Air Pollution and Children's Health: Environmental injustice manifested in the body

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In this paper, I will argue that we need a research agenda that responds to the physical markers of air pollution that are situated in the human body, rather than in soil or water. Specifically, I will argue that the fields of health geography and environmental justice must be brought into a dialogue so that we can move beyond traditional quantitative environmental justice frameworks which measure the physical markers that these environmental hazards have left in the soil, water, and plants in the vicinity of these locally unwanted land uses. By seeing injustice manifested bodily through health geography, particularly in the children within marginalized communities, environmental justice requires a methodology that weaves together traditional and citizen-based data with the lived experiences of children and community members who experience air pollution in varying intensity throughout time, not as an average measure. This methodology requires local measurement, communication, and understanding of real-time air quality in order to inform policy on emissions enforcement, hold polluters accountable to the community, and strategize health "remediation" interventions.

When the physical markers for measuring environmental harm and neglect are found in the lungs of children, there is a desperate need for further information about how and where the air quality is at such damaging levels. While current law has established standards for acceptable levels of pollutants in the air, many areas around the country regularly exceed those levels on multiple days out of the year. A multitude of environmental factors contribute to these increasing levels of harmful particulate matter in the air. However, the low number of air quality monitors hampers the ability of researchers to pinpoint the state and private actors which regularly violate these regulations with impunity. Looking at the studies of air pollution and its effects upon children's health and educational outcomes, as well as the current rates of asthma and illness-based school

absences, I will build the case that current research is not enacting improvement in air quality or increased enforcement of air quality violations. In light of this fact, an embodied experience of air pollution must be brought to the forefront of air pollution research, centering the sensory knowledge of marginalized communities, especially of the children who are living, playing, and going to school every day in these areas.

Environmental justice for every body?

The legacy of environmental justice (EJ) scholarship bears witness to the terrible environmental atrocities that have been wrought among marginalized communities. Community activists rallied to show injustice in the siting of polluting industrial locations. The lack of regulations around the use, storage, and disposal of toxic chemicals meant it was largely up to communities with political clout to keep them at a safe distance. Not until 1970 was the Environmental Protection Agency established and given the power to regulate the damage which industries were brazenly causing. Even with the establishment of a regulatory agency, justice was far from attained. As laws and regulations were established, they were not enforced equally at every location or in every community. Many communities were and are still left with the same strategies for voicing their opposition - protesting, community organizing, and fighting for political representation.

This paper does not have the breadth to do a full historical review of the environmental justice movement, and it has been accomplished elsewhere with thorough scholarship (Cutter 1995, Pulido 1996, Waller 2001, Walker 2009). My review will focus specifically on how environmental justice literature addresses scale, social production of space, and varying

definitions of justice. I will attempt to expose the gaps in the established body of EJ research where the frameworks of feminist and embodied geographies are needed to build a feminist epistemology of environmental justice that can speak to the heterogenous and embodied factors of air pollution.

Environmental justice has been analyzed at scales ranging from the census tract to the nation-state. Many questions posed in early reviews of EJ research are concerned with whether the disparate impacts of health hazards upon minorities meet the statistical standards of scientific hypothesis testing (Cutter 1995, Bowen 2002). These authors focus on empirical measurements, universal definitions of environmental justice, and the lack of clear cause and effect in many situations. While they claim to pursue more effective studies by finding the spatial unit or scale at which these situations can best be studied, they lack a critical lens that could reveal the racist and colonial structures which have produced the conditions at every scale. In more recent work (Scott 2016, Senanayake and King 2019), there is an exploratory look at the scale of the human body, which will be addressed at length later in this paper. By taking a critical approach to the question of scale, we are able to see the social production of space operating in multiple fields at once, as described in more detail below.

An essential development in the discussion of environmental justice has been the dialogue with critical human geography that Pulido draws into the conversation (Pulido 1996). Pulido (1996) problematizes the linear view of environmental degradation and racism, turning the causal relationship into one of simultaneous social production of space. In contrast to the strictly empirical or statistical relationship between factors, the social construction of spatial

relationships allows us to analyze the markers of race and class in the processes of economic and political systems. When we consider a temporal co-production of space, the conditions of racism and industrialization can be seen through their coexisting processes of spatial production rather than as distinct events or conditions. Through this lens we are able to not only provide a contextual framework to the quantitative work of early decades, but also begin to approach new methodologies for strategic work in environmental justice.

