practices, periphery countries often engage in the hyperconsumption of the waste of core countries, such as plastics and electronics, as a way to generate revenue. Thus, extraction zones and waste dumps are increasingly concentrated within periphery and semiperiphery countries even though the consumption of such commodities occurs in and is organized by core countries.

This is exactly why those news headlines showed up on your phone. The increase in consumption of avocados, coffee, and chocolate in the United States and Europe is fueling deforestation throughout the world because the global economy is geared toward meeting the consumer needs of core countries with little thought to the social, economic, and ecological impacts on semiperiphery and periphery countries. In this regard, high-income countries are not framed as “environmental states” that are uniting growth and environmentalism, as ecological modernists claim, for they are only able to green the economy within their national borders by exporting the negatives of growth to semiperiphery and periphery countries. Thus, what appears to be a **dema-terialization** of the economy, the decoupling of withdrawals and additions from economic growth, only appears so because ecological modernists look at the firm or nation state rather than the global economy. For instance, while industrial production is much cleaner in the United States today due to legal requirements and technological innovation—particularly in the Rust Belt regions of Michigan, Indiana, Illinois, and Ohio—so much so that Torontonians can breathe clean air again, much of this is due to the exportation of noxious industries to other countries with less stringent environmental regulations such as China and India. Thus, what first appears to be a great example of ecological modernization is less so. Particularly because many of the factories in China were powered with cheap and dirty coal, which has produced toxic level air quality in Beijing and other major Chinese cities, and due to wind patterns, this dirty air now blows over the Pacific Ocean to California.

Therefore, when the push toward profit maximization is faced with stricter environmental regulations, often passed by the state based on the public’s demands for cleaner air and water, companies will export production and pollution overseas to countries organized as pollution zones. While core companies will develop and utilize more expensive and cleaner technologies in the core, as ecological modernization theory has shown, these same companies transfer the older and dirtier technology overseas. The end result is that Americans can continue to buy their goodies (at much cheaper prices, too) while having cleaner air and water because of the global division of labor within capitalism.

RISK SOCIETY

Are you worried about pesticides on your produce, pollutants in your tap water, toxins in the air you breathe? Do you use apps on your iPhone to avoid produce that contains the most pesticide residue, to find filtered water refill stations, to check the air quality outside? If so, you are not alone. Millions of people in the United States do the same to try and insulate themselves from these manufactured risks. But why do we engage in such practices and what are the psychological, social, and political effects of such practices? Ulrich Beck's (1995) theory of the **risk society** is helpful here, which claims that high-income Western countries are no longer industrial societies but risk societies; and that this change entails significant transformations in how societies are organized, particularly the anxieties and worries of its residents, how they are to be addressed, and by whom. In industrial societies, like the United States in the 1950s, there is an emphasis on class inequities and class solidarities, with the pivot of social relations and social struggle being around the politics of wealth distribution and how social movements within working-class and middle-class communities try to challenge how the state distributes wealth. This is very different compared to risk societies, like the United States today, where there is a focus on individualization and political consumerism, which shifts social struggle to the politics of risk distribution and how individuals need to buy products to protect themselves from toxins. In such a society, according to Beck, we are no longer worried about acquiring "social goods" but avoiding "social bads." This societal shift from a "logic of goods" to a "logic of bads" manifests in people being less worried about hunger or scarcity, the concerns of industrial society, and more worried about protecting themselves from unhealthy food and its associated problems of diet-related disease, being seen as lazy or gluttonous, or being seen as a failed body. This fear emerges because risk is much more equally distributed across the population in a risk society than goods distribution was in an industrial society. According to Beck, "poverty is hierarchic, smog is democratic (Beck 1992: 36)." Why is this so? First, the risks that haunt people today are clearly not "natural risks" that are temporary, locally specific, and outside of human control, for example, drought, plagues, or forest fires attributable to supernatural forces (nature, gods, or demons). Instead they are "manufactured risks" produced by human society continuously as a part of everyday life, often at a regional and global scale, and can last thousands of years. A chemical spill in one location at one point in time has the potential to travel hundreds if not thousands of miles away and can affect the communities depending on these ecosystems for generations. For instance, the testing of nuclear bombs by the United States in the Marshall Islands archipelago poisoned Marshallese residents hundreds of miles away and produced "jellyfish" babies born without skeletal structures and translucent skin. Another example is how millions of gallons of herbicides, including Agent Orange, were sprayed by the United States over 4 million acres during the Vietnam War to eradicate tree cover and agricultural crops for the North

