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"Keeping Them Down": Neurotoxic Pesticides, Race, and Disabling Biopolitics

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Abstract

Chlorpyrifos, the most widely used insecticide in the US, has gained great notoriety as a contested chemical substance after the U.S. Environmental Protection Agency refused to ban it in 2017. Arguing that scientific studies support their observations and suspicions that agricultural pesticides subtly produce neurological and cognitive harm, concerned groups continue to demand US regulatory agencies to ban this chemical. Their narratives demonstrate how the maintenance of unequal racial and capitalist orders across generational time is tied to small chemical exposures permitted by state regulatory agencies during critical temporalities in the life course. This essay shows the importance of including local perspectives in research that seeks to understand how concerns for the mass neurological and cognitive disabling emerge from lived experiences entangled in histories of racism, exploitation, and neglect. Interweaving feminist science and technology studies, queer theory, and critical disability studies, this analysis contributes to the limited scholarship on cognitive disabling in contexts of environmental injustice through exposure to industrially produced chemicals. Attending to these perspectives provides insights on how to fortify coalitions between environmental justice and critical disability justice.

Introduction

On 1 April 2017, two days after the United States Environmental Protection

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Agency (EPA) denied a nationwide ban on chlorpyrifos, a neurotoxic organophosphate insecticide, dozens of people gathered outside the Monterey County Jail in Salinas, California. They protested the EPA's decision and urged legislators to enact a ban in California. Among the protesters was Dr. Garcia,[1] an environmental scientist and longtime farmworker advocate. As an invited speaker, she addressed the crowd:

> Every farmer I've ever talked to wants their kids educated and out of farmwork. But how are kids going to be successful if their mothers are exposed to organophosphates and they're losing IQ points?[2] And then the children are sent to schools where they are being gassed with this neurotoxin so their brains aren't developed normally? This would never happen in an all-Caucasian neighborhood. Ninety percent of the kids in these schools are Latino. This is [a] predominantly Latino-targeted environmental racism issue. It must be stopped! It is illegal, it's discriminatory, and it must be stopped! We need to ask [the manufacturer] Dow Chemical, is it really worth your profits to create a whole generation of Latino children that are brain compromised?

Like Dr. Garcia, the protestors claim that the disproportionately high incidence of developmental disorders and learning disabilities in children are an outcome of pesticide exposures associated with abnormal brain development and permanent neurological damage. Some locals have declared it a "neurological crisis." Health scientists Rauh and Hirsh-Pasek (2017) have described the issue as "chemical warfare on children's brains." Citing hundreds of scientific studies, multiple cases of acute poisoning, and their own experiential testimonies, farmworkers, environmentalists, NGOs, and scientists across the US contend that there is no doubt of chlorpyrifos's harmful effects and have fought for a nationwide ban for almost twenty years.

As a local nurse puts it, Monterey County in California's Central Coast is "ground zero" for the tonnage of neurotoxic pesticides applied in its US$50 billion chemically intense agroindustry. Chlorpyrifos, used to kill insects, ticks, and mites to protect high value crops, is the most heavily used insecticide in California (nearly 1 million tons in 2016) (California Department of Pesticide Regulation, 2018) and the US. In California, "chlorpyrifos is used on over 800,000 acres across more than 60 crops," accounting for US$23 billion in production value (Agricultural Council of California, 2017). Big growers endorse this chemical as a "critical tool for pest control" and argue that a ban would provoke "significant economic harm" (Agricultural Council of California, 2017). On the other hand, critics warn that such assessments neglect the social and environmental harm

that this contested chemical brings to other bodies within its reach—especially Latino farmworkers who live and work near farms, and who, for decades, have felt their bodies targeted and their wellbeing deteriorated by the exorbitant pesticide use. As another local school nurse puts it in her pleadings to the EPA, "chlorpyrifos is found all over the planet: in water, air, and dust, in Arctic fog and ice, and in the blood of most humans." This pervasiveness contributes to the EPA's own determination that chlorpyrifos and two other common organophosphate insecticides adversely affected 97% of listed endangered plant and animal species (Chow, 2016).

One of the most extensively studied pesticides in the world, chlorpyrifos, like other nerve gases, produces systemic toxicity as it spreads through all body organs and systems by inhibiting acetylcholinesterase (AChE), an enzyme found across animals from insects to humans. This enzyme breaks down acetylcholine (ACh), an essential neurotransmitter that signals voluntary and involuntary muscle activation. High exposures can lead to acute poisoning, which drives the nervous system to collapse and can result in death.

Recent studies have found that human exposure to levels too low to inhibit AChE in adult bodies may nevertheless target different developing brain regions in younger bodies and, depending on which developmental stage a low exposure occurs, can be associated with distinct neurodevelopmental disabilities (Karr & Rauh, 2013). Therefore, the use of adult AChE inhibition levels by regulatory agencies as a threshold of neurodevelopmental harm in children is an "unscientific and inadequate approach to health assessment" (Hertz-Picciotto et al., 2018). Concerned groups underscore that fetuses and young children are most vulnerable to the exposure of this neurotoxicant.[3] Building from more complex toxicological models that explain the importance of the timing of the exposure during the life course, rather than "the dose makes the poison," anti-chlorpyrifos groups affirm that any amount of chlorpyrifos exposure can be unsafe.

Overall, organophosphate exposures to fetuses are associated with cognitive, social, behavioral, and social development impacts in children (see Hertz-Picciotto et al., 2018). Among the hundreds of medical and toxicological studies done on chlorpyrifos and organophosphates, two widely referenced epidemiological studies stand out to support a chlorpyrifos ban. The first one is from the Columbia Center for Children's Environmental Health. This study measured a biomarker of chlorpyrifos exposure during pregnancy among seven hundred African American and Latino mothers in New York City, and followed the children from birth into middle childhood to measure their brain physiology and cognitive functioning

(Columbia Center for Children's Environmental Health, 2012; Columbia Mailman School of Public Health, 2019).

The second study—the Center for the Health Assessment of Mothers and Children of Salinas (CHAMACOS) study by the University of California Berkeley—is the longest-running birth cohort study (Health Research for Action, n.d.). CHAMACOS tested pesticides and other chemicals in biomonitoring samples from a cohort of around six hundred pregnant Latino women from the Salinas Valley in Monterey County and studied the effects on their children's growth, neurodevelopment, and health (Health Research for Action, n.d.). Although this study does not discriminate between kinds of organophosphates, the community finds it extremely significant because it was done in the Salinas Valley. One of the most striking findings to concerned groups is that children's cognitive development tested at age seven decreased with higher amounts of organophosphate use on nearby fields during their mothers' pregnancies (Gunier, Bradman, Harley, Kogut, & Eskenazi, 2017). Both studies found low-level exposure during gestation linked to brain anomalies, reduced IQ, attention deficit disorders, developmental delays, autism, and other pervasive developmental disorders correlated with exposures to organophosphates (Bouchard et al., 2011; Eskenazi et al., 2007; Marks et al., 2010) and chlorpyrifos (Rauh et al., 2011; Rauh et al., 2015; Rauh et al., 2006; Rauh et al., 2012; Whyatt et al., 2005).

As concerned groups construct cognition such as learning or attention as embodied biochemical processes—rather than abstract social constructions or metaphysics—they bring attention to their political ecologies. Mobilizing scientific findings and their own knowledges, they allege that pesticide pollution maintains an underclass by constraining their opportunities to develop the appropriate neurological capacities for learning—at least in formal education settings, which limits their access to other forms of power.

Amid a struggle to ban chlorpyrifos use, this essay examines how biopolitical control by the neoliberal racial capitalist state within industrial agricultural settings is exercised through chlorpyrifos's material capacity to silently harm disposable bodies. In this manner, harm extends past the spatiotemporal limits of the agricultural field and its present workers, reaching the young and future generations. I situate my study at the interface of feminist science and technology studies, queer theory, geographies of environmental justice, and critical disability studies. In a polluted world (Liboiron, Tironi, & Calvillo, 2018; Murphy, 2008; Walker, 2011), where bodies are chemically altered by the thousands of

unprecedented industrially produced substances, we require a politics that attends to how power is enacted through the ubiquitous yet uneven distribution of toxicity that (re)produces sociomaterial injustices. I follow concerned groups (including activists, farmworkers, teachers, health providers, parents, and the like) in Monterey County in California's Central Coast in their efforts to ban this chemical.