Environmental justice advocates have typically sought two types of justice - distributive and procedural (Sze and London 2008). Distributive justice relates to the location and density of polluting sources in relation to communities primarily consisting of poor and/or minority populations. The producers of toxic output choose where to build their facilities and cities create zoning maps for heavy industry. Governments use eminent domain to route pipelines and other infrastructure away from cities and through areas that are necessary for the survival of local indigenous communities. The disproportionate siting of these sources of pollution near communities that are also actively disempowered politically and economically means the harmful health effects of this pollution is proportionally much higher in black and brown populations.

One of the primary definitions of environmental justice relates to the procedural equality that is sought in the regulatory system, enforcement practices, and validity of testimony in court. (Sze & London 2008) Procedural justice pertains to the equal regulation and enforcement of clean air, water, and land for everyone. After decades of struggle to establish fair and enforceable regulations for the main polluting industries, a framework does exist for monitoring and

controlling air quality at toxic release facilities. However, their cumulative effects on a particular area often go overlooked, and chronic violators of air quality standards are still active, despite citations and fines against them. When regulations and laws are selectively enforced, when the speed with which polluting industries are shut down varies dramatically, and when the only experts recognized in a lawsuit are representing colonial and white supremacist sources of knowledge, procedural justice cannot be grasped. This justice is put out of reach by governments that hide or delay crucial information rather than publicizing harmful effects in real time. It is further obscured by a neoliberal economic structure that accelerates the extraction of resources and profits while destabilizing the structures which offer social services.

Procedural justice, when worked out in the legal system, must also follow the structure of liability and legal proofs of misconduct or neglect. Those who are most marginalized are also those who are least likely to have the resources to sustain a legal battle to prove that polluting entities are causing bodily harm. Additionally, the types of experts who are legitimized in the court system will often exclude the diligent record-keeping of actual physical experience of those subjected to ongoing pollution (Scott 2016). Many companies have the resources to pay the fines for polluting over the limits, and continue at the same level of pollution. In a system that is structured around industries self-reporting their outputs, and without enough regulatory power or infrastructure to effectively enforce the regulations that do exist, procedural justice is limited to those with resources, time, and access. When the population suffering from bodily harm due to pollution has also been disenfranchised and marginalized, polluting industries can continue their destructive practices with impunity. Scott points to the direction that knowledge creation and valorization must move in, for justice to be apprehended:

> To validate this experiential knowledge in its fluid merger with conventional science, we need to find a way to counter the epistemologies of mastery that pervade legal proceedings and rule-making institutions. Those proceedings and institutions continue to focus on precise measurement and strict, linear notions of causation. They implicitly adopt the idea of a universally translatable truth to be found by individual, interchangeable autonomous subjects working alone. A negotiated empiricism, attenuated by transcorporeality, instead puts forward the possibility that experiential knowledge is robust because of its intersubjectivity, not in spite of it. (Scott 2016, 280)

Spaces of air pollution

While the detrimental effects of air pollution exposure have been documented through multiple medical studies, this information has not been leveraged against the industries and systemic patterns that cause the most vulnerable to develop serious respiratory illnesses. Children are one of the most vulnerable populations to air pollution, and yet their safety and health has not been prioritized through meaningful changes to transportation, heavy industry, or poor housing. Air pollution is categorized as "a risk factor for both acute and chronic respiratory disease" for children by the World Health Organization (WHO 2020). Since it is listed as a risk factor which worsens existing health conditions, it is not recognized as a primary cause of illness or death. A landmark inquest in the United Kingdom is challenging this assumption, with a legal case that, if successful, would allow air pollution to be listed as a cause on the death certificate of a nine-year-old girl who lived in one of London's hotspots of diesel particulate matter ("Inquest", 2019).

The field of health geography has focused primarily upon distribution and access to health services, while medical geography is more akin to the epidemiological study of the spread of disease (Kearns and Moon 2002). As the field of health geography has found its place in broader context of research, Kearns and Moon (2002) also noted some omissions in this field, particularly the engagement with literature on the body and with theories of risk in public health. This omission has created a space where studies on air pollution, listed as a risk factor for other illnesses, is studied from many different perspectives, including health, social sciences, environmental justice. Each of these modes of research could address the specific harmful effects of air pollution on children, but the interdisciplinary approach that would naturally emerge from this overlapping area of interests has not coalesced. As the following studies will demonstrate, air pollution has a detrimental effect on children's health, disproportionately affects children of racial minorities, and is linked to higher school absenteeism and lower educational attainment.