Vietnamese and Viet Cong troops. The toxicity of such defoliants has produced hundreds of thousands of birth defects, cancers, rare illnesses, and deaths for the people of Vietnam, issues that are ongoing to this day.

A key aspect of risk society is that manufactured risks take on a scale and a threat that far outpaces the ability and willingness of contemporary political institutions to reduce or eliminate such risks. For instance, governments and regulatory agencies do not debate how to eliminate risk or prevent risk from being produced in the first place (the **precautionary principle**) but on how much risk (pollution) is allowed and how to distribute this risk across the population. Given this approach to risk management, what occurs is the slow and steady poisoning of people and the planet, a toxification that occurs alongside the shift from group membership (classes) to processes of individualization. This process of individualization forgoes collective solidarities in favor of prioritizing individual choice and creating your own unique life path unmoored by tradition, culture, class, and family. This is potentially freeing, as your biography is now yours to make and remake as you see fit; but it also involves a lot of risk management, as we now have to make endless decisions about our life. This “reflexive modernity” engulfs our entire existence: who am I, what high school sport defines me, what friends do I want, what partner(s) should I choose, what college should I go to, what major should I pick, where should I vacation? We have even named this anxiety: fear of missing out (FOMO). Risk management has even impacted our food practices, with people micromanaging each food purchase, scanning the list of ingredients for additives, chemicals, toxins, and allergens. This constant need to choose everything, and choose well, produces a lot of anxiety and stress for people, and they have turned toward the market to try and protect themselves from these manufactured risks. In such a society, people engage in what Andrew Szasz (2007) calls “inverted quarantine” where people buy products on the market to try and protect themselves from an increasingly toxic environment, such as the organic produce, bottled water, and air purifiers I mentioned earlier. However, none of these products addresses the structural relations creating toxicity in the first place; and, in fact, they can exacerbate pollution and waste through their production, consumption, and postconsumption. Szasz claims that such practices operate as a form of “political anesthesia” that pushes people away from the collective mobilization necessary to take on the actors creating the problems in the first place. Bottled water means not fighting for better funded municipal water systems. Purchasing organic food means not challenging the pesticide usage of industrial agriculture. Air purifiers can reduce attempts to pass stricter air quality regulations on automobiles, factory farms, and fossil fuel and petrochemical industries. These three market-based options all hold out the hope that they can provide a solution to the problem that they cannot. They offer the illusion of risk reduction when in fact they actually magnify risk production. For instance, in 1975, the average US resident consumed a gallon of bottled water per year; now it is over 30 gallons, a thirtyfold increase. A whole infrastructure is needed to extract the water from the ground, process it, and get it into your body.

Even if the bottle is recyclable or made from recycled plastic, plastic production is a polluting process, and a lot of these single-use bottles are not even recycled (their recycling rate ranges from 27 to 33 percent).

For risk theorists, society manufactures risks that we have to individually manage; as a result, one's social status is connected not merely to their wealth and income but to their ability to protect themselves from exposure to this risk. Culturally, this shifts political debate from an emphasis on creating equality to one of securing safety and from one of ensuring possession to one of realizing avoidance. It also produces a society that is no longer riveted by a class struggle over who gets what percentage of the economic pie but an individualized struggle over who can best insulate themselves from toxicity. At the same time, Beck's theory often ignores or overstates how much equalization of risk has actually occurred. Smog and poisoned water do not affect everyone equally, as the poisoning of Flint, Michigan underscored; and as environmental justice advocates have long stated, risk exposure is mapped over existing race, class, and gender inequities (see Lessons 10 and 11). While more and more people are subject to toxification, this is still an unequitable process of both who is exposed to it and who has the income and political power to protect themselves from such risks. Additionally, Beck's claims of the de-emphasizing of class mobilization by the working class and middle class in risk society might have rung true in the 1990s and 2000s; but since the Great Recession, it appears that class conflict is, once again, moving toward the center of political struggle in the United States.