While a robust body of literature maps how environmental hazards are geographically dispersed along the lines of social difference, this article adds to the limited body of work that looks at the intersections between political ecologies of industrial excess and the biopolitics of cognitive disabling as exclusion. Whereas more visible physical and sensory impairments have received greater attention overall, there has been much less theoretical engagement with cognitive disabilities (Erevelles, 2011b; Kafer, 2013)—particularly with respect to racialized environmental injustices. I use the term *disabling* to capture the ongoing process enabled by the ubiquity of these chemicals and the structural forces at play, as well as to blur the abled/disabled binary. Though both environmental justice and disability studies are invested in the relationship between the built environment and social inequality, disability studies scholars have raised red flags about the possible issues with stigmatizing disabled bodies in order to point out ecological problems, and with the premise of repairing toxic environments to reduce disabled or queer bodies (Clare, 2018; Di Chiro, 2010; Gibbons, 2017). While these concerns are critical for reimagining worlds where nondominant abilities are valued, it is also important to engage with people's lived experiences of disability. This article draws from community members' perspectives to consider how disabling emerges through the entangled sociomaterial conditions, as well as the biopolitics that unevenly reproduce the condition of disposability among racialized bodies.

In the first section, I introduce the notions of "toxicity" and "chemical injury" (Murphy, 2011), along with theorizations around biopolitics in order to approach the geographies of dispersed harm by toxic pesticides that farmworkers have encountered for decades in California's agricultural fields. I propose that linking the geographies of environmental justice to biopolitics of debilitation (Puar, 2017) may help us grasp cognitive disabling within zones of dispossession. Then, I situate how chlorpyrifos's toxic politics (Liboiron et al, 2018) is entangled with racism, regulatory science, and corporate power. Finally, I bring in the perspectives from two teachers and a farmworker advocate to examine the entanglements of cognitive disabling. Teachers offer valuable insights as experts

in learning, cognitive and behavioral processes, child development, and education. Not only are they local residents, but many come from agricultural backgrounds and are also parents. Dr. Garcia, for example, has fought for migrant farmworkers' rights for over two decades. Their insights help us understand the social impact of cognitive disabling through time and in the broader community. Taking a biopolitical approach, I explore how community members relate the exposure to brain-harming pesticides to the mass cognitive disabling of Latino populations. I conclude by arguing that through science, regulations, and pervasive racial constructions, concerned local groups denounce how state agencies entangled with agricultural industry interests allow low-dose exposures during sensitive life course temporalities and displace chemical injury onto certain populations who do not count. Consequently, such forms of harmful exposures go unseen and unaccounted for.

Geographies of Dispersed Harm: Chemical Injury and Debilitation

Many scholars urge us to track the invisible, temporally and spatially dispersed effects of industrially produced environmental toxicants related to capitalism's rampant ecological devastation and production of social inequalities (Adam, 1998; Auyero & Swistun, 2009; Davies, 2018; Fortun, 2014; Nixon, 2011; Shapiro, 2017). However, scholars assert that toxicity or toxic harm should be reduced neither to the polluting molecule or particle (Liboiron et al., 2018; Taft, 2016), nor to a property of individuals or groups (Chen, 2011). Toxicity is entangled in cultural, material, techno-scientific, and political intertwinements (Nunn, 2018; Hecht, 2016). Thinking with Douglas's (2001) systems approach to pollution that involves "a set of ordered relations and a contravention of that order" (p. 36), Liboiron et al. (2018) argue that toxicity or toxic harm "disrupts order and existing relations" while it "also maintains systems, including those that produce inequity and sacrifice" (p. 333). Moreover, toxicity marks difference and indifference towards certain things to thrive and others to wither (Liboiron et al., 2018; Murphy, 2017). As a matter of reproductive justice, it involves "uneven relations and infrastructures that shape what is destroyed, injured, and constrained" (Murphy, 2017, pp. 141-142). Murphy (2011), who chronicles the violent temporal reach of petrochemical infrastructures along the St. Clair River in Ontario, Canada, among the Aamjiwnaang First Nation, notes that,

> Chemical injury, produced by industrial production or later by commodities…is not just displaced spatially to disenfranchised locations where bodies can be rendered more disposable, but also

> displaced temporally, such that accountabilities exceed the scope of individual lives—accumulating or persisting over time. The possible effects are not only felt at the moment of the exposed organism, not only in the future of potential lives yet to be born, but also in the future generation of possible grandchildren. (p. 33)

Attending to the geographical dispersal and displacement towards disenfranchised locations where bodies are rendered more expendable is critical to visibilizing the harmful effects of industrial excess.

Beyond considering the dose of the toxicant, following toxicological advances, many scholars are turning their attention to the timing of the exposure to certain chemical substances such as neurodevelopmental toxicants and hormone disruptors during sensitive periods in the life course along with the various temporalities of their effects (e.g., Di Chiro, 2010; Langston, 2010; Liboiron, 2016 Guthman & Mansfield, 2012; Mansfield, 2012; Murphy, 2013). Depending on the timing of exposure, displaced chemical harm may yield "other" life pathways where the development of certain processes and abilities are delayed, disrupted, disordered, disturbed, or lost in ways not always anticipated or desired. Such alternative pathways are often labeled as deviant from the norm and classified as disorders or disabilities. Thus, while exterminating unwanted bugs, neurotoxic insecticides also co-produce disorder or disability among the racialized bodies of Mexican farmworkers when dispersed during critical windows of development. Though environmental justice has focused on mapping the spaces disproportionately exposed to toxic materials (Alaimo, 2010; Auyero & Swistun, 2009; Bullard, 1990; Cole & Foster, 2001; Davies, 2018; Pellow, 2007; Sze, 2007; Voyles, 2015), less research has traced the temporal geographies of how the disabling capacity of toxicity emerges across the life course and generations.

Feminist, queer, and critical disability scholars have politicized disability, stressing its concentrations among disenfranchised communities in the periphery (Erevelles, 2011b; Kafer, 2013; Livingston, 2006; Meekosha, 2011; Puar, 2017; Sadler, 2017; Taylor, 2017). They move away from the dominant social model strongly defended by (liberal) Euro-US American disability scholars and activists that privileges discourse over lived experiences and toward the material, social, political, and economic entanglements in which disabilities emerge.[4] They question whether it is possible to isolate disability from its entanglements and embrace it as a universal and inescapable condition even when produced under oppressive structures and social injustice. Against the universalizing of disability,

Puar (2017) responds,

> depending on where we live, what resources we have, what traumas we have endured, what color our skin is, what access we have to clean water, air, and decent food, what type of health care we have, what kind of work we do…we will not all be disabled. Some of us will simply not live long enough, embedded in a distribution of risk already factored into the calculus of debilitation. (p. xiv)

This statement resonates with Wilson Gilmore's (2007) definition of racism as "the state-sanctioned and/or extralegal production and exploitation of group-differentiated vulnerability and premature death" (p. 247). Along this same vein, Kafer (2013) assures that, "of course, disability is more fundamental, more inevitable, for some than others: the work that one does and the places one lives have a huge impact on whether one becomes disabled sooner or later, as do one's race and class" (p. 26). In this way, the distribution of environmental risk and vulnerability produces social difference through bodies that are raced, classed, gendered, and disabled.

Foucault's (1978, 2003, 2007) theorization of biopolitics has been useful in examining differentiated practices of inclusion and exclusion through the dispersed administration of life via the distribution of risk, bodily health, and vulnerability among different populations under current neoliberal regimes. For instance, several authors have adopted biopolitical frameworks to thoroughly examine how pesticide regulations are made to protect agribusiness as well as certain bodies regarded worthy, yet leave those unwanted exposed to harm reproducing their condition of being expendable (Guthman, 2017; Guthman & Brown, 2016; Harrison, 2006, 2008, 2011; Saxton, 2015). To grapple with the biopolitical distribution of health, risk, and toxicity, Chen (2012) proposes a posthumanist approach. For this purpose, they question the politics of dominant hierarchies of animacy arranged by qualities of agency, sentience, or liveness while attending to the material conditions of social difference along the lines of race, species, bodily ability, and sexuality.