In 2009, a study on air pollution, family, and neighborhood environment was conducted in Los Angeles. Focusing on three types of air pollution - ozone (O3), particulate matter (PM2.5 and PM10), and carbon monoxide (CO) - and the rates of asthma among children, the study concludes that higher rates of CO, which generally indicate heavier traffic pollution, were linked with higher rates of asthma in children. As part of their conclusions, they also noted the issues of spatial distribution with the air monitors, since traffic pollution in particular is extremely localized and might not have registered on a nearby air monitor. Additionally, their findings indicate that the health realities of non-English speaking families may be under-represented, posing a challenge to telling the whole story on asthma exposure and experience among children of non-English speaking families (Wilhelm et al 2009)

One study that utilizes geographic information systems (GIS) to analyze the spatial distribution of diesel particulate matter (DPM) in relation to lung cancer and asthma rates in Massachusetts is particularly informative. In this study, researchers found that asthma rates by town corresponded with areas with high rates of diesel particulate matter. In addition, they also considered which neighborhoods were listed as environmental justice regions (classified as household income at 65% or less of that state average and 25% of the population that are immigrants, minorities, or have low English proficiency). All of the environmental justice neighborhoods in the Boston area were found within town DPM hotspots (McEntee 2008).

Another study based in Toronto, Ontario analyzed the relationship between the birthplaces of children with atopic asthma and traffic-related air pollution. This study found the connection between location at birth to be particularly significant, as more than two thirds of the cases had moved residences between birth and the time of the study, reducing the chance of the results being related to factors in later childhood. In the results, the clusters of birth location of atopic asthma cases were either fully or partially explained by traffic-related air pollution. Other factors which may not have been picked up on in this study include differences in socioeconomic level, as well as other spatial conditions such as the air quality in the home (Shankardass 2015).

As many of the above studies have highlighted, the GIS analysis of asthma and air pollution in the Bronx emphasizes the need for better data and methodology around the distribution of air pollution health risks. While Mantaay (2007) points to many medical studies that show the negative health effects of air pollution, the gaps in reporting from Toxic Release Inventory (TRI)

facilities means that linking actual cases of respiratory illness to specific sources is still a long way from being possible. Additionally, the cumulative effects of multiple sources of hazardous air pollutants are often aggregated at a scale (county or tract) that doesn't allow for the granular level of data necessary for a health risk analysis (Mantaay 2007, USEPA 2003). The cumulative moments of exposure from large or small facilities result in real bodily harm, but are difficult to prove (Scott 2016, Lewis 2005).

In addition to establishing the geography of respiratory health, research has also linked elevated levels of air pollution to illness-related absenteeism among schoolchildren (Mohai 2011). A study conducted in Seoul, South Korea linked illness-related absenteeism with increased levels of PM2.5, ozone (O3), and sulfur dioxide (Park et 2002). Another study based in Los Angeles looking at six months of absentee rates and levels of various air pollutants found that levels of O3 were particularly correlated with increased illness-related absenteeism (Gilliland et al 2001). Further emphasizing this relationship is a study based in Utah in which the air pollutant PM10 was linked to higher hospitalization rates for respiratory illness among children, with the elevated air pollution and hospitalizations lining up with steel mill activity (Pope 1991).

While some of these studies have recommendations for research and policy to build upon their findings, the field of health geography is still missing an actionable directive for mitigating the health risks of air pollution or a methodology that will make environmental justice a reality for those suffering from or at risk of chronic respiratory illness. Because of the lack of empirical data on hazardous air pollutants at a higher resolution, linking respiratory illness cases to the sources of contaminants is extremely difficult. Additionally, the temporal aspect of air pollution

complicates the relationship between the body and environment, suggesting a constitutive relationship with room for uncertainties, rather than one that requires the body and environment to be separate and static (Garnett 2017).