ECOFEMINISM

You may not know Tian Yu, but she made international headlines in March 2010 when she was just a teenager. Like many others in China, she had moved from the agrarian countryside to the industrializing urban centers to find employment and a better life than working on a farm. She found herself working at Foxconn's Longhua factory over 12 hours a day, 6 to 7 days a week, having to skip meals and toilet breaks to do "mandatory" overtime and continually being berated and reprimanded by supervisors for not working fast enough: all to meet the production quotas that Apple, Samsung, Sony, and Dell had placed on Foxconn, which keeps its assembly line running 24/7. With little time to sleep or meet friends, dormitory life was equally alienating. Then Yu was not paid for a full month's work due to a bureaucratic error, an error that no one in the company helped her to solve. By this time, a little more than a month into her job, she was sleep deprived, isolated, out of money, without a paycheck, and unable to contact family because her cell phone was broken. This is when she went back to her dormitory on the fourth floor and jumped: she was only 17. In a coma for nearly two weeks, upon waking up she found herself paralyzed from the waist down, with three spinal fractures and four hip fractures. For the rest of

her life she will be in a wheelchair and by-and-large unable to work in factories or on farms. Yu was not alone either; 17 other workers attempted suicide that year at the factory, and 14 died. They were all 25 or younger. How did Foxconn respond to the suicides? The company installed safety nets on the roofs, windows were locked and surrounded by wires, and it tried to get workers to sign an “anti-suicide” pledge that absolved the company of responsibility if they killed themselves.

What is the relationship between gender and the environment? Are gendered inequities and environmental inequities interconnected? How do capitalism and patriarchy interconnect in ways that harm women and the planet? Such questions, among others, motivate **ecofeminism**, which combines ecological theory with feminist theory to explore how socioenvironmental relations are shaped not just by capitalism but patriarchy as well. The intersection of capitalist domination over labor and nature with patriarchal domination over women is capitalist patriarchy. Consequently, ecofeminists investigate how women’s relationship to the environment is shaped by structural inequities, often drawing relations between the oppression and exploitation of nonhuman nature, which is gendered female, with the oppression and exploitation of women. These processes overlap in how capitalist patriarchy sees both nonhuman nature and women as property, commodifies both in the pursuit of profit, and exploits and appropriates the free labor of nonhuman nature and women. Such processes also shape the Western mindset that sees the physical environment and women (and care work and the home) as part of nature and men (and the political and economic realms) as part of culture, with the latter being more important and superior to the former.

Emerging from such a theoretical focus is an exploration of the contradictions and conflicts that emerge between the needs of capitalists for profit; the social needs of people for food, water, shelter, and healthcare; and the ecological needs of the planet. This has entailed studying how ecological degradation in South America, Africa, and Asia has negatively affected women’s ability to care for their families by polluting water for drinking and cooking and clear-cutting trees that would be used to cook food and build homes (see Lesson 15). In the United States, this has involved studying how industrial pollutants have toxified women’s bodies and produced miscarriages, birth defects, cancers, and rare illnesses. Such work underscores that the toxification of nonhuman nature is at the same time the toxification of people since both are part of the environment and interconnected (see Lesson 1).