Similarly, Puar (2017) reads Foucault's (2003) conceptual paradigm of biopolitics as a theory of debility and capacity. In addition to the sovereign's "right to take life or let live," and "right to make live and let die," she distinguishes "the right to maim or will not let die." Specifically, she conceptualizes maiming as "a source of value extraction from populations that would otherwise be disposable" (Puar,

2017, p. xviii). Deliberate maiming or disabling is carefully calculated and executed by means of scientific knowledge and risk management intricate to biopolitical population management. As a result of maiming, disability is a deliberate product—an expected impairment—due to exploitative labor conditions, with the racialized body targeted for injury. She suggests that disability "exists in relation to assemblages of capacity and debility, modulated across historical time, geopolitical space, institutional mandates, and discursive regimes" (Puar, 2017, p. xiv). Looking at the production of disability through colonial and militarized occupations, she warns us that the Israeli Defense Force policies of shooting Palestinians to maim, not to kill, or of regulating calories ("starvation diet") to stunt children's growth, are often misperceived as life-preserving and humanitarian (Puar, 2017). Such biopolitical tactics "[keep] the death toll numbers low in comparison to injuries" (Puar, 2017, p. 144). Puar argues that debility does not necessarily encompass disability; nor is it an identity but rather a massification, a process or doing through capitalist exploitation and imperialist expansion to "precaritize populations and maintain them as such" (2017, p. 73). In this essay, I employ biopolitical approaches from feminist and queer theory to look at how chemical injury is deployed to maintain certain orders by disabling racialized bodies that are rendered available for injury. I illustrate how the neurological disabling of racialized subjects who are deemed disposable through the release of toxic pesticides, permitted by regulatory agencies that place the threshold of harm above what they legally and scientifically recognize as harm, leaves the toll of neurotoxic pesticide exposure unknown.

Chlorpyrifos's Toxic Politics

The thought of being gassed by chlorpyrifos today evokes war and death. Its opponents frequently note that chlorpyrifos derives from a nerve gas first developed by German chemists during World War II that the Nazis adopted for its neurotoxic potency. This class of chemicals, which includes sarin gas, are known as organophosphates and are still used as chemical weapons in combat (Davis, 2014; Nash, 2004). Dow Chemical Company—one of the world's agrochemical mega companies—repurposed these chemicals as pesticides and introduced chlorpyrifos into the market in 1965. However, organophosphates were not commonly used until the 1980s (Davis, 2014). After Rachel Carson's influential *Silent Spring* was published in 1962, which documented the adverse environmental effects of indiscriminate use of pesticides in the US, DDT and other organochlorines underwent legislative and regulatory scrutiny for their environmental impacts as persistent organic pollutants. Once DDT was banned in 1973 in the US, growers turned to alternatives such as organophosphorous

compounds as these were less persistent in the environment and did not bioaccumulate as organochlorines did. Some farmworkers who are still active in the fight for safer agricultural practices remember pushing for organophosphates at the time, believing these could be a promising solution.[5] Even though organophosphates are more acutely toxic for shorter intervals, chemical toxicity became more contained spatially and temporally but also more hazardous to those most proximate: namely, farmworkers.[6] Moreover, although the pesticide compounds used in this region's productionist agricultural regimes have changed from lead arsenate, organochlorines like DDT, and now organophosphates, the communities affected have expressed feelings that they are simply different forms of the same persistent toxic carelessness and ongoing violence directed towards their communities and the environment.

While the overall use of chlorpyrifos has increased over the years, the EPA has slowly instituted moderate restrictions on its use and application to reduce certain risks. In fact, in 2001 the federal EPA prohibited chlorpyrifos for residential use (U.S. Environmental Protection Agency, 2001) given that it found "unacceptable risks to children" (Earthjustice, 2017). Many people called out environmental racism the decision to *not* ban chlorpyrifos in agriculture allowing the continued exposure of farmworkers and their children, who are mostly Mexican. After several lawsuits to ban this pesticide, the EPA, under President Barack Obama's administration, in November 2016 finalized an extensive risk assessment ordered by a federal court. To those most affected—that is, farmworkers and their children—the report basically concluded that there is no safe level of chlorpyrifos. The public foresaw a ban in the near future. However, on 29 March 2017, EPA Director Scott Pruitt, under President Donald Trump, refused to ban chlorpyrifos, defending it as follows:

> We need to provide regulatory certainty to the thousands of American farms that rely on chlorpyrifos, while still protecting human health and the environment. By reversing the previous Administration's steps to ban one of the most widely used pesticides in the world, we are returning to using sound science in decision-making—rather than predetermined results. (U.S. Environmental Protection Agency, 2017)

The public felt devastated and indignant after this response, which evinced Trump's post-truth, corporate-driven, and anti-Mexican politics. The community has felt unheard and discounted by Dow Chemical's illegal corporate practices, the concealing of risks from the public, unethical scientific studies, and corrupt relationships between the corporation and government agencies.[7] Given the

federal government's inaction, environmental groups, NGOs, and communities affected—particularly those in the Central Valley and the Central Coast—sought a chlorpyrifos ban in California. On 8 May 2019 California became the third state to ban all chlorpyrifos use, following Hawaii and New York (Dennis & Eilperin, 2019).

Figure 1. Monterey County local resident holding poster at the California EPA in Sacramento to demand a chlorpyrifos ban.

Now, "chlorpyrifos is only the tip of the iceberg," as a local teacher commented. Many opponents of chlorpyrifos know that it may not be the most harmful organophosphate to which they are commonly exposed, and that most of the past and current studies do not capture the cumulative, long-term, or interactive effects of multiple pesticides. However, they still consider the case of chlorpyrifos an important representation of how long-term and transgenerational chemical injury is produced through interactions with certain chemicals during sensitive life periods. Furthermore, it illuminates how scientific knowledge, regulatory policies, capitalist power, and racism are intertwined in the reproduction of inequality.

Loss of Learning Potential through Chemical Injury

For Charlie, there is a wondrous resemblance between the images of a neural

network and the known universe's cosmic web of galaxies. As he pointed this out to me, he explained that "in its most basic level," learning "is the ability of neurons or brain cells to intercommunicate with one another." Charlie, who is now retired, worked as a farmworker for eighteen years and later became a special education instructor for two decades in rural agricultural communities among majority Latino, low-income students. Drawing from scientific evidence from various laboratory studies of cell and nonhuman animals, and of human populations, he explains that exposure to organophosphates and cholinesterase inhibitors such as chlorpyrifos blocks or "scrambles" this messaging between brain cells that makes learning possible. Charlie links pesticide exposures to his students' learning disabilities, neurological disorders, lower IQs, and various behavioral problems he has long observed. Although Charlie recognizes that learning disabilities can develop from various factors, including birth complications, poverty, poor nutrition, physical or psychological trauma, and various environmental exposures, he asserts that chlorpyrifos is undeniably a contributing factor.

Through "accepted risks," Charlie explains the deferment of chemical injury onto the children of farmworkers, co-producing "other" developmental trajectories and intergenerational pathways labeled with disorder and disability. Thus, the chemical effects of pesticides are spatially and temporally displaced from the fields and their present workers onto the later development of future generations. Chemical injury is not only latent (Murphy, 2013), but triggered or pre-activated during critical windows of development. As such, Charlie raises the interconnectedness between past and future temporalities, but also the peculiar ontological vulnerability of sensitive durations in the life course, such as the nine months of gestation. Rather than causing death or other symptoms of acute exposure, the ordinary low-level exposure to chlorpyrifos and other neurotoxic pesticides cause long-term transgenerational injuries that often go unaccounted for in the calculus of farming expenses.

Charlie also stressed that, while neural pathways can be rewired or reprogrammed to make up for changes in brain morphology in children exposed to organophosphates in utero, learning disabilities are permanent. As a special education instructor, he aimed to provide accommodations and compensatory strategies. However, Charlie felt that his students still confronted multiple structural challenges, including the educational system itself, from understaffed large classes and overworked special education teachers, to the archaic classroom structure and ineffective curricula. He describes how his students had trouble developing appropriate cognitive abilities, as well as paying attention and

adjusting their behavior to the classroom setting. Voicing frustration, he states, "it is very challenging to get students to like school again because most of them hated it because they felt that they failed." He also condemns the unequal and unfair distribution of resources and services towards white students in more affluent zones of the school district. Anglo or white parents, he presumed, were more likely to advocate for their children thanks to their higher education, financial, and legal resources, and institutional knowledge; whereas Latino parents struggled with language barriers, immigration, and limited institutional knowledge, and felt disempowered and thus were less likely to advocate.