The body bears the evidence of the impacts of air pollution on respiratory health. However, in both distributive and procedural justice, that bodily knowledge is difficult to spatially correlate with the sources of something as mutable as air pollution. One research agenda could be to implement more fine-tuned air quality measurement with more air quality sensors, and to gather more detailed medical histories for those who suffer from respiratory illness (Wilhelm 2009). However, while this would undoubtedly produce a more clear picture of our current situation, air quality devices and medical records cannot measure history, social frameworks, or relationships. While this quantitative data is a valuable resource, relying strictly upon these statistics reinforces the legitimization of experts over experience, especially the bodily experiences of Black, Latinx, indigenous, and other marginalized and intersecting identities.

Embodying the risks of air pollution

Early feminist theories of bodies in geography dealt with essentialist and constructivist approaches, arguing for using the 'real' anatomical/biological body as the starting point or doing away with the biological body as a reinforcement of social constructs, respectively (Longhurst 1997, 489). This argument is just one of many dualisms within which the body is often placed in geography. One common separation between mind and body assigns logic, reasoning, and access

to universal knowledge to masculinity and assigns impulse, vulnerability, and limits of a physical place to femininity (Longhurst 1997).

The importance of place and bodies is integral to the work of Lefebvre, who laid the groundwork for many geographers to work in a dialectic of co-production of space and place (Lefebvre 1974). As feminist geographers built upon and utilitized these ideas of production of space to address other social and cultural forms of production. Among these is the idea of the body, in turn focusing on the ways in which society and culture produce the body in various forms, as well as how the body produces place and culture (Grosz 1995). In this vein, geographers have followed the path of embodied locality and its significance in the process of producing space.

This thread of research has generally focused on themes of human geography, including social reproduction, race and gender identities, and phenomenological experiences of senses and emotions (Senanayake and King 2019). However, this is complicated by the "porous boundary between the body and environment", which is seen in the body as an ecological space, the microbiome, and the complex human-environment relationship (Senanayake and King 2019, 719). This porousness of boundaries is acutely seen in the ways in which the body literally breathes in and absorbs the air of its environment, with particulate matter and chemicals entering the body itself and interacting with lung tissue.

Air pollution is perceived in many ways besides just the scientific measures of particles. There are sometimes smells associated with pollutants, there are visible particles both in the air in the form of smog and in deposits of dust on surfaces, and there are bodily reactions such as eye

irritation, breathing difficulty, and headaches (Scott 2016, Bickerstaff and Walker 2003). In 2009, government officials in Madrid covertly moved the monitors that recorded the highest levels of air pollution which, once it became known, revealed the uncertainty in where air is or isn't being monitored, and what could potentially be missing in these quantitative measures (Calvillo 2018). While scientific study necessitates ongoing monitoring, the centering of statistical measures reveals the following truth:

> "Distortions of power remain; the policy dominance of techno-scientific definitions is unquestioned, obliterating and marginalizing the corporeal, placed and practised understandings of most people." (Bickerstaff and Walker 2003, 60)

Other possibilities of synthesizing air pollution experience with air quality measurements are possible. Through the mediating circumstances of an air pollution monitor scandal in Madrid, new ways of sensing air pollution were activated in public participation (Calvillo 2018).

Many of the themes of embodiment in a composition of spaces ties helpfully into the issue of temporality in geographic study. This idea complicates the static spatial context that most geographic analyses are based upon by acknowledging the importance of human mobility to spatial problems (Kwan 2013). A body is not a static entity, and in its aliveness, exists throughout continuous moments of time. Each of those moments is experienced fully, not as an average over a day or a year (Park and Kwan 2017). Taking averages of air quality measurements leads to an obscuration of the lived moments in time that bodies located in that space experience. In writing about temporality, lay knowledges, and climate change, Brace and Geoghegan (2010) conclude that space and time need to be considered on a more localized scale related to the experiences of the people who actually live in that specific landscape.

Locating children in air pollution research

When considering the health implications with the embodied and temporal experience of children and air pollution, a few themes that have been discussed need to be addressed. First, while children are especially vulnerable to the effects of air pollution, accurately capturing their health outcomes is a challenging temporal problem. Air pollution increases the incidence of low birth weight and preterm birth, directly affecting the temporal and spatial circumstances of newborns and their mothers (Wang et al 1997; Bobak, 2000; Ritz et al 2007). Studies have shown the negative health outcomes for children whose birthplace is situated in a high air pollutant area (Shankardass 2015), and for school age children exposed to particulate matter and carbon monoxide (Wilhelm et al 2009). These localized, short-term air pollution exposures at young ages become a temporal concern when mobility and density of air pollutants construct vastly differing moments in a day. Many long-term effects may be missed, if a study doesn't have a longitudinal component that captures these varying spatio-temporal concerns.