In the book *Ecofeminism*, Maria Mies and Vandana Shiva contend that the ecological degradation of the planet is rooted in the scientific project of the enlightenment, which is not objective nor value-free but privileges the standpoint of Western men and devalues the knowledge and experience of women and indigenous peoples. Examples include the devaluation of midwives within Western medicine through the medicalization of childbirth, which privileges the perspective of the doctor over the mother as well as organizes birth around efficiency for the doctor and hospital rather than the comfort of the mother. Another example are witch hunts, which occurred

simultaneously with the rise of the enlightenment, capitalism, and the enclosure (privatization) of the commons, all of which operated to criminalize the existence of women who were working class, elderly, single, and widowed. Oftentimes these were women who sought to grow food, raise cattle, and hunt wildlife in the commons and had ecological knowledge of plants that were used to assist people with their ailments and help women regulate births. From this perspective, the witch hunts were about limiting women's social, political, and economic independence from a male-dominated, profit-oriented society based on their customary practices and ecological knowledge instead of capitalist techniques and modern science.

The **bioprospecting** of US and European companies is also indicative of these colonizing processes. In this process, northern companies go to Africa, Latin America, and Southern Asia to find genetic samples of plants that can be commodified, trademarked, and turned into a profit stream even though such plants and the knowledge of how to use them have been common knowledge within indigenous communities for millennia. However, within Western property regimes, this indigenous knowledge is not valued nor compensated since it is not seen as of value or of worth because it exists outside of "science." Thus, Western companies can engage in new forms of ecological colonialism in which they steal the ecological knowledge of peripheral countries in an attempt to create patents that can then be sold throughout the global economy for millions if not billions of dollars.

While risk society theorists claim that risk is equally distributed throughout society, an ecofeminist theorist might ask who exactly is expected to protect the family from the toxicity of modern life? Who is buying organic baby food, bed sheets free of toxic flame retardants, and scanning the ingredient list of toothpaste for harmful chemicals? Norah MacKendrick's work, *Better Safe Than Sorry: How Consumers Navigate Exposure to Everyday Toxics*, answers this question (see Lesson 11). MacKendrick finds that the practice of inverted quarantine is gendered and that the time and money spent on what she calls "precautionary consumption" falls on women. This practice, which is demanding in both time and money, falls on women based on cultural ideals of femininity and motherhood, one reproduced through environmental health advocacy groups, retailers, and the marketing campaigns of companies. At the same time, it is not a practice available to all women but principally upper- and middle-class households. More importantly, MacKendrick emphasizes that this burden to protect oneself and one's family from socially produced risk falls on women even though such activities are not effective in reducing the production of toxic risk in the first place. Precautionary consumption cannot protect the family from the socially produced risk of modern life and the failure of the state to protect citizens from pollution. MacKendrick's work builds on Szasz's argument by adding a strong intersectional analysis that brings together the overlapping privileges and oppressions connected to gender, race, and class. It showed how inverted quarantine is gendered, raced, and classed; how environmental health groups play a role in selling consumerism as the solution; and how such groups facilitate a political

environment that enables the continuation of regulatory failure at the state level in which the government gets away with not regulating industry to protect all of us.

Much like treadmill theorists' focus on how environmental justice movements are trying to stop the treadmill, ecofeminists examine women's involvement in environmental movements, exploring how and why women become involved in environmental activism, and how women work to legitimate their knowledge, experience, and power in a male-dominated society that regularly disregards their experiences and voice (see Lesson 18). This scholarship has found that the gendered identities of women can be called on to legitimate their activism. Oftentimes this takes the form of "activist mothering," where a women's motherhood identity is invoked to justify their intervention into the public sphere based on protecting their children from environmental pollutants. Shannon Bell's work expands on this concept through exploring how Appalachian women in the environmental justice movement explain and legitimate their activism (see Lesson 10). In *Our Roots Run Deep as Ironweed*, Bell finds that women articulate something beyond a motherhood identity, what pushes them to oppose destructive mining practices in Appalachia is a "protector identity" where they have an obligation not merely to protect their children and grandchildren but their entire community. These women activists fight for the physical health and safety of their community; to protect community bonds, social networks, and kinship ties; to protect the "homeplace" that their family has lived on for generations; to protect the physical landscape of Appalachia from destruction; and to protect their cultural ties to land. Overall, Bell finds that the cultivation and maintenance of an "Appalachian identity" is central to the activism of these women.