Figure 2. Display board titled 'Chlorpyrifos and Greenfield' assembled by Charlie, shown outside the California State Capitol in Sacramento on a trip to meet with state legislators to urge a chlorpyrifos ban. Maps were taken from California Environmental Health Tracking Program, California Department of Public Health. Online at www.cehtp.org/pesticidetool.

In this regard, disability intersects with other geopolitical and social markers of difference, and is further compounded or alleviated by uneven infrastructures (Erevelles, 2011a; Murphy, 2017; Puar, 2017). Puar (2017) notes that bodily experiences "can be capacitated through a reorganization of resources, of white privilege, class and economic mobility" (p. 65), while "other" bodies are debilitated through multiple barriers and forms of community disenfranchisement. Therefore, not only are Latino children more exposed to chlorpyrifos and other pesticides, but this chemical has a more profound impact

on Latino children due to language, class, race, national origin—to which environmental regulatory agencies remain oblivious.

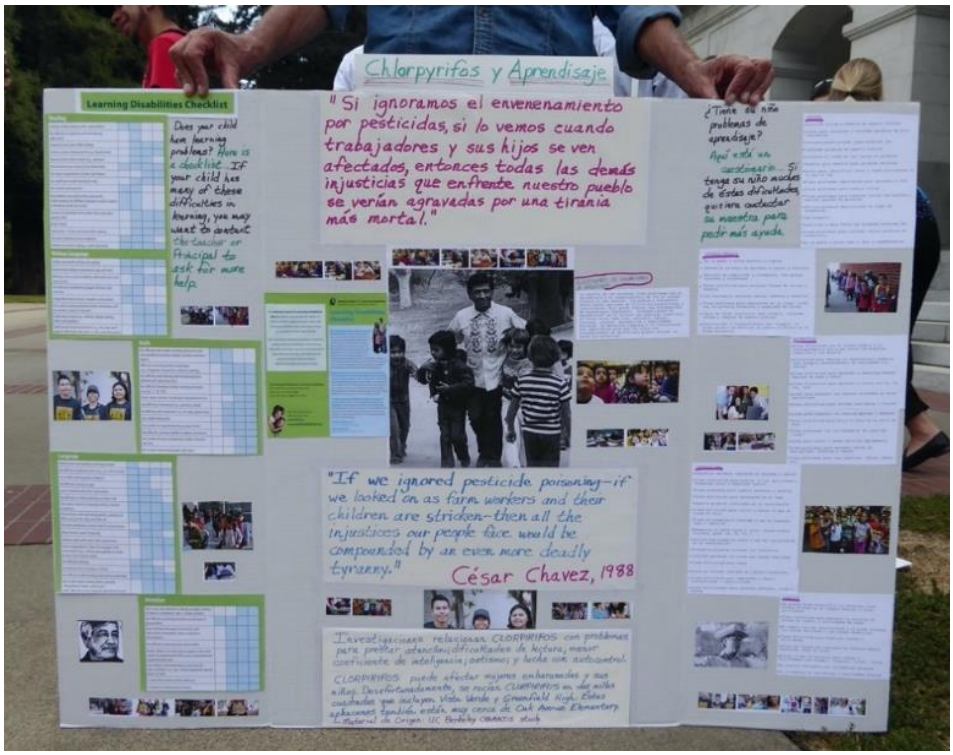

Figure 3. Display board titled 'Chlorpyrifos and Learning' also created by Charlie. Charlie included a Learning Disabilities Checklist in both English and Spanish in order for parents to identify whether their child might potentially have a learning disability. As shown, Charlie also includes pictures and quotes from farmworker leader Cesar Chávez. Both boards in Figures 2 and 3 were initially created to show Spanish-speaking parents in Greenfield (south of Monterey County) the use of chlorpyrifos and acetylcholinesterase inhibitor pesticides in their area, and the links between chlorpyrifos and learning disabilities.

In the same fashion, Charlie identifies weaker support systems for adults with learning disabilities, which deepens their marginality. In addition to considering agribusiness's economic costs of banning chlorpyrifos, Charlie has urged the California EPA to bear in mind the "hidden costs" from chlorpyrifos exposures. He finds the incalculable "loss of human learning potential staggering." He draws from national data that shows that adults with learning disabilities rarely apply for Americans with Disabilities Act accommodations, have higher unemployment rates, receive lower incomes, and are disproportionately incarcerated or imprisoned. While their social and economic marginalization may resist capitalism in various ways as several disability scholars suggest, the oppressive processes of capitalism that exploit profit from their disposability still impinge upon them. Puar

(2017) explains,

> populations that are not roped into an economy of rehabilitative objects of care are sites of profit precisely for their availability for injury, their inability to labor, their exclusion from adequate health care, and their ideological production as lazy, criminal, and burdensome. (p. 78)

Read as non-laboring bodies or non-contributing subjects, they are further constructed as unworthy and disposable objects, which perpetuates their exclusion. Thus, debilitation is central to capitalism's ongoing exploitation in zones of dispossession prone to environmental injustice.

Stolen Futures and Cheap Labor

Eric remembers being awoken as a child by the sound of the crop duster spraying pesticides in the mornings over the fields surrounding the farmworker labor camp where he lived. Growing up, he worked in the sprayed agricultural fields alongside his parents and siblings, but began to learn about the pesticide impact on human health a few years ago. Eric has taught at the same elementary school for over twenty years, where most students are Hispanic from low-income farmworker families from the Salinas Valley. Through the years, he has noticed the expanding list of learning disabilities and overall health issues among his students. He reckons that "students of Monterey County face alarming rates of learning disabilities," [8] as he stated in his speech at a rally for the statewide banning of chlorpyrifos outside the California EPA. Referring to the CHAMACOS study, Eric remarked, "the scientific evidence…demonstrates the undeniable link between the agricultural pesticides applied nearby and developmental delays that leave children at a huge disadvantage." Seeing the difficulties his students have with developing different skills and competencies such as reading, comprehension, math, and logical reasoning, he added, "It's hard! It's really hard to watch children struggling in the classroom and know that their health and potential, their true potential had been stolen from them." Rather than flourishing at this stage, these school-aged children, Eric observes, are developmentally delayed, disadvantaged, setback in a fast-paced school system. To imagine future generations of children whose brains are compromised and who are dispossessed from their intellectual capabilities afflicts the community; and these issues have been central to the anti-chlorpyrifos campaign.

The notion of lost futures and children's stolen potential are common tropes in the fight against chlorpyrifos as well as in discourses of children threatened by other environmental toxins (e.g., Colburn, Dumanovksi, & Peterson Myers, 1996; Chen, 2012; Grandjean, 2013; Markowitz & Rosner, 2013). Aside from the overexamined meanings of innocence, vulnerability, victimhood, lack of agency, and becoming that the child figure evokes (Cannella & Kincheloe, 2002), feelings of disadvantage, loss, dispossession, and injustice among a group deemed "deficient" and depicted as careless about their children's learning and education (Valencia, 2002) also emerge. Some disability scholars (e.g., Clare, 2017; Gibbons, 2017; McRuer, 2006; Siebers, 2008) suggest that the nostalgic mourning for a lost body is symptomatic of a compulsory able-bodiedness/able-mindedness to the degree that the futures of those disabled become "both unimagined and unimaginable" (Kafer, 2013, p. 44). Instead, Puar (2017) suggests,

> the capacity to inhabit futurity is already a privilege of ableism. This capacity is not simply affective or phenomenological but also structural, biopolitical, and ensnared in economies of risk, calculation, and survival. The future is already here, but it is unevenly distributed, in bits and pieces in time and space, as extremes and also as banalities. The disability to come is thus due not to aging or the exceptional accident but to the racialized body as available for injury, what Deleuze and Guattari denote as the "pre-disabled." (p. 86)

As bodies available for injury, Latino children are predisabled before birth, already disadvantaged. The exposure to chlorpyrifos and other pesticides that harm bodies is part of this structural and biopolitical distribution of risk and futurity that follows racial lines and intensifies precarious futures. Therefore, to mourn lost futures is not limited to a compulsory desire for ablebodiedness. It calls for us to value these bodies and render them worthy of being nurtured and cared for to reach their full potential. Given the dominant biopolitical distribution of harm and futures, to imagine alternative "futures" where Mexican American children can be seen as capable of learning, but also vulnerable to the exposure of tiny amounts of chemicals, disrupts and transgresses the status quo.