Second, because children's mobility is dependent upon their parents or guardians and could include factors such as school, childcare, and play, the same kind of quantitative studies that focus primarily upon places of residence and work won't capture the type of world a child is navigating. While quantitative measurements of air quality near the places in which a child primarily resides may be helpful, there are other narratives that are carried in the lived experience of childhood amidst detrimental environmental factors. For the children of Mexican descent in the San Joaquin Valley of California, living in close proximity to the fields sprayed

with pesticides has serious implications on their respiratory health (Schwartz et al 2015). This area exhibits higher asthma rates among children ages 1-17 than the national average. As part of a multi-site ethnographic study, Schwartz (2015) reports that the only places for the children of farm workers to play and be physically active are in the fields and roads where pesticides are being aerially sprayed. The various coinciding social, racial, and environmental factors that affect these children's mobility, their habits of movement, and their ability to play freely are not captured in frameworks like those used in existing EJ research (Collins et al 2011).

Finally, quantitative health studies often don't address the systemic concerns of what is visible and what is obscured in their data gathering. Pulido (1996, 2017) addresses these issues in the ongoing exposition of environmental racism as a process that is continually producing white supremacist economic and political structures. For example, in a study of childhood asthma and the neighborhood, social, and environmental contexts in Houston, the quantitative analysis was based on those who had outpatient and/or inpatient records at two health centers (Brewer et al 2017). While this allows for a large sample size to analyze statistical measures, those who have an undocumented immigration status or who may avoid health institutions for fear of oppression will not show up in this narrative. Considering that the Hispanic population is considered as a whole and not conceived of with more nuance as in a similar study in El Paso (Collins et al 2011) which considered white/non-white Hispanic categories as well as other socioeconomic factors, there is a potential for systemic exclusion of the most marginalized groups. These systemic factors should inform how environmental justice is defined and pursued for the spatio-temporal context of children.

Proposed research direction: Family-based participatory research

I propose that air pollution research needs an interdisciplinary, multimodal, and family-based participatory research methodology integrated into research projects that are conceived as quantitative or qualitative. The field of environmental justice needs to expand its methodologies, and rather than operate in a binary of quantitative versus qualitative, to emphasize the groundedness and reliability of narrative experience, as well as the uncertainties and weaknesses of quantitative data that is produced largely within a system upholding white supremacy. As a counterbalance, it is imperative that where possible, data is produced by those who are most marginal to the systems of power. While statistics regarding an individual's health are powerful markers of the effects of pollution, they exist within the context of family and community, and should not be taken as isolated experiences.

Community-based participatory research (CBPR) is a method of gathering data and framing research. This method allows for the members of the community to provide input into the focus, structure, and goals of a research project (Lewis 2005). By inviting input from those who normally exist as subjects of study, the researcher is moving into a more collaborative approach. While power structures and privileged viewpoints still affect these studies as much as others, there is a possibility for the voices of those in the community to show up more directly in the results.

What is needed is an expansive family-based participatory research in which family and community experiences are considered as constitutive of each other, where one age or voice is

not seen as existing without the context of those who share a spatial and temporal relationship with them. The experiences of children and youth need to be directly included, as they are also being affected in the present temporal context by air pollution and other factors (Davis and Jones 1996). Many research agendas reinforce negative assumptions and characterizations of the lived experiences within communities that may not actually reflect the views of those within the community. In conducting interviews with indigenous youth regarding their associations with the reservation, many saw their connection to the reservation as one that was uplifting and positive, contrary to many health narratives that focus on the lack of resources and perceived toxicity of that space (Wood et al 2018). When the children of farm workers in the San Joaquin Valley were engaged in a photovoice project, moments in place and space were able to be captured that presented a unique perspective on how children navigate risk in their spaces of play (Schwartz et al 2015). In these snapshots of the lived experience, the story of children's quality of life and health is demonstrated in a testimony that is both more expansive and more acute than a statistic of asthma diagnosis can capture.