However, Bell also learned that while gendered identities were a strength and asset for these women activists, they also faced gendered intimidations. Men continually challenged their right to speak in public and against mining company practices because a "woman's place was in the home." Men also tried to reassert a traditional patriarchal social order by calling these activists overly emotional when they did speak in public; they employed sexual harassment by referring to them as "bitches" and "whores" when they did speak up; and they threatened them with physical violence and death for speaking out. Gender therefore played a central role to both the empowerment of women in Appalachia as well as attempts to repress and oppress their activism. Such research also underscores the claim of ecofeminists that the capitalist exploitation of land is interconnected with the patriarchal oppression of women. In this instance, the male-dominated capitalist industries profiting off of the ecological destruction of Appalachia try to minimize the power of women activists to stop this destruction through asserting patriarchal beliefs and values about who should run the show, who has a right to speak, and who is the superior gender. Consequently, the capitalist destruction of Appalachia is supported and reinforced through patriarchal power structures.

While ecofeminism has found that nonpolitical women often become activists after encountering an environmental inequity, this raises the question of whether women's activism is only ever tied to or seen as legitimate if it is based on their role in the domestic sphere and the motherhood role. If this is the case, it shows how women's empowerment is still constrained by patriarchal values and beliefs. Tracy Perkin's research on women activists in the environmental justice movement in the central valley of California has found that this is not always the case. The women activists she interviewed were all politically engaged prior to joining the movement; and while some were directly affected by environmental inequities, many of them legitimated their activism through a social justice identity alongside of a motherhood identity, showing that the processes shaping women's activism is context specific and shaped by broader processes than just a motherhood identity.

Given the feminist praxis of ecofeminism, which aims to empower women and challenge capitalist patriarchy, it is a conflict theory akin to treadmill theory, ecological Marxism, and world systems theory. However, rather than prioritizing class relations, there is an intersectional approach that explores the relationship between gender, class, and race and the interconnected oppressions tied to patriarchy, capitalism, and white supremacy. In particular, there is emphasis on the intersection between gender and the environment with much of the research being qualitative in form and grounded in exploring the lives of women and how they construct and negotiate inequitable environmental relations.

WRAPPING UP

In October 2019, Apple released their latest product, the AirPods Pro. Marketed as the higher-end version of the AirPods, the product has a new in-ear design, features active noise cancellation technology, is water and sweat resistant, and contains the H1 chip with "Hey Siri" support: all for the low low price of \$249. What the AirPods Pro do not have, unfortunately, are replaceable batteries. A month later, Apple released iOS 13, the latest operating system for iPhones. The OS is faster than previous versions, with app launch times being twice as fast, and includes a new systemwide Dark Mode feature; revamped apps for Maps, Photos, and Music; and a new Siri voice. All these updates must be wonderful; too bad my mother will not get to experience them, as she has an iPhone 5, which isn't supported by iOS 13. She will forever be stuck in iOS 12 unless she buys a new phone. It appears that technological obsolescence and the treadmill of production is still strong within Apple; maybe next year they will get around to better integrating cradle-to-cradle design within their products.

Theories within environmental sociology raise fundamental questions about why socioenvironmental problems exist, what and who is producing them, and who they effect and why. They also provide explanations of what

needs to change and how to address the problems emerging from socioenvironmental relations. However, since each theory has its own philosophical assumptions and scale of analysis, their examination of the problems and the solutions to ecological degradation differ. Ecological modernization theory is one of gradualism, which contends that capitalism can green itself through technological innovation, and it supports such claims by looking at the leading industries and how they are moving toward cradle-to-cradle design. This is due, in part, to the theorist's beliefs that technological development, economic growth, and progress are good and beneficial. Treadmill of production theorists contest such claims because of the economic growth needs of capitalism and their belief that the state prioritizes capital accumulation over environmental protection. Additionally, treadmill theorists assert that ecological degradation is not a technical problem in need of more innovative technology but a political problem rooted in inequitable relations between the general public and the economic and political elite. Moreover, they contest ecological modernization's claim that the market is self-generating green technology, countering that most greener solutions emerge through government regulations and social movement demands, not market signals.