Along with Charlie and other teachers, Eric sees how the futures of Latino children are limited not only by the toxic harm but also educational inequality. Latino and other children of color disproportionately attend underserved rundown schools with limited resources. In effect, he notes,

> Every year, the further they fall behind. The further they fall behind, the less motivated they are going to be…They start to feel

> embarrassed, self-conscious about it. I think that is when education doesn't become a priority anymore, and they say, "You know what? I don't want others to see me. I am dumb, stupid. I'm unintelligent. I rather do something that I am good at." And they'll find a job and prefer to go work somewhere. So obviously it is very discouraging for them. And that is why they will probably choose a different path.

Eric offers a complex view of how social and economic inequality through Latinos' educational underachievement are reproduced through chemical, institutional, and affective entanglements. In this sense, there is an unequal distribution of harm and exhaustion that make it difficult for abandoned groups to strive and persevere (Povinelli, 2011).

The troubles these children experience trying to learn at school rewrites long-held eugenic notions about the bodies of Mexican Americans—namely, that they are "unfit" and "unworthy citizens." They are only desirable as workers if they are physically fit to do the hard labor they are "biologically suited" to do and that whites avoid, like agriculture (Molina, 2006; Nash, 2006). Unfortunately, Eric explains, such patterns of low educational attainment make it easy for "those who deny the science, [to] make excuses." These excuses say that Latinos do not prioritize education, or that they should move away—as if that were easy. Coming from a farm working background himself, Eric knows well the constrictions they face and their reliance on farmwork as a form of subsistence.

Like Dr. Garcia mentioned in the opening quote, Eric also views education as a way out of the minimum-wage agricultural work, out of the labor camp, as it was for him and his siblings. Indeed, many farmworkers find their labor gratifying and enjoyable. Yet, many also realize the physical toll and undervalued aspects as well, and aspire for their children to study and move on to more highly valued and paid positions. Dr. Garcia and Eric imply that it becomes harder for these children with harmed brains to perform in school and achieve academically; many of them eventually fall into farmwork and reproduce cycles of poverty and segregation that trap Latinos in the labor camp where they only work to get by. If everyone gets an education, then, he posed rhetorically, "who is going to do the jobs nobody wants to do?" Therefore, the production of cognitive disabling through chemical injury functions to extract value from racialized bodies by creating a surplus of future generations to work in toxic and dangerous industries such as agriculture (Guthman, 2017), which maintains them in a mode of survival amid precarity in a stratified society (Puar, 2017).

To Eric, the subtle, low-level exposure of pesticides is not a "conspiracy"; rather, it is calculated through science, technology, and regulation to benefit agribusiness and disregard Latinos. He says, "we're just a workforce and that is it. That is all they want us for: cheap labor. The same thing with Flint." Eric alludes to the similar racial and class discrimination against Latinos and Blacks through environmental toxicity. Doing so, he claims that the state and private industries do not care for the wellbeing of these populations, yet they profit from the cheap labor extracted from their bodies, and then from their further marginalization.

Racial Biopolitics in Mass Disabling

A few months before Pruitt refused to ban chlorpyrifos, Dr. Garcia compared the lead-poisoned water crisis that has primarily affected African Americans in Flint, Michigan, to the organophosphates in Monterey County and across California. In a community meeting, she referenced Dr. Mona Hanna-Attisha, the pediatrics professor whose research revealed that children in Flint were exposed to dangerous lead levels, who once said, "if you were going to put something in a population to keep them down for generations to come, it would be lead" (Ganin & Tran, 2016). Alternatively, Dr. Garcia posited, "it could be organophosphates." Like lead, organophosphates are toxic to the nervous system, especially to the brain. To support her proposition, she cited the CHAMACOS study, which correlated prenatal exposure to 522 lb (237 kg) of organophosphates within one-kilometre radius with a two-point decrease in IQ. Looking at publicly available data, Dr. Garcia figured it is very common for areas in Monterey County to have been dumped with more than 522 lbs of organophosphates. As in Flint, "the horror" is that state regulators "have looked the other way" and failed to protect the public—specifically, poor urban African American residents and poor Mexican farmworkers. She alerts us that it is not "just a few IQ points" lost when we estimate "the thousands and tens of thousands of children"—generations—affected over the years. The mass scale of the issue emerges from the systemic racist neglect of and carelessness for these children of color. Similarly, Puar (2017) notes how Israel's strategy of disabling, maiming, and stunting Palestinians is a form of biopolitical control to "render impotent any future resistance, future capacity to sustain Palestinian life on its own terms, thereby debilitating generational time" (p. 4).

Uncovering the meanings and politics of what and who become chemically injured, toxic, polluted, disrupted, or lost (Chen, 2012; Douglas, 2001; Liboiron et al., 2018) helps us see why a matter of such scope remains marginalized. Nash

(2006) explains how health officials and public authorities employ racialized discourses of lack of hygiene and education to belittle farmworkers' personal testimonies of pesticide poisoning. According to Chen's (2012) animate hierarchies, the biopolitics of race and bodily ability defer toxicity to "deprivileged or already 'toxic subjects" (p. 218). Before the Flint crisis garnered the media's attention, Chen questioned whether it would be possible to alarm the public about Black children's vulnerability to environmental lead given the dominant construction of the Black body. They note that the "racial construction of blacks as already unruly, violent, contaminated, and mentally deficient lies inherent in the current neoliberal economy, itself an economic mode conditioned and supported by a growing and incredibly powerful prison industrial complex" (Chen, 2012, p. 270). Through similar racial projects, Mexican descent groups have been constructed as lazy, dirty, trash, vermin-infested, backward, unambitious, irresponsible, dumb, unmotivated to learn, and unworthy of knowledge. A large body of critical scholarship has shown that African American and Mexican American children have been more frequently labeled as "intellectually deficient," "inferior," and "feeble-minded." In fact, during the early twentieth century, segregated schools were rationalized and legitimated on the basis that Mexican children were genetically deficient, unmotivated, and immoral in comparison with their white peers (Chávez-García, 2007; Gonzalez, 1996; Valencia, 1997).

Over time, the underlying racist science of such ideas was (more or less) debunked and replaced by ideas of cultural deficiency, which continued to justify Mexican Americans' underachievement as a corollary of their backward culture. Through these sort of racial constructions, certain groups are regarded as deserving of their conditions, which absolves the neoliberal state from securing their welfare. Like Black children, Mexican American children are not only deemed unavailable or unable to learn but predisabled (Puar, 2017) by structural forces even before they encounter chlorpyrifos and other neurotoxicants in their bodies. As these children are unable to learn and achieve academically, cognitive disabling through chemical exposures remains unalarming and uneventful (Nixon, 2011). In this sense, the subtle low-level exposures during early life stages, even before birth, disrupts farmworker children's development and learning but maintains the community as a subaltern underclass (Douglas, 2001; Liboiron et al., 2018). A biopolitical lens helps us examine how concerned groups see exposure to neurotoxic organophosphates as an artifact of population control "to keep them down," as Dr. Garcia said, and sheds light on underlying racial hierarchies.

Conclusion

In this article, I use a biopolitical lens to examine how disproportionate exposure to industrially produced toxic substances that are linked to neurological and cognitive disabling is both an instrument and product of racial capitalism. Such exposure allows industries to exert power over populations by extracting value from their bodies, which are cast disposable. As they trace the invisible and dispersed geographic reach of chlorpyrifos' chemical injury, concerned local groups in Monterey County denounce the chemical's spatial and temporal deferment onto the unborn and children of Latino farmworkers for debilitating their capacity to sustain their communities. Tracing its invisible and dispersed geographic reach, concerned local groups in Monterey County denounce that the spatially and temporally deferred chlorpyrifos' chemical injury onto the unborn and children of Latino farmworkers debilitates their capacity to sustain their communities. Thus, toxic harm is embedded in the unequal racial and capitalist orders that maintain them as an expendable class living in precarity and working in exploitative jobs such as farmwork. The massive transgenerational disabling effects are sustained through pervasive racist perceptions of Mexican Americans as defective, unfit to learn, lazy, and a burden to society. Consequently, the mass exposure and disabling of Mexican American children to pesticides goes largely disregarded by the general public.