In the area of research on environmental justice, air pollution, and negative health effects upon communities, community-based participatory research could reach into some of the spatial and temporal uncertainties and provide a more direct narrative of the bodily experiences of air pollution. Especially where other research studies have failed to answer the questions or capture the effects which are most salient to community members, participatory research offers the opportunity for people to share their own data and observations of health experiences (Allen 2018). In the study of a town near Marseille, France, Allen describes how a strongly participatory science is a necessary part of establishing new 'knowledge justices' (Allen 2018,

949) that do not see the only answer for uncertainties or insufficient quantitative data as falling back upon what experts will deem satisfactory. As seen in discussion of the legal processes of environmental justice, this citizen science is not legitimated by the power structures of scientific and legal systems (Schwartz et al 2015).

With the proliferation of home air monitoring devices and health data collection through wearable tech, Gabrys (2016) astutely notes that the amount of data now gathered and available to individuals has increased significantly. Many questions have arisen about the privacy and usage of this data by the companies that collect it. The hierarchy of who collects the data and how legitimate is based on that structure shows some potential for disruption. However, even though individuals are being encouraged to gather this data and pay more attention to their health and to the air they breathe, there is little recourse for them to pursue change when political and regulatory powers are actively engaged in protecting the industries and systems that produce pollution (Gabrys et al 2017). However, this data that is gathered through methods of citizen sensing may still be effective to assert claims upon resources needed for that community, records of infractions to advocate for increased enforcement, and narratives that provide a fuller picture than the limited data available from current EPA monitoring (Gabrys et al 2016).

The field of environmental justice must contend with the fact that current systems of political and economic power are structured to uphold a white supremacist value structure (Pulido 2017) and that the path to justice may lie outside of the bounds of traditional academic scholarship. When the communities who live downwind from refineries and petrochemical plants in southern Ontario began to document and narrate their experiences of harmful air, they were asserting a

bodily expertise into the realm of statistical uncertainty provided by the incomplete and missing information from official air monitoring systems (Scott 2016). They collected their own air samples, kept detailed logs of physical symptoms of polluted air, and contested the opinion of "breathable" air that was provided by the experts - but were unable to effect wide scale change in their efforts (Scott 2016). While this may not come as a surprise to those who are advocating and working for environmental justice within this white supremacist system, it urgently reinforces the need for those with the power of research and academia to turn the hierarchy on its head, prioritize the family and community over the individual, share the stories of the alternative narratives of actual spatial and temporal relationships with land and air, and bear witness to the to the air that children are often struggling to breathe.

Conclusion

Efforts to obtain environmental justice have generally focused on two vectors - the distribution or spatial allocation of environmental hazards, and the procedure for enforcing standards of environmental health and protection (Sze and London 2008). However, the physical manifestations of environmental injustice and environmental racism are not the product of a linear historical narrative, but rather an ongoing process of social and spatial production of white supremacy (Pulido 2017). The result of this process leads to a system of expert knowledge that upholds capitalist neo-liberal economic power, ignoring the uncertainties and subjectivities within itself, and dismissing the uncertainty of citizen data and firsthand experiences of air pollution (Gabrys et al 2016). Several studies have linked exposure to air pollution to respiratory illness in children and illness-related school absenteeism, causing damage not only to children's

health, but also to their educational outcomes. While this health-related data is well-researched and documented, there are spatial and temporal uncertainties that inhibit those studies from speaking to all of the complexities of the context of air pollution. A deeper understanding of the relationship between bodies and space must be brought to bear upon the air pollution research, in the complexity of temporal experiences and porous human-environment boundaries (Senanayake and King 2019). Black, Latinx, and immigrant children are bearing the effects of air pollution in their bodies from the time of birth, and yet their experiences do not translate into procedural or distributional justice, for the many reasons listed in this paper. As members of the community, they need to be integrated into a family-based participatory research method that extends beyond the binary of quantitative and qualitative methods, creating space for alternate narratives and community-produced data. The empirical methods and research that links children's respiratory health to air pollution has not affected substantial change in the levels of particulate matter, carbon monoxide, and ozone that is found in the air. If anything, these levels have increased in recent years in many US cities, not decreased. It is imperative that further research recognizes that the power structures which continually create a spatial and social context of white supremacy will not be torn down with their own weapons. Environmental justice research that recognizes the body as the monitor of air pollution levels (Scott 2016) must situate itself in the context of knowledge and experience which is produced in the marginalized spaces of children's racialized experiences of breathing.

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