In fact, sampling differences, not just philosophical differences, explain why treadmill theorists, ecological Marxists, and world systems theorists all critique the arguments of ecological modernization theory. Ecological modernization theory has tended to focus on individual products or firms rather than the nation state or the global economy. From the level of the product or firm, what initially looks promising often becomes ecologically catastrophic once it is scaled up to the volume of national or global consumption. Additionally, ecological Marxism's concept of the metabolic rift shows how capitalism's quest for profit and its shaping of technological development toward this end continually produces ever greater levels of environmental destruction, while world system theory shows how the benefits and burdens of commodity chains are rooted in a global division of labor that reproduces economically and ecologically unequal exchange that privileges core countries (and their residents and consumers) over semiperiphery and periphery countries (and their residents and consumers). Merely greening a company or a nation-state will not rectify this unequal division of labor; only restructuring power between and within nations will, according to conflict theorists. Consequently, gradualism looks politically viable from the scale and philosophical assumptions of ecological modernization, while from the scale and philosophical assumptions of treadmill theorists, ecological Marxists, and world systems theorists, gradualism is increasingly insufficient to counter the ecological degradation of capitalism. For these theoretical frameworks, a wholesale transformation of the economic, cultural, and political structures of society are necessary to avoid planetary collapse. Such arguments also emerge from treadmill, ecological Marxism, and world system theories because they are critical approaches to the study of socioenvironmental relations that question how the dominant political and economic structures of society are organized; this is much less the case for ecological modernists

who are “realists” focusing on how the dominant institutions can be reformed rather than transformed.

At the same time, another key variable that influences the outlooks of these opposing theoretical camps is where they emerged. Ecological modernization theory emerged from and is much more popular in Western Europe (e.g., Scandinavia, Germany, Switzerland, and the Netherlands) where the progress made in greening capitalism is more advanced but also better supported by the state. Thus, one could read ecological modernization theory as a prescription for where capitalism could go given particular state-corporation-citizen relations. Treadmill theory was born in the United States and is much more popular here because it has more explanatory power in why the United States has been less able to green capitalism and why efforts for environmental reform have faced so much resistance by corporations and the state. In a country with a conservative anti-statist and anti-environmental culture, and a federal government generally dominated by Republicans or pro-corporate Democrats, the state has long tried to roll back any and all environmental regulations while working to open up more land to mineral, gas, and oil exploration. In such a nation, ecological modernization theory has less analytic weight because it has less explanatory power.

Finally, it must be noted that all of these theories have been tied to the perspective and experiences of predominantly white males and have overwhelmingly focused on how class inequities and class conflict shapes socio-environmental relations. Ecofeminists have emphasized how such analysis leaves out the question of gender as well as an intersectional approach that is important to understanding how people experience socioenvironmental relations and who bears the burdens of the toxicity of modern life. Most of these theories discussed in this lesson are either macro-level theories of socioenvironmental relations or meso-level theories of organizations as well. Ecofeminism tends to provide a different perspective on socioenvironmental relations through exploring micro- and meso-level theories of groups and communities. Ecofeminism brings us down to earth and flesh and blood people through qualitative methodologies that explore how people live socioenvironmental relations and how through their everyday practices people are trying to make the planet a more just and sustainable world.

Each of the theories discussed in this lesson are just that, theories, assumptions about the world that need to be verified, altered, and refined through engagement with data collected through interviews, archives, ethnography, or statistical analysis. No matter which of these theories you end up drawing on in your study of the world, it is important to remember that no theory provides absolute knowledge of socioenvironmental relations; each theory can be beneficial in particular ways while also creating its own limits or “blindness” based on the questions you want to ask, the philosophical assumptions guiding these questions, how you will collect data to answer your questions, and how you will interpret this data. Theories are critical to being an environmental sociologist because they guide your investigation of the

world, but they must also be continually refined in light of changes within the world, which is constant; thus your theory toolbox should be a work in progress as you tweak it regularly to take into account the ongoing transformation of socioenvironmental relations in the 21st century.

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