Claiming the mass disabling of their Latino community condemns the ongoing exposure to neurotoxic pesticides, particularly to those most vulnerable during sensitive periods, as well as the poverty, racism, the unequal education system, limited access to health and social services, exploitative labor conditions, notions of individualism and productivity, capitalist modes of production, inadequate public health regulations, and corrupt corporate politics. All these issues extend and intensify the disabling capacity of chlorpyrifos—maintaining and reproducing "inequity and sacrifice" (Liboiron et al., 2018). By attending closely to how the community sees such exposure as suffering and loss, I aim to make space for communities deemed defective and disposable, to denounce and mourn their vulnerability to being harmed by toxins, and to desire otherwise—including more socio-environmentally just and caring futures.

In light of possible coalitions between environmental justice and disability studies that attend to how power is enacted through chemical injury, it is critical to not lose sight of environmental justice's fundamental tenet. That is, we must recognize that environmental hazards are differentially distributed, and critically examine the multiple ways in which disenfranchised communities are

disproportionately burdened. Being critical of how futures are distributed in accordance with our racial state's biopolitics, and valuing and caring for those regarded has having "no future" other than as surplus available for injury is important for fostering more socio-environmentally just politics. Given the slow legal battle to ban chlorpyrifos at a federal level, a comprehensive ban in the near future seems unlikely. In the meantime, concerned groups shun Dow Chemical as it continues to capitalize on the sale of chlorpyrifos, while they suffer its risks. As those directly involved in the struggles note, as long industry and regulators continue to deem certain people unworthy of living and available for industry, the fight against pesticides will continue.

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Notes

[1] Pseudonyms are used to protect informants' privacy.

[2] Various IQ standardized tests are commonly used as scientific tools in the measurement of cognition. In this case, IQ testing becomes significant as scientific studies correlate it to brain anomalies and chemical exposures. It is worth noting that IQ scores in general have been highly disputed as an accurate measure of intelligence and, even more so, the quantification of intelligence. Additionally, several scholars have noted that intelligence tests have also been used as diagnostic tools to categorize populations for biopolitical control and scientific racism. In fact, intelligence tests were introduced when eugenic movements emerged around the early twentieth century (see Gould, 1996; Stern, 2006).

[3] Children's susceptibility to environmental toxicants and to organophosphates in particular has been noted. First, children have larger intakes to toxic chemicals on a body-weight basis than adults. Second, their susceptibility is heightened during windows of vulnerability, which occur in embryonic and fetal life and early

childhood. Third, children have a lower capacity to metabolize and detoxify (Etzel & Landrigan, 2013).

[4] According to the social model, disability is universal and we are all "temporally able bodied" to the extent that becoming disabled is "only a matter of time" (Garland-Thomson, 2005, p. 1568). The former originally arose to disavow the dominance of the able-body—which depicts disability as a personal tragedy that wreaks a "grim future" or "no future" at all—and to push against the medical model that saw disabled bodies as pathological, deviant, and defective and insisted for cures.

[5] According to Davis (2014), at the time, risk assessment focused on cancer, and organophosphate insecticides were not greatly associated with carcinogenicity in humans—despite evidence of carcinogenicity in nonhuman animals—which allowed them to sneak through the regulatory gaps.

[6] Nonetheless, chlorpyrifos is still a semi-volatile compound prone to becoming air-borne and drifting off-site (Pesticide Action Network North America, n.d.) for several miles, and its half life in soils can last between 7 and 120 days (National Pesticide Information Center, 2010). Chlorpyrifos can be more persistent in indoor environments. Particulates have been found in dust samples even after they were phased out for residential use (Quirós-Alcalá et al., 2011).

[7] For instance, concerned groups have brought up that Dow Chemical has engaged in unethical and illegal practices, conducted research on inmates (Robbins, 1983), and falsely made safety claims in the advertisements of their products (New York Office of the Attorney General, 2003). They have expressed skepticism about trusting regulatory agencies given that following his election, Trump appointed Dow Chemical chairman and CEO Andrew Liveris to be chair of the American Manufacturing Council (Knaus, 2016). In addition, Dow Chemical donated $1 million to Trump's inaugural committee (Blumenthal, 2017). News circulated that Pruitt met privately with Dow CEO Andrew Liveris on 9 March 2017, although an EPA spokesperson clarified that the meeting was cancelled and they only had a "brief introduction in passing" (Associated Press, 2017).

[8] In Monterey County, of all students enrolled in special education (11.3%), 44% have learning disabilities. These numbers do not vary significantly from the state averages (12.5% in special education, 38.4% of whom have learning disabilities) (Lucile Packard Foundation for Children's Health, 2018a, 2018b).

Notwithstanding, educators I spoke with who work in Monterey County's low-income schools where the majority is Hispanic (above 98%) cautioned that these numbers are likely underestimations for their schools. Based on their observations, they estimate that up to 40% of their students may have learning disabilities and should receive special education services. However, given the limited resources in these schools, only those students most severely affected are referred and become recipients of special education services. Furthermore, educators and parents of children with disabilities complain that children are often not properly diagnosed due to limited resources.

References

Adam, B. (1998). *Timescapes of modernity: The environment and invisible hazards.* London, UK: Psychology Press.

Agricultural Council of California. (2017, July 6). *Pesticides.* Retrieved from http://www.agcouncil.orgpesticides

Alaimo, S. (2010). *Bodily natures: Science, environment, and the material self*. Bloomington, IN: Indiana University Press.

Associated Press. (2017, June 30). EPA chief met with Dow Chemical CEO before deciding not to ban toxic pesticide. *Los Angeles Times.* Retrieved from https://www.latimes.com/business/la-fi-epa-pesticide-dow-20170627-story.html

Auyero, J., & Swistun, D. A. (2009). *Flammable: Environmental suffering in an Argentine shantytown*. Oxford, UK: Oxford University Press.

Blumenthal, P. (2017, April 19). Companies that made big donations to Trump inauguration are benefiting from presidency. *Huffington Post*. Retrieved from https://www.huffingtonpost.com/entry/trump-inauguration-corporations_us_58f7abdde4b029063d36577f

Bouchard, M. F., Chevrier, J., Harley, K. G., Kogut, K., Vedar, M., Calderon, N. ... Eskenazi, B. (2011). Prenatal exposure to organophosphate pesticides and IQ in 7-year-old children. *Environmental Health Perspectives, 119*, 1189-1195.

Bullard, R. D. (1990). *Dumping in Dixie: Race, class, and environmental quality*. Boulder, CO: Westview Press.

California Department of Pesticide Regulation. (2018, November 15). *DPR recommends interim restrictions on use of chlorpyrifos* [News release]. Retrieved from https://www.cdpr.ca.gov/docs/pressrls/2018/111518.htm

Cannella, G., S., & Kincheloe, J. L. (2002). *Kidworld: Childhood studies, global*

perspectives, and education. New York, NY: Peter Lang Publishing.

Chávez-García, M. (2007). Intelligence testing at Whittier School, 1890–1920. *Pacific Historical Review, 76*(2), 193-228.

Chen. M. Y. (2011). Toxic animacies, inanimate affections. *GLQ: A Journal of Lesbian and Gay Studies,* 17(2-3), 265-286.

Chen, M. Y. (2012). *Animacies: Biopolitics, racial mattering, and queer affect*. Durham, NC: Duke University Press.

Chow, L. (2016, April 9). 97% of Endangered Species Threatened by 3 Common Pesticides. *Ecowatch.* Retrieved from https://www.ecowatch.com/ozone-depletion-arctic-warming-2644883057.html

Clare, E. (2017). *Brilliant imperfection grappling with cure*. Durham, NC: Duke University Press.

Clare, E. (2018). *Cautionary tales: Environmental injustice, disability, and chronic illness* [Video file]. Retrieved from https://www.youtube.com/watch?v=DvrGXf5Z_6M

Colburn, T., Dumanovksi, D., & Peterson Myers, J. (1996). *Our stolen future: Are we threatening our fertility, intelligence, and survival?: A scientific detective story.* New York, NY: Dutton.

Cole, L. W., & Foster, S. R. (2001). *From the ground up: Environmental racism and the rise of the environmental justice movement.* New York, NY: New York University Press.

Columbia Mailman School of Public Health. (2019, January 19). Out of Harm's Way. Retrieved from https://www.mailman.columbia.edu/public-health-now/news/out-harm's-way

Columbia Center for Children's Environmental Health. (2012, April 12). Prenatal Exposure to the Pesticide Chlorpyrifos Linked to Alterations in Brain Structure and Cognition. Retrieved from https://ccceh.org/news/april-30-2012-prenatal-exposure-to-the-insecticide-chlorpyrifos-linked-to-alterations-in-brain-structure-and-cognition

Davies, T. (2018). Toxic space and time: Slow violence, necropolitics, and petrochemical pollution. *Annals of the American Association of Geographers, 108*(6), 1537-1553.

Davis, F. R. (2014). *Banned: A history of pesticides and the science of toxicology*. New Haven, CT: Yale University Press.

Dennis, B., & Eilperin, J. (2019, May 18). California to ban controversial pesticide, citing effects on child brain development. *The Washington Post*. Retrieved from https://www.washingtonpost.com/climate-environment/2019/05/08/california-ban-controversial-pesticide-citing-effect-child-brain-development/

Di Chiro, G. (2010). Polluted politics? Confronting toxic discourse, sex panic, and eco-normativity. In C. Mortimer-Sandilands & B. Erickson (Eds.), *Queer ecologies: Sex, nature, politics, desire* (pp. 199-230). Bloomington, IN: Indiana University Press.

Douglas, M. (2001). *Purity and danger: An analysis of concepts of pollution and taboo.* New York, NY: Routledge.

Earthjustice. (2017, March 28). *What you should know about chlorpyrifos: The toxic pesticide now harming our children and environment*. Retrieved from https://earthjustice.org/features/what-you-need-to-know-about-chlorpyrifos

Erevelles, N. (2011a). The color of violence: Reflecting on gender, race, and disability in wartime. In K. Q. Hall (Ed.), *Feminist disability studies* (pp. 117-135). Bloomington, IN: Indiana University Press.

Erevelles, N. (2011b). *Disability and difference in global contexts: Enabling a transformative body politic*. New York, NY: Palgrave Macmillan.

Eskenazi, B., Marks, A. R., Bradman, A., Harley, K., Barr, D. B., Johnson, C. ... & Jewell, N. P. (2007). Organophosphate pesticide exposure and neurodevelopment in young Mexican-American children. *Environmental Health Perspectives, 115*(5), 792-798.

Etzel, R. A., & Landrigan, P. J. (2013). Children's exquisite vulnerability to environmental exposures. In P. J. Landrigan & R. A. Etzel (Eds.), *Textbook of children's environmental health* (pp. 18-27). New York, NY: Oxford University Press.

Fortun, K. (2014). From labour to late industrialism. *HAU: Journal of Ethnographic Theory, 4*(1), 309-329.

Foucault, M. (1978). *The history of sexuality. Volume 1: An introduction* (R. Hurley, Trans.). New York, NY: Pantheon Books.

Foucault, M. (2003). *"Society must be defended": Lectures at the College de France, 1975–1976* (D. Macey, Trans.). New York, NY: Picador.

Foucault, M. (2007). *Security, territory, and population: Lectures at the College de France, 1977–1978.* (G. Burchell, Trans.). New York, NY: Picador.

Ganin, S. & Tran, L. (2016, January 13). How tap water became toxic in Flint, Michigan. *CNN.* Retrieved from https://edition.cnn.com/2016/01/11/health/toxic-tap-water-flint-michigan/index.html

Garland-Thomson, R. (2005). Feminist disability studies. *Signs, 30*(2), 1557-1587.

Gibbons, S. (2017). Neurological diversity and environmental (in)justice: The ecological other in popular and journalist representations of autism. In S. J. Ray & J. Sibara (Eds.), *Disability studies and the environmental humanities toward an eco-crip*

theory (pp. 531-551). Lincoln, NE: University of Nebraska Press.

Gilmore, R. W. (2007). *Golden gulag: Prisons, surplus, crisis, and opposition in globalizing California*. Berkeley, CA: University of California Press.

Gonzalez, G. G. (1996). Chicano educational history: A legacy of inequality. *Humboldt Journal of Social Relations, 22*(1), 43-56.

Gould, S. J. (1996). *The mismeasure of man.* New York, NY: Penguin.

Grandjean, P. (2013). *Only one chance: How environmental pollution impairs brain development—and how to protect the brains of the next generation.* Oxford, UK: Oxford University Press.

Gunier, R. B., Bradman, A., Harley, K. G., Kogut, K., & Eskenazi, B. (2017). Prenatal residential proximity to agricultural pesticide use and IQ in 7-year-old children. *Environmental Health Perspectives,125*(5), 057001-057002-8.

Guthman, J. (2017). Lives versus livelihoods? Deepening the regulatory debates on soil fumigants in California's strawberry industry. *Antipode, 49*(1), 86-105.

Guthman, J., & Brown, S. (2016). Whose life counts: Biopolitics and the "bright line" of chloropicrin mitigation in California's strawberry industry. *Science, Technology, & Human Values, 41*(3), 461-482.

Guthman, J., & Mansfield, B. (2012). The implications of environmental epigenetics: A new direction for geographic inquiry on health, space, and nature-society relations. *Progress in Human Geography, 37*(4), 486-504.

Harrison, J. (2006). "Accidents" and invisibilities: Scaled discourse and the naturalization of regulatory neglect in California's pesticide drift conflict. *Political Geography, 25*(5), 506-529.

Harrison, J. (2008). Abandoned bodies and spaces of sacrifice: Pesticide drift activism and the contestation of neoliberal environmental politics in California. *Geoforum, 39*(3), 1197-1214.

Harrison, J. L. (2011). *Pesticide drift and the pursuit of environmental justice.* Cambridge, MA: MIT Press.

Health Research for Action, UC Berkeley. (n.d.). *The CHAMACOS cohort study*. Retrieved from http://www.healthresearchforaction.org/sph/chamacos-cohort-study

Hecht, G. (2016). Making war in secret for the future (A toxic tale from the African Anthropocene). *Toxic: A symposium on exposure, entanglement, and endurance.* Retrieved from http://www.toxicsymposium.org/conversations-1/2016/2/15/making-war-in-secret-for-the-future-a-toxic-tale-from-the-african-anthropocene

Hertz-Picciotto, I., Sass J. B., Engel, S., Bennett, D. H., Bradman, A., Eskenazi, B., …

Whyatt, R. (2018). Organophosphate exposures during pregnancy and child neurodevelopment: Recommendations for essential policy reforms. *PLoS Med 15*(10): e1002671.

Kafer, A. (2013). *Feminist, queer, crip*. Bloomington, IN: Indiana University Press.

Karr, C. J., & Rauh, V. A. (2013). Pesticides. In P. J. Landrigan & R. A. Etzel (Eds.), *Textbook of children's environmental health* (pp. 296-302). New York, NY: Oxford University Press.

Knaus, C. (2016, December 10). Australian chosen by Trump once called president-elect a "marketer of fantasy." *The Guardian.* Retrieved from https://www.theguardian.com/us-news/2016/dec/11/donald-trump-australian-role-in-administration

Langston, N. (2010). *Toxic bodies: Hormone disruptors and the legacy of DES.* New Haven, CT: Yale University Press.

Liboiron, M. (2016). Redefining pollution and action: The matter of plastics. *Journal of Material Culture, 2*(1), 87-110.

Liboiron, M., Tironi, M., & Calvillo, N. (2018). Toxic politics: Acting in a permanently polluted world. *Social Studies of Science, 48*(3), 331-349.

Livingston, J. (2006). Insights from an African history of disability. *Radical History Review, 94*, 111-126.

Lucile Packard Foundation for Children's Health. (2018a). *Special education enrollment.* Retrieved from https://kidsdata.org/topic/95/special-needs-education-enrollment/table#fmt=1146&loc=2,320&tf=108&sortType=asc

Lucile Packard Foundation for Children's Health. (2018b). Special Education Enrollment, by Disability. Retrieved from https://www.kidsdata.org/topic/96/special-needs-education-enrollment-disability/table#fmt=246&loc=2,320&tf=108&ch=206,207,208,209,210,1415,212,211,213,215,216,214,217,218&sortColumnId=0&sortType=asc

Mansfield, B. (2012). Environmental health as biosecurity: "Seafood Choices," risk, and the pregnant woman as threshold. *Annals of the Association of American Geographers, 102*(5) 969–976.

Markowitz, G., & Rosner, D. (2013). *Deceit and denial: The deadly politics of industrial pollution.* Berkeley, CA: University of California Press.

Marks, A. R., Harley, K., Bradman, A., Kogut., K., Barr, D. B., Johnson, C. ... Eskenazi, B. (2010). Organophosphate pesticide exposure and attention in young Mexican-American children: The CHAMACOS study. *Environmental Health Perspectives, 118*(12), 1768-1774.

McRuer, R. (2006). *Crip theory: Cultural signs of queerness and disability*. New York, NY: New York University Press.

Meekosha, H. (2011). Decolonising disability: Thinking and acting globally. *Disability and Society, 26*(6), 667-682.

Molina, N. (2006). Medicalizing the Mexican: Immigration, race, and disability in the early-twentieth-century United States. *Radical History Review, 94,* 22-37.

Murphy, M. (2008). Chemical regimes of living. *Environmental History, 13*(4), 695-703.

Murphy, M. (2011). Distributed reproduction. In P. Currah & M. J. Casper (Eds.), *Corpus: An interdisciplinary reader on bodies and knowledge* (pp. 21-38). New York, NY: Palgrave.

Murphy, M. (2013). Distributed reproduction, chemical violence, and latency. *The Scholar & Feminist Online, 11*(3). Retrieved from http://sfonline.barnard.edu/life-un-ltd-feminism-bioscience-race/distributed-reproduction-chemical-violence-and-latency/

Murphy, M. (2017). *The economization of life*. Durham, NC: Duke University Press.

Nash, L. (2004). The fruits of ill-health: Pesticides and workers' bodies in post-World War II California. *Osiris, 19*, 203-219.

Nash, L. (2006). *Inescapable ecologies: A history of environment, disease, and knowledge.* Berkeley, CA: University of California Press.

National Pesticide Information Center (2010). Chlorpyrifos. Retrieved from http://npic.orst.edu/factsheets/chlorpgen.html

New York Office of the Attorney General (2003, December 15). Dow subsidiary to pay $2 million for making false safety claims in pesticide ads [Press release]. Retrieved from https://ag.ny.gov/press-release/dow-subsidiary-pay-2-million-making-false-safety-claims-pesticide-ads

Nixon, R. (2011). *Slow violence and the environmentalism of the poor*. Cambridge, MA: Harvard University Press.

Nunn, N. (2018). Toxic encounters, settler logics of elimination, and the future of a continent. *Antipode, 50*(5), 1330-1348.

Pellow, D. N. (2007). *Resisting global toxics: Transnational movements for environmental justice*. Cambridge, MA: MIT Press.

Pesticide Action Network North America. (n.d.). Chlorpyrifos factsheet. Retrieved from https://www.panna.org/sites/default/files/ChlorpyrifosFactsheet2006.pdf

Povinelli, E. (2011). *Economies of abandonment: Social belonging and endurance in late*

liberalism. Durham, NC: Duke University Press.

Puar, J. K. (2017). *The right to maim: Debility, capacity, disability*. Durham, NC: Duke University Press.

Quirós-Alcalá, L. Bradman, A., Nishioka, M., Hardly, M. E., Hubbard, A., … Eskenazi, B. (2011). Pesticides in house dust from urban and farmworker households in California: An observational measurement study. *Environmental Health, 10*(19), 1-15.

Rauh, V., Arunajadai, S., Horton, M., Perera, F., Hoepner, L., Barr, D. B., & Whyatt, R. (2011). Seven-year neurodevelopmental scores and prenatal exposure to chlorpyrifos, a common agricultural pesticide. *Environmental Health Perspectives, 119*(8), 1196-1201.

Rauh, V. A., Garcia, W. E., Whyatt, R. M., Horton, M. K., Barr, D. B., & Louis, E. D. (2015). Prenatal exposure to the organophosphate pesticide chlorpyrifos and childhood tremor. *NeuroToxicology, 51*, 80-86.

Rauh, V. A., Garfinkel, R., Perera, F. P., Andres, H. F., Hoepner, L., Barr, D. B., … Whyatt, R. W. (2006). Impact of prenatal chlorpyrifos exposure on neurodevelopment in the first 3 years of life among inner-city children. *Pediatrics, 118*(6), e1845-e1859.

Rauh, V., & Hirsh-Pasek, K. (2017, November 13). Chemical warfare on children's brains: Where environmental toxins meet education. *Brookings.* Retrieved from https://www.brookings.edu/blog/education-plus-development/2017/11/13/chemical-warfare-on-childrens-brains-where-environmental-toxins-meet-education/

Rauh, V. A., Perera, F. P., Horton, M.K., Whyatt, R. M., Ransal, R., Has, X., … Peterson, B. S. (2012). Brain anomalies in children exposed prenatally to a common organophosphate pesticide. *Proceedings of the National Academy of Sciences of the USA, 109*(20), 7871-7876.

Robbins, W. (1983, July 17). Dioxin tests conducted in 60's on 70 Philadelphia inmates, now unknown. *The New York Times.* Retrieved from https://www.nytimes.com/1983/07/17/us/dioxin-tests-conducted-in-60-s-on-70-philadelphia-inmates-now-unknown.html

Sadler. J. (2017). War contaminants and environmental justice. In S. J. Ray and J. Sibara, (Eds.). *Disability studies and the environmental humanities: Toward an eco-crip theory* (pp. 338-357). Lincoln, NE: University of Nebraska Press.

Saxton, D. I. (2015). Strawberry fields as extreme environments: The ecobiopolitics of farmworker health. *Medical Anthropology*, *34*(2), 166-183.

Shapiro, N. (2017). Attuning to the chemosphere: Domestic formaldehyde, bodily reasoning, and the chemical sublime. *Cultural Anthropology, 30*(3), 368-393.

Siebers, T. (2008). *Disability theory.* Ann Arbor, MI: University of Michigan Press.

Stern, A. M. (2006). An empire of tests: Psychometrics and the paradoxes of nationalism in the Americas. In A. L. Stoler (Ed.), *Haunted by empire: Geographies of intimacy in North America* (pp. 325-343). Durham, NC: Duke University Press.

Sze, J. (2007). *Noxious New York: The racial politics of urban health and environmental justice.* Cambridge, MA: MIT Press.

Taft, C. (2016). What is toxic? *Toxic: A symposium on exposure, entanglement, and endurance.* Retrieved from http://www.toxicsymposium.org/conversations-1/2016/3/21/3ggqmt8rnq1qslt443mibknvjdatlg

Taylor, S. (2017). *Beasts of burden: Animal and disability liberation.* New York, NY: The New Press.

U. S. Environmental Protection Agency. (2001, September 12). Chlorpyrifos; End-use products cancellation. A notice by the Environmental Protection Agency. *Federal Register: The Daily Journal of the United States*. Retrieved from https://www.federalregister.gov/documents/2001/09/12/01-22756/chlorpyrifos-end-use-products-cancellation-order

U.S. Environmental Protection Agency. (2017, March 29). EPA administrator Pruitt denies petition to ban widely used pesticide. Retrieved from https://www.epa.gov/newsreleases/epa-administrator-pruitt-denies-petition-ban-widely-used-pesticide-0

Valencia, R. (1997). Conceptualizing the notion of deficit thinking. In R. Valencia (Ed.), *The evolution of deficit thinking* (pp. 1-12). London, UK: Routledge Falmer.

Valencia, R. (2002). "Mexican Americans don't value education!": On the basis of the myth, mythmaking, and debunking. *Journal of Latinos and Education, 1*(2), 81-103.

Voyles, T. B. (2015). *Wastelanding: Legacies of uranium mining in Navajo country.* Minneapolis, MN: University of Minnesota Press.

Walker BL (2011). *Toxic Archipelago: A History of Industrial Disease in Japan.* Seattle, WA: University of Washington Press.

Whyatt, R. M., Carman, D., Perera, F. P., Rauh, V. A., Tang, D., Kinney, P. L., Garfinkel, R., Andrews, H., Hoepner, L., & Barr, D. B. (2005). Biomarkers in assessing residential insecticide exposures during pregnancy and effects on fetal growth. *Toxicology and Applied Pharmacology, 206*(2), 262-254.